Shelter

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

D4.2 – Strategy for early recovery 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 Executive summary

This report describes the overall strategy for building an Early Recovery Roadmap to increase the resilience of historic areas. It provides simple guidelines for identifying effective pre-planned strategies to be quickly mobilized, allowing greater attention to event-specific, post-disaster recovery actions that must be performed according to prevailing conditions and newly-generated data.

The methodology has been built starting from the documents available at the international level, such as the Sendai Framework and other practical guides (e.g., *Pre-Disaster Recovery Planning, Guide for Local Governments,* developed by FEMA in 2017; *Guidance note on recovery: Pre-Disaster Recovery Planning* developed by UNDRR in 2012) to reduce disaster risk and build resilience that has been collected and investigated at the beginning of this activity. Strengths and weaknesses of such documents have been analysed, to understand to what extent the SHELTER Strategy for Early Recovery Roadmap could rely on existing policy instruments, but also which were the limitations that have so far prevented local and national governments from largely and easily applying them.

As a result, a new methodology has been proposed to develop a sequence of actions for decision-makers in the form of a Roadmap, conceived as an operative tool, easy to understand, not strictly linked to a specific national system, able to adapt to local governments, and capable of referring to the other existing planning tools. Therefore, the innovative aspect of the Roadmap is its operational and schematic approach, which includes step-by-step instructions to be followed in improving the resilience of historic areas.

The Roadmap consists of five phases. They are namely:

1. Phase 1 – GETTING STARTED: Form a collaborative Planning Resilience Team
2. Phase 2 – COLLECTING NECESSARY DATA: Understand the situation
3. Phase 3 – FORMULATING RECOVERY GOALS AND PRINCIPLES
4. Phase 4 – DEVELOP THE PLAN: Establish post-disaster recovery organisation and outline recovery-specific decisions
5. Phase 5 – ASSESSING AND MAINTAINING THE PLAN: review and update

The structure of the Roadmap is summarized as follows:

- Each phase includes one or more key activities, defined by analyzing, modifying and complementing the contents of the reference documents. The key activities are intended to serve as additional considerations to expand the five steps and focus more specifically on the challenges for successful pre-disaster recovery planning.
- In addition, sub-activities for each key-activity have been specified, to provide more information regarding the necessary steps to follow. These additional notes

are helpful to better specify the objectives of the activity and the actions that should be taken.
- For this reason, each sub-activity has a related checklist: it summarizes the detailed activities of the roadmap and can be used to understand if each element has been taken into account, track progress and identify what could be done or implemented.
- In addition, the Roadmap is provided with a flowchart. It is a tool used to make the planning process clear and simple for governments and policymakers who undertake the process towards the development of their own Roadmap. The flowchart helps to understand operations to perform in each phase, people to involve, tools and methods to apply and organizational systems to develop.

The Strategy for Early Recovery Roadmap has proved to be a useful tool for understanding which actions should be performed and in which order to design a Pre-Disaster Recovery Plan to follow to improve the resilience of historic areas. Key findings of this process are summarised below:

- To form a collaborative team to work on the Pre-Disaster Recovery Plan is essential. Interactions among stakeholders contribute to a common operational understanding;
- Planning decisions impact not only infrastructures and the environment but primarily society. Involving the community in the process helps in building awareness of disaster risk, validating the activities of the plan and establishing a relationship for response and recovery;
- Understanding the current situation means identifying the hazards, performing the disaster risk assessment and identifying the community's priorities. Previous disaster events, their impacts and all the existing planning tools should be investigated first to define the known and potential vulnerabilities
- Completing the evaluation of the community's capacities and comparing identified needs to established roles and existing community resources allows the community to identify gaps. This will serve as the basis for resource and partnership decisions throughout the recovery planning process.
- Short, medium and long-term goals should be defined in a participatory, inclusive and negotiated manner. Involving the public in defining how the recovery goals and objectives are to be achieved will enable greater public trust and collaboration in government-led recovery efforts.
- After assessing the community's capacity, detecting resources, organizational processes, preventive actions for effective resilience, roles and responsibilities is at the basis of the Pre-Disaster Recovery Plan. A Local Disaster Recovery Manager that organizes, coordinates and advances recovery at the local level should be appointed.
- After the manager has been selected, it will be important to decide which agencies and organizations will serve in leadership roles and which will provide support during the post-disaster recovery process.

- Coordinated messaging is a challenge in any disaster. The Planning Resilience Team should determine who is responsible for delivering effective public communication, how this will be accomplished, how often, in what formats, and for what purposes.
- The coordinating organization and partners identified for each recovery strategy should meet to determine how the strategy will be operationalized. The team prevent the plan remains simply a document, assigning responsibility for each action to one or more entities, creating deadlines for completion of pre-disaster actions, and specifying the resources required and the means to obtain them. The type of actions to be taken will depend on the strategy.
- Recovery strategies and actions will need to be monitored, evaluated and adjusted over time, to be effective. Regular assessments and willingness to redirect them are important to obtain long-term success. The monitoring of the plan will assess if strategies and actions are consistent with the community's post-disaster vision and recovery goals.

Alongside the general Roadmap, five tailored Roadmaps have been built, one for each SHELTER Open Lab. They have been designed, on the one hand, to get feedback on the clarity of the overall strategy, the steps and activities of the general Roadmap, to detect possible bottlenecks or weaknesses that may affect its applicability; on the other hand, 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. For this purpose, inputs from other project activities and tasks have been used, together with the feedback provided directly by the OL coordinators and OL technical partners during dedicated bilateral meetings with UNIBO.

This work contributes to the SHELTER operational framework, on the one hand, by providing practical guidelines to be followed by organisations who are seeking a clear and effective way to build their Pre-Disaster Recovery Plan; on the other hand, by increasing the knowledge of what is currently available at a territorial level for each SHELTER Open Lab, what has been already completed in terms of key activities, and on what they should focus their attention towards the adoption of a Pre-Disaster Recovery Plan able to increase the resilience of communities and historic areas.

The results will be further used especially for drafting the guidelines for integrated cultural heritage management, climate change adaptation and disaster risk management within existing planning policies and tools, and for developing the web-based step-by-step guide that will include all relevant steps to be performed to implement SHELTER framework to build low carbon systemic resilience.

2 Introduction

2.1 Aims and objectives

The overall objective of SHELTER project is to establish cross-scale, multidimensional, data-driven and community based operational knowledge framework for heritage-led and conservation-friendly resilience enhancement and sustainable reconstruction of historic areas to cope with climate change and natural hazards.

Disaster risk management (DRM) and climate change adaptation (CCA) strategies share common approaches and methodologies around concepts such as resilience, vulnerability and capacity. At the same time, integrating Cultural Heritage (CH) into the wider framework of sustainable development is recognized as fundamental, especially towards the resilience of Historic Areas (HA).

Based on the available international reports developed recently around the concepts of Disaster Risk Reduction (DRR), Build Back Better (BBB) and Pre-Disaster Recovery Planning (PDRP), the main aim of this report is to develop guidelines for identifying strategies and actions to be quickly mobilized when a disaster event occurs. The Task integrates CH within planning policies and tools of SHELTER case studies, linking DRM, CCA and heritage site management and including stakeholders' inputs.

The general roadmap has been conceived to enable hazard-related effective coordination and decision-making structures and facilitates rapid yet informed action in an otherwise demanding and chaotic environment. The general roadmap has been then tested in each case study through Open Labs, and tailored to the specific site characteristics. The roadmap in SHELTER has been developed as a new schedule, more operative, easier to understand the tool, not strictly linked to a specific nation's system, able to adapt to local governments and capable of referring to the other existing planning tools.

Specific objectives have been defined according to the key steps conducted through the development of this Task, which are outlined as follows:

1. Identify the available strategies and guidelines at international and European level to address Disaster Risk Reduction (DRR), Build Back Better (BBB) and Pre-Disaster Recovery Planning (PDRP), in order to build the SHELTER methodology for early recovery roadmap on existing knowledge;
2. Develop a common Roadmap, conceived as an operative and easy-to-understand tool that makes explicit which steps and activities have to be taken to improve the existing policy instruments, or to build a new Pre-Disaster Recovery Plan;
3. Validate the methodology and tool by tailoring the general Roadmap to the 5 SHELTER OLs.

The main target group of the report are policy makers who have the power to influence the way DRM, CCA and CNHM are embedded into the policy instruments at various planning scales.

2.2 Relations to other activities in the project

The SHELTER project has been structured in 9 Work Packages (WP) (see Figure 1) to ensure fertilization among the different steps and partners. The main objective of WP4 (Collaborative planning for building low carbon systemic resilience) is to define protocols, plans and guidelines for all the DRM phases based on the data driven platform (WP5) and the participatory process of the case studies (Open Labs in WP7) and operationalize them in an incremental documentation strategy through Resilience ID.

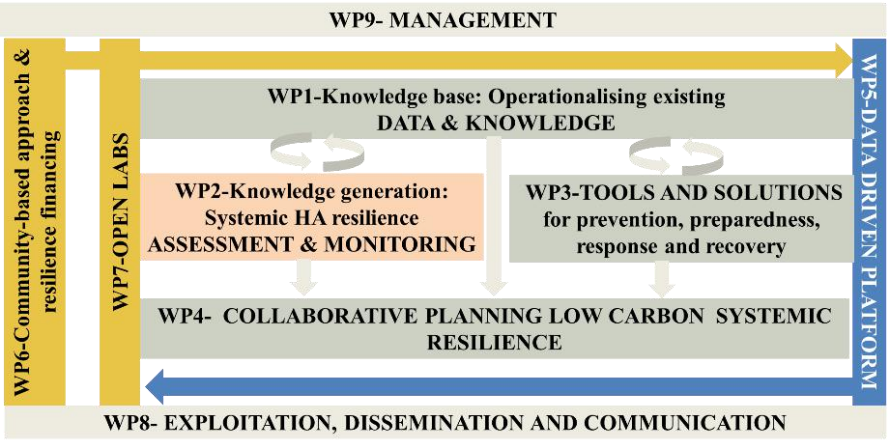

Figure 1: PERT chart of SHELTER

Within WP4, the aim of Task 3.4 (Strategy for Early Recovery Roadmap) is to provide a guideline for identifying acceptable and effective and pre-planned strategies to be quickly mobilized, allowing greater attention to event-specific, post-disaster recovery actions that must be performed according to prevailing conditions and newly-generated data.

Task 4.3 has a strong relation with all the WPs in the SHELTER project. The main relationships are the following:

- **WP1:** Knowledge base: operationalizing existing data and knowledge.
  Data identified within **Task 1.1** for each OL and knowledge collected through the **Task 1.2** have been considered valuable inputs for one or more key activities which constitute the breakdown of the steps of the roadmap.
- **WP2:** Knowledge generation: Systemic HA resilience assessment and monitoring.
  The systemic resilience assessment and monitoring framework for HA of **Task 2.2** and the specific hazard risk assessment performed in **Task 2.5** have been considered valuable inputs for one or more key activities which constitute the breakdown of the steps of the roadmap. Moreover, **Task 2.7** has been taken into account to verify the early recovery roadmap methodology in this Task is aligned with the SHELTER methodological framework.
- **WP3:** Tools and solutions for prevention, preparedness, response and recovery.
  Among the tools developed in WP3, the chatbot (**Task 3.5**) has been identified as a valuable input for one or more key activities which constitute the breakdown of the steps of the roadmap.

- **WP4:** Collaborative planning for building low carbon systemic resilience.
  This Task relies significantly on the knowledge collected in **Task 4.2** through the literature review and the OL questionnaires about the available policy instruments and planning tools in each OL. Moreover, **Task 4.1** has been considered a valuable input for one or more key activities which constitute the breakdown of the steps of the roadmap. Furthermore, the results from this Task will be further used especially for drafting the guidelines for integrated cultural heritage management, climate change adaptation and disaster risk management within existing planning policies and tools (**Task 4.5**). Finally, this Task will be strongly linked with the step-by-step guide to be developed in the last year of the project in **Task 4.6**.
- **WP5:** Data Driven Platform.
  The Data Drive Platform developed in WP5 has been considered as one of the main sources of data to be able to complete the steps and activities foreseen by the roadmap. In particular, Historic Areas Resilience Dashboard (**Task 5.3**) has been identified as a valuable input for one or more key activities which constitute the breakdown of the steps of the roadmap.
- **WP6:** Community-based approach and resilience financing.
  The results from the adaptive governance scheme mapping of **Task 6.3** and the resilience business and financing landscape geography for Open Labs currently under development in **Task 6.6** have been considered valuable inputs for one or more key activities which constitute the breakdown of the steps of the roadmap.
- **WP7:** Open Labs.
  The 5 SHELTER OLs are functioning as knowledge generators and evaluation frameworks, demonstration sites, long-term thinking transition labs and learning environments. They have been consulted in the last stage of the Task and they have provided valuable feedback on the tailored Roadmaps UNIBO has built based on the inputs the OLs have already provided to other project tasks.
- **WP8:** Exploitation, communication and dissemination
  SHELTER dissemination and exploitation activities have been considered a valuable input to take into account when it comes to disseminate the Pre-Disaster Recovery Plan, which is one of the key activities foreseen by the Roadmap.

2.3 Report structure

The report is structured as follows:

Section 2 establishes the purpose of the deliverable and the links with other work packages and tasks of SHELTER project.

Section 3 introduces and summarizes the main international reference documents used to structure the early recovery roadmap methodology.

Section 4 presents the SHELTER early recovery roadmap in the form of a Pre-Disaster Recovery Roadmap (PDRR), intended as a sequence of actions for decision-makers and

detailed step-by-step instructions to be followed for improving the resilience of historic areas.

Section 5 includes the application and tailoring of the general roadmap described in Section 4 to the 5 OLs. These results in 5 tailored early recovery Roadmaps, taking into account the inputs provided by other project Tasks and the outcomes generated so far from SHELTER project.

In **Section 6** the conclusions are drawn.

In **Section 7** the references are provided.

2.4 Contribution of partners

The following table (Table 1) details the contribution of each partner:

Partner	Contribution
UNIBO	WP4 leader, responsible for the coordination of the task and deliverable. Responsible for definition of the overall approach, methodology, interactions with OLs and for drafting the document. Responsible for providing feedback on Ravenna OL.
TECNALIA	Review of the whole document. Responsible for providing feedback on Galicia OL.
POLITO	Review of the whole document.
UNESCO & SAVA	Responsible for providing feedback on Sava River Basin OL.
GAL	Responsible for providing feedback on Galicia OL.
DORD & IHED	Responsible for providing feedback on Dordrecht OL.
EKO & SEFER	Responsible for providing feedback on Seferihisar OL.

Table 1. Contributions of partners

3 Policy framework and guidelines at international level

3.1 The Sendai Framework

According to the UNDRR Terminology (UNDRR, 2017), DRR strategies and policies define goals and objectives across different timescales and with concrete targets, indicators and time frames. At the global level, the main policy instrument of DRR has been set out at the Third United Nation World Conference on Disaster Risk Reduction and it has been called the *Sendai Framework for Disaster Risk Reduction 2015-2030* (Sendai Framework), signed by 196 Member States of the United Nations in March 2015.

The Sendai Framework, successor instrument to the *Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters*, is the first major agreement of the post-2015 development agenda and provides Member States with concrete actions to protect development gains from the risk of disaster. It clearly indicates the need to achieve goals, including the adoption of plans to reduce the risk of natural disasters at local level, activation of local communities' activities, and cooperation of public administration with operative organizations and entities (Goniewicz and Burkle, 2019).

The expected fundamental outcome of this policy is "*the substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries*" (UNDRR, 2015).

The United Nation agreement also provides four different Priorities for Action, which consist in concrete activities:

Priority 1 - Understanding Disaster Risk

Policies and practices for disaster risk management should be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment. Such knowledge can be leveraged for the purpose of pre-disaster risk assessment, for prevention and mitigation and for the development and implementation of appropriate preparedness and effective response to disasters.

Priority 2 - Strengthening disaster risk governance to manage disaster risk

Disaster risk governance at the national, regional and global levels is of great importance for effective and efficient management of disaster risk. Clear vision, plans, competence, guidance and coordination within and across sectors, as well as the participation of relevant stakeholders, are needed. Strengthening disaster risk governance for prevention, mitigation, preparedness, response, recovery and rehabilitation is, therefore, necessary and fosters collaboration and partnership across mechanisms and institutions

for the implementation of instruments relevant to disaster risk reduction and sustainable development.

Priority 3 - Investing in disaster risk reduction for resilience

Public and private investment in disaster risk prevention and reduction through structural and non-structural measures are essential to enhance the economic, social, health and cultural resilience of persons, communities, countries and their assets, as well as the environment. These can be drivers of innovation, growth and job creation. Such measures are cost-effective and instrumental to save lives, prevent and reduce losses and ensure effective recovery and rehabilitation.

Priority 4 - Enhancing disaster preparedness for effective response, and to «Build Back Better» in recovery, rehabilitation and reconstruction

The steady growth of disaster risk, including the increase of people and assets exposure, combined with the lessons learned from past disasters, indicates the need to further strengthen disaster preparedness for response, take action in anticipation of events, integrate disaster risk reduction in response preparedness and ensure that capacities are in place for effective response and recovery at all levels. Empowering women and persons with disabilities to publicly lead and promote gender equitable and universally accessible response, recovery, rehabilitation and reconstruction approaches is key. Disasters have demonstrated that the recovery, rehabilitation and reconstruction phase, which needs to be prepared ahead of a disaster, is a critical opportunity to "Build Back Better" (BBB), including through integrating disaster risk reduction into development measures, making nations and communities resilient to disasters (UNDRR, 2015).

The Sendai Framework works hand in hand with the other 2030 Agenda agreements, including *The Paris Agreement on Climate Change*, the *New Urban Agenda* (Habitat III), and the *Sustainable Development Goals* (SDGs). These international agreements shape policy and implementation strategies at the global level for climate change, Disaster Risk Reduction and development (UNDP, 2020).

At present, the main issue related to these agreements is that they are not explicitly binding, so each government is free to establish the legal framework and pursue the desired policy (Sobieraj and Zacharczuk, 2016).

3.2 Examples of practical guides to reduce disaster risk and build resilience

In the last years, at international level different organizations have developed important tools and strategies in the form of guideline, applying the Sendai Framework Priority Action 2: Strengthening disaster risk governance to manage disaster risk. The outcomes of these guidelines are operational frameworks, strategic work plans and detailed plans, called Pre-Disaster Recovery Plans (or similarly), that aim to prepare heritage and societies to respond to unplanned events and to recover after a disaster occurrence in the best way possible and with fewer losses.

As DRR implementation, the planning process proposed is a community-based one, so it involves every part of society, from the first to the last step of the operation. It is a chance for communities to establish how they will manage important recovery issues, like how to re-establish economic and cultural essential activity, how they will rebuild, how to keep the essential services up and running and where to locate temporary housing. Thanks to this process, communities can, and should, prepare before being impacted by a disaster to ensure that the consequences will not become devastating[1].

Here below the most relevant guidelines are reported:

1. Guidance note on recovery: Pre-Disaster Recovery Planning;
2. Pre-Disaster Recovery Planning Guide for State Governments;
3. Pre-Disaster Recovery Planning Guide for Local Governments;
4. How To Make Cities More Resilient: A Handbook For Local Government Leaders;
5. Taking Sendai Forward - Strategic work plan on Disaster Risk Reduction & Resilience 2017 – 2020;
6. Comprehensive Preparedness Guide 101: Developing and Maintaining Emergency Operations Plans.

They are presented in the following sub-sections in order to investigate the main characteristics, such as strengths that can take as a reference for the SHELTER Early Recovery Roadmap, and limitations that the project methodology for Roadmap should overcome.

3.2.1 Guidance note on recovery: Pre-Disaster Recovery Planning

Before the Third UN World Conference on DRR in Sendai (2015), in 2012 UNDRR published *Guidance note on recovery: Pre-Disaster Recovery Planning*, one of the first guideline of this kind. The guide presents a series of steps (Figure 2) to initiate and sustain Pre-Disaster Recovery Planning (PDRP) in order to ensure that communities BBB following a natural disaster. It offers guidance on developing a planning framework and attempts to present the key steps and considerations at a broad level, to present relevant examples, and to provide recommendations grounded in the experiences of others. The Pre-Planning process, that is cyclical, scalable and participating, is divided in six main steps.

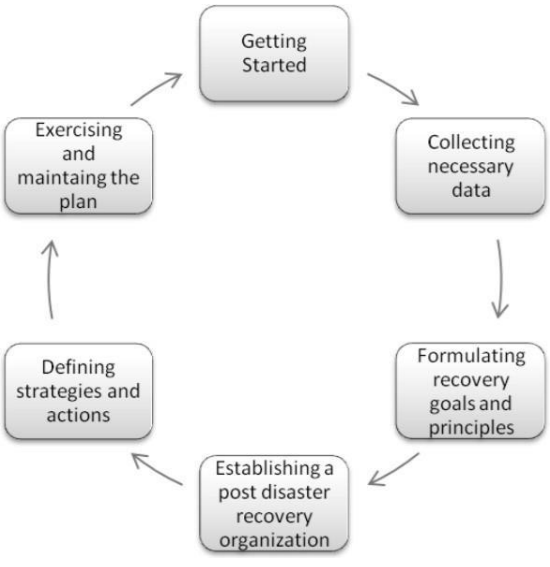

Figure 2. The Planning Process, from Guidance note on recovery: Pre-Disaster Recovery Planning (UNDRR, 2012)

[1] Planning for Hazards: Pre-Disaster Recovery Planning (Colorado Department of Local Affairs, 2019). Available at: https://planningforhazards.com/pre-disaster-recovery-planning

It is intended to help government officials working in small communities or across an entire nation, to define and follow a process to pre plan for disaster recovery, and thereby strengthen their own future recovery efforts and outcomes (UNDRR, 2012).

3.2.2 Pre-Disaster Recovery Planning Guide for State Governments

In 2016 FEMA[2] published the *Pre-Disaster Recovery Planning Guide for State Governments* (Figure 3). This planning guide is designed to help States and territories prepare for recovery by developing Pre-Disaster Recovery Plans that follow a process to engage members of the whole community, develop recovery capabilities across State government and nongovernmental partners, and ultimately create an organizational framework for comprehensive State recovery efforts.

Developing a Pre-Disaster Recovery Plan equips States with the structure, process, roles, and policies to be well prepared to meet the unique recovery needs of each of their communities. A State recovery plan sets the stage for necessary strategic, operational, and tactical post-disaster planning, actions, and processes. It also facilitates capacity building by preparing State-level agencies and recovery stakeholders to anticipate the needs of post-disaster recovery management and planning challenges prior to the

Figure 3. Comprehensive Preparedness Guide Planning Steps, from Pre-Disaster Recovery Planning Guide for State Governments (FEMA, 2016)

[2] The Federal Emergency Management Agency (FEMA) is an agency of the United States Department of Homeland Security. The agency's primary purpose is to coordinate the response to a disaster that has occurred in the United States and that overwhelms the resources of local and state authorities. Available at: https://www.fema.gov/

disaster. A recovery plan prepares State agencies to more easily adapt to new post-disaster roles needed to manage new or modified sources of State and Federal recovery resources.

This guide for State governments presents considerations for following the six-step planning process that are specific to Pre-Disaster Recovery Planning at the State level.

It also focuses more specifically on the challenges and unique partnerships necessary for successful and inclusive recovery (FEMA, 2016).

3.2.3 Pre-Disaster Recovery Planning Guide for Local Governments

Pre-Disaster Recovery Planning Guide for Local Governments, published in 2017, is another FEMA guide (Figure 4).

It was designed to help local governments prepare for recovery by developing Pre-Disaster Recovery Plans that follow a process to engage members of the whole community, develop recovery capabilities across governmental and non governmental partners, and create an organizational framework for comprehensive local recovery efforts.

Pre-disaster planning is an important process that allows a comprehensive and integrated understanding of community objectives. This guide aid in understanding the

Figure 4. Comprehensive Preparedness Guide Planning Steps, from Pre-Disaster Recovery Planning Guide for Local Governments (FEMA, 2017)

key considerations and process that a local government can use to build a community's recovery capacity and develop a Pre-Disaster Recovery Plan. It promotes a process in which the whole community fully engages with and considers the needs and resources of all its members.

Using a step-by-step discussion of the planning process, this guide introduces principles underlying preparedness and recovery planning, describes topics to be considered as part of the planning process, and identifies specific organization-building and planning activities.

As in Pre-Disaster Recovery Planning Guide for State Governments, the planning process introduced and discussed in this guide directly aligns with the process outlined in Developing and Maintaining Emergency Operations Plans: Comprehensive Preparedness Guide (CPG) 101.

The result of this process is a Pre-Disaster Recovery Plan that provides a local-level framework for leading, operating, organizing, and managing resources for post-disaster recovery activities. This guide also assists communities with the creation of other tools, such as recovery ordinances, that support recovery activities (FEMA, 2017).

3.2.4 How To Make Cities More Resilient: A Handbook For Local Government Leaders

How To Make Cities More Resilient: A Handbook For Local Government Leaders (published in 2017 by UNDRR) is designed primarily for local government leaders and policy makers. It seeks to support public policy and decision making so they can implement activities to reduce disaster risk and build resilience. It sets out practical guidance for putting the "Ten Essentials for Making Cities Resilient", into action.

The Ten Essential for Making Cities Resilient (Figure 5) is an operational framework of the Sendai Framework at the local level, developed to accelerate its implementation.

Essentials are the critical and independent steps that need to be undertaken at the local level to build and maintain resilience.

Since the first edition (2012) of the Handbook, local governments all over the world have come up with concrete ways to reduce disaster risk and boost resilience. There is no one-size-fits-all solution to achieve resilience. Local government actors will determine how these actions apply to their own contexts and capacities. In the urban setting, risk management is an essential part of building resilience.

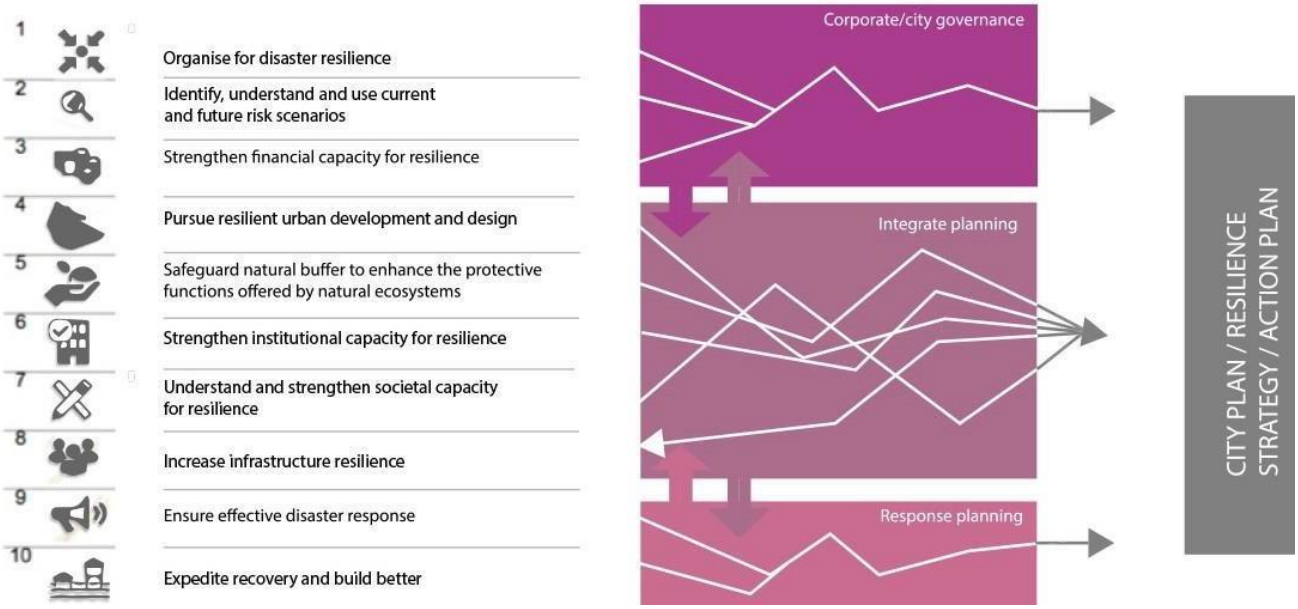

Figure 5. The Ten Essential, from How To Make Cities More Resilient: A Handbook For Local Government Leaders (Gencer, 2017)

This Handbook showcases the knowledge and expertise of several Campaign cities. It responds to the call for better access to information and knowledge resources, and tools to effectively deal with the impacts of natural hazards and climate change. It provides an overview of key strategies and actions as part of an overall sustainable urban development strategy (Gencer, 2017).

3.2.5 Taking Sendai Forward - Strategic work plan on Disaster Risk Reduction and Resilience 2017-2020

Taking Sendai Forward - Strategic work plan on Disaster Risk Reduction & Resilience 2017 – 2020 is another implementation of Sendai Framework. It is an IOM[3] strategic approach to Disaster Risk Reduction (DRR) and resilience. It presents a set of concrete actions that IOM undertook over the course of 2017-2020 to assist Member States' efforts to reduce risk and strengthen resilience. In doing so, this document brings to light the relevance of mobility as a fundamental human process that can increase risk, but can also be central to building resilience in contexts of sudden or slow-onset disasters, whether natural or man-made.

IOM's objectives aim to achieve the overall goal of the Sendai Framework. The strategic work plan on DRR and resilience proposes 5 strategic outcomes (Figure 6):

[3] IOM is the International Organization for Migration, an intergovernmental organization that provides services and advice concerning migration to governments and migrants, including internally displaced persons, refugees, and migrant workers. It is the principal intergovernmental organization working in the field of migration. IOM's stated mission is to promote humane and orderly migration by providing services and advice to governments and migrants (https://www.iom.int/).

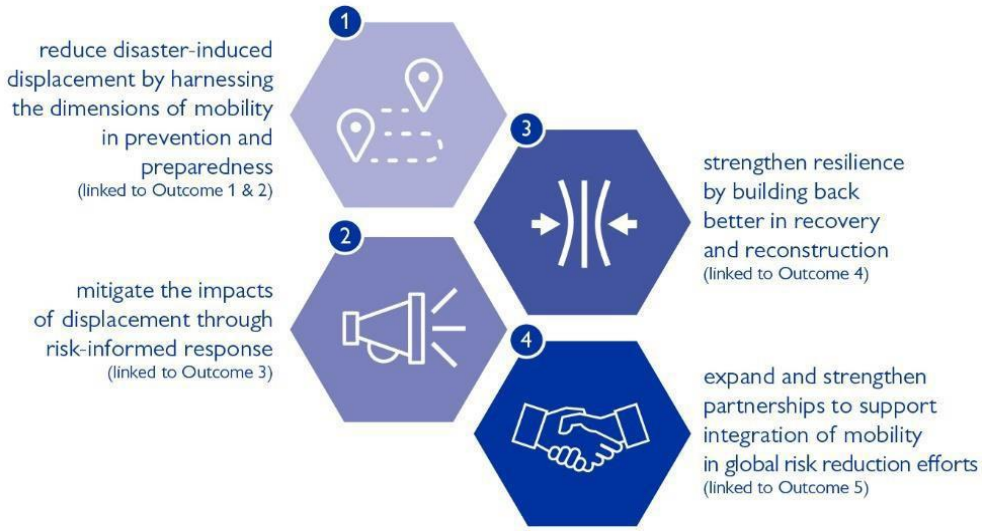

Figure 6. IOM's objectives, from Taking Sendai Forward - Strategic work plan on Disaster Risk Reduction & Resilience 2017 – 2020 (IOM, 2017)

1. Reduced risk of disaster-induced displacement through effective disaster prevention;
2. Improved capacity of States and communities to effectively anticipate, respond to, and recover from, the mobility consequences of disasters, through strengthened disaster preparedness – 'building capacity for response';
3. Rapid, effective and risk-informed emergency response that addresses the immediate needs of disaster-affected populations, as well as secondary risks generated as a result of prolonged displacement – 'managing mobility in a disaster';
4. Improved disaster resilience in recovery and reconstruction – 'fostering resilience in recovery';
5. Expanded and strengthened partnerships to promote the integration of mobility in efforts to reduce risk and build resilience (IOM, 2017).

3.2.6 Comprehensive Preparedness Guide 101: Developing and Maintaining Emergency Operations Plans

CPG 101 is a FEMA guide on fundamentals of developing Emergency Operations Plans (EOPs) that are connected to planning efforts in the areas of prevention, protection, response, recovery, and mitigation. The CPG 101 is a key resource in the emergency management community, it describes the steps (Figure 7) to produce an emergency operation plan, possible plan structures and components of a base plan and its annexes.

There are three versions of CPG 101, the last one published in September 2021 (version 3.0). While much of the core content in CPG 101 Version 2.0, released in 2010, remains fundamentally valid, a refresh of the document allows for inclusion of additional concepts, principles and strategies. The updated content in CPG 101 Version 3.0 is based on practitioner feedback, identified lessons learned and successful practices from real-world events and exercises that can inform the planning process. CPG 101 shows how

emergency operations plans connect to planning efforts in five different mission areas: prevention, protection, mitigation, response and recovery. Version 3.0 of this guide emphasizes the importance of including the private and non-profit sectors in planning activities and incorporates lessons learned as well as pertinent new doctrine, policy and laws. The guide provides methods for planners to:

- Conduct community-based planning to engage the whole community through a planning process that represents the actual population in the community and involves community leaders and the private sector;
- Develop plans by identifying and analyzing risk;
- Identify operational assumptions and resource demands;
- Prioritize plans and planning efforts to support the transition from development to execution for any threat or hazard;
- Integrate and coordinate efforts across all levels of government, the private sector and non-profit organizations.
- Successful operations occur when organizations know their roles, understand how they fit into the plan and can execute the plan. CPG 101 provides the foundation for state, local, tribal, territorial and insular area emergency planning in the United States.

The planning process proposed is flexible and allows communities to adapt it to varying characteristics and situations. Small communities can follow only the steps that are appropriate to their size, risks and available planning resources. At each step, jurisdictions should consider the impact of their decisions on training, exercises, equipment and other requirements. Although planning involves a consistent set of activities, the process is not strictly linear and includes iterative cycles of review and collaboration. Outputs from each step lead to greater understanding by the planning team and leadership of key issues and shape the contents of the plan (FEMA, 2021).

Figure 7. Steps in the Planning Process, from Comprehensive Preparedness Guide 101: Developing and Maintaining Emergency Operations Plans (FEMA, 2021)

3.3 How to move forward

All the strategies and guidelines presented in Section 3.2 have been conceived to facilitate the implementation of the Disaster Risk Reduction, and the Sendai Framework principles. To do this, they are presented in the form of guidelines or manuals with detailed step-by-step instructions to be followed and application examples. However, they also present some limitations that have so far prevented local and national governments from largely and easily applying them.

- **The Guidance note on recovery:** Pre-Disaster Recovery Planning (Section 3.2.1), developed in 2012, is designed to help governments of small communities and entire nations, however, its method is not so easy to apply due to the generic description of the planning process and steps.
- As defined in its title, the **Pre-Disaster Recovery Planning Guide for State Governments** (Section 3.2.2) focuses on strengthening resilience at national level by developing a PDRP, but it leaves out almost entirely the local organizations that have certainly a key role in DRM and community's resilience.
- Instead, the approach of the **Pre-Disaster Recovery Planning Guide for Local Governments** (Section 3.2.3) aims to help local governments, defining roles, responsibilities and stakeholders to involve, but it does not sufficiently specify the necessary inputs of each step and the regulatory planning tools to refer to. In addition, both guidelines developed by FEMA are referred to US emergency organization system, using specific terms which are not internationally recognized.
- Differently from the previous guidelines, the document called **"How To Make Cities More Resilient: A Handbook For Local Government Leaders"** (Section 3.2.4) reports quite detailed practical examples, useful to describe the correct way to apply the provided scheme, but at the same time the general description of the activities and operations results to be not clear enough.
- Furthermore, the planning **guide "Taking Sendai Forward - Strategic work plan on Disaster Risk Reduction & Resilience 2017 – 2020"** (Section 3.2.5) has been developed to assist Member States. However, also in this case, the approach results to be too generic referring to state level, and at the same time, it is too specific because it only aims to reduce risk and strengthen resilience of places linked to migratory processes.
- Lastly, the guideline "**Comprehensive Preparedness Guide 101: Developing and Maintaining Emergency Operations Plans"** (Section 3.2.6) developed by FEMA is, on the one hand, extremely linked to the US system, and on the other hand, gives limited information about the planning process phases and operative activities.

In this context, a new methodology has been proposed in the framework of SHELTER project to develop a new tool, more operative, easier to understand, not strictly linked to a specific national system, and able to adapt to local governments of different countries and capable of referring to the other existing planning tools.

4 Pre-Disaster Recovery Roadmap: five phases to build the Pre-Disaster Recovery Plan

4.1 Introduction

The task has developed a strategy for early recovery roadmap, that may be defined as follows.

> *Pre-Disaster Recovery Roadmap (PDRR)*
>
> It is a community-based planning process that allows societies and governments of the world to make cultural heritage resilient. It is a five-steps process that provide guidelines to prepare for and to respond to unplanned events and to recover after a disaster occurrence.

The PDRR provides a guideline for identifying acceptable, effective and pre-planned strategies to be quickly mobilized when a disaster happens. It allows greater attention to event-specific, post-disaster recovery actions that must be performed according to prevailing conditions and newly-generated data.

The roadmap is intended as a sequence of actions for decision-makers and it is presented in the form of operator manuals with detailed step-by-step instructions to be followed in improving the resilience of HAs.

The PDRR is built upon the results from the literature review and the guides presented in the previous chapter. From this starting point, the Task has developed a new schedule, more operative, easier to understand, not strictly linked to a specific nation's system, able to adapt to local governments of different states and continents of the world and capable of referring to the other existing planning tools.

> *Pre-Disaster Recovery Planning (PDRP)*
>
> It is a pro-active process of anticipating future recovery issues, developing a scenario-based recovery plan and building the capacity to improve recovery outcomes. It is any planned attempt to strengthen disaster recovery plans, initiatives, and outcomes – before a disaster occurs. The concept is built on the recognition that much can be done before a disaster happens to facilitate recovery planning after a disaster and improve recovery outcomes (UNDRR, 2012). The result of this planning process is a Pre-Disaster Recovery Plan (PDRP).

PDRP consists of a series of decisions and actions (UNDRR, 2012) to be taken both before and after a disaster, in order to:

- Identify and establish shared recovery goals, objectives and strategies – to guide post-disaster decision-making, ensure that relief and recovery activities align with long-term development goals, address actual needs, and enhance resilience to future disasters;
- Develop and have ready the capacity to plan, initiate and manage – an efficient, adaptive, and well-coordinated recovery effort that progresses towards the recovery goals.

The *Pre-Disaster Recovery Planning, Guide for Local Governments,* developed by FEMA in 2017 (FEMA, 2017), proposed several key concepts, as a foundation for successful pre- and post-disaster recovery planning, developed through years of experience implementing community disaster recovery efforts.

Recovery activities are locally driven

The PDRP should be driven by the community. In particular, the responsibility for this planning process is on local governments, businesses, NGOs, and their community members. In some cases, there could be a lack of capacity, resources, staff, or other factors that made the activity difficult for the community. External partners may need to support recovery planning, outreach, communication, and implementation activities. However, this support must still be guided by community leaders, the local government, and a broad range of community stakeholders. Care must be taken to ensure that support is applied where necessary, beginning immediately after disaster strikes and continuing through challenging redevelopment decisions.

Recovery planning is a broad, inclusive process

Preparedness is a shared responsibility, and it is important that planning be a whole-community activity: it must involve individuals, businesses, non-profit groups, schools and academia, media outlets, cultural, environmental, and recreational organizations, and all levels of government. Participation of all parts of the community strengthens the planning process and facilitates an equitable implementation after a disaster strikes. Recovery planning must also involve stakeholders and elements of local government not typically involved in emergency planning. It is important also to include people with disabilities and others with access and functional needs from the beginning to prevent delays or exclusion in post-disaster recovery efforts.

Recovery planning builds upon and is integrated with other community plans

The planning process should consider the results of other applicable planning processes, such as hazard mitigation plans, comprehensive plans, housing plans, and other planning documents. They have already defined a wide range of goals for the community and represented the shared priorities of community members. In this way, the recovery planning is built directly on the community's existing plans, which helps to inform recovery planning efforts and capitalize on past planning efforts.

Recovery planning is aligned with hazard mitigation

Both hazard mitigation and recovery have the same key goal: to increase resilience. Although these two activities differ in many elements, the shared overall aim allows mitigation and recovery planning to reinforce one another and leverage greater benefits within the development of plans. Because both mitigation and recovery planning can be carried out pre-disaster, there is generally time to coordinate activities and promote more widespread attention to resilience. Recovery planning can support hazard mitigation and resilience building by providing a post-disaster mechanism for implementation and integration into the roles, processes, and decisions that occur in the complex recovery environment. Additionally, much of the analysis and information involved in the development of mitigation plans can be used to inform the pre-disaster recovery planning effort.

Recovery planning is goal-oriented

The PDRP allows beginning the recovery process immediately after a disaster, in a more easy and effective manner. The development of recovery planning goals helps recovery stakeholders understand existing capabilities and gaps. It is very important to develop realistic goals: common, mutually agreeable, and strategic goals established early in the planning process reduce conflicts when the plan is implemented in a post-disaster setting.

Recovery planning is scalable

Recovery plan components should be scaled to meet both the capacity of the community to manage its own recovery process and the level of risk the community faces. Communities with minimal resources to manage recovery, but many vulnerabilities and risks should emphasize partnership-building, while communities with a high capacity to manage recovery should emphasize local roles and responsibilities in facilitating the recovery process.

Starting from these considerations and the results of Chapter 3, the PDRR is developed. It consists of five phases (Figure 8). Each phase consists of one or more activities, defined analyzing and reworking the contents of the reference guides. The innovative aspect of the Roadmap is its operational and schematic approach.

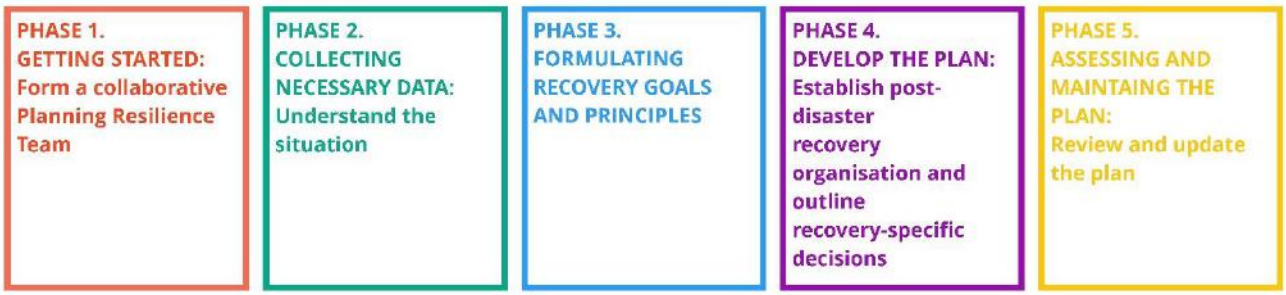

Figure 8. The five phases of the Pre-Disaster Recovery Roadmap

4.2 Pre-Disaster Recovery Roadmap flowchart

The early recovery roadmap developed in this Task is provided with a flowchart (Figure 9). It is a tool used to make the planning process clearer for governments and policymakers who undertake the roadmap and to simplify its applicability. The flowchart helps to understand operations to perform in each phase, people to involve, tools and methods to apply and organizational systems to develop.

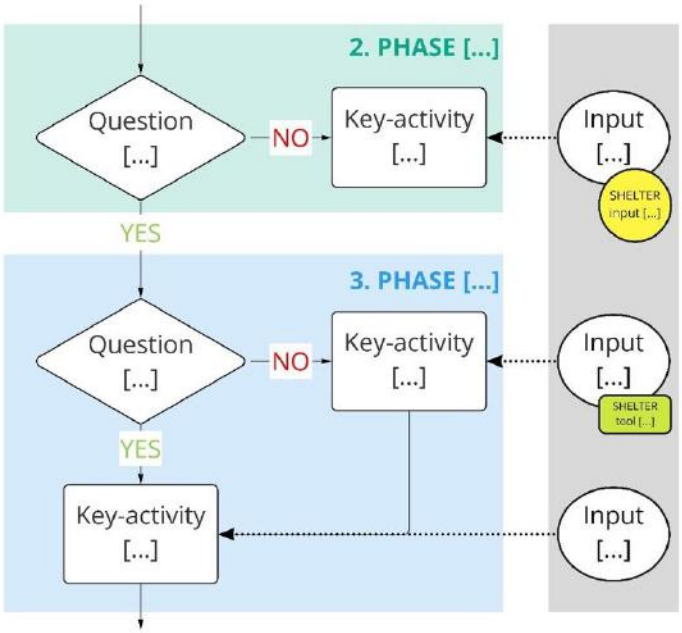

Figure 9. Flowchart template

Starting from the first key-activity, the method employed is to ask questions, inserted in white rhombuses to be answered with "YES" or "NO"; according to the type of response, the connecting arrows specify the key-activity to be carried out first. In addition, the activities are connected to white circles, on the right of the flowchart, that report the necessary inputs to complete the operations. In some cases, the inputs are linked to a yellow circle or a green rectangle: the first identifies the SHELTER Tasks or Work Packages, that can provide information, data and outputs useful for the specific inputs; the second defines the SHELTER tools representing the input itself.

Each of the five-phase is characterized by colour and the key-activities in the same phase are included in a rectangle of the colour that identifies the phase.

The next pages show the SHELTER Roadmap flowchart (Figure 10-12).

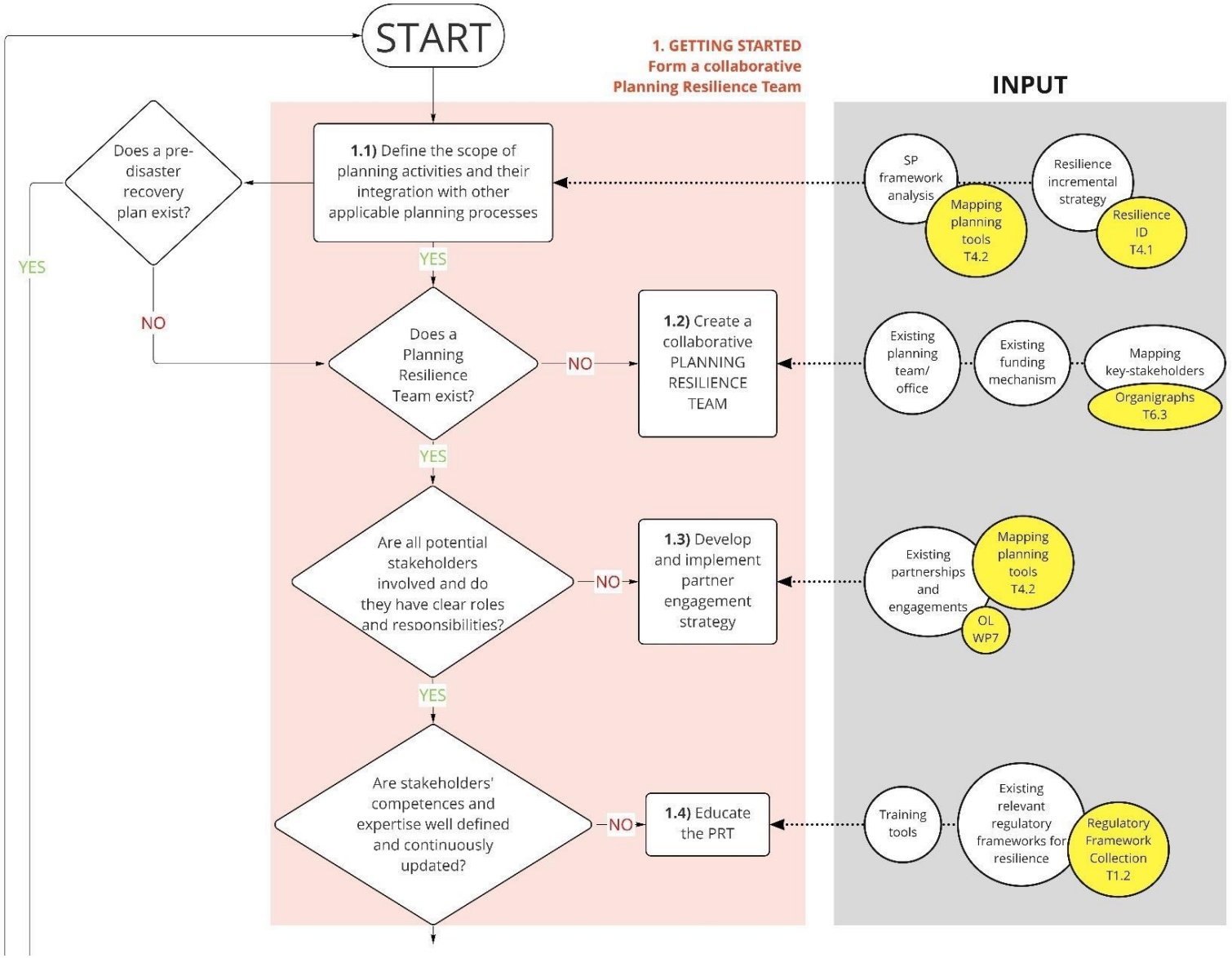

Figure 10. Pre-Disaster Recovery Roadmap flowchart – phase 1

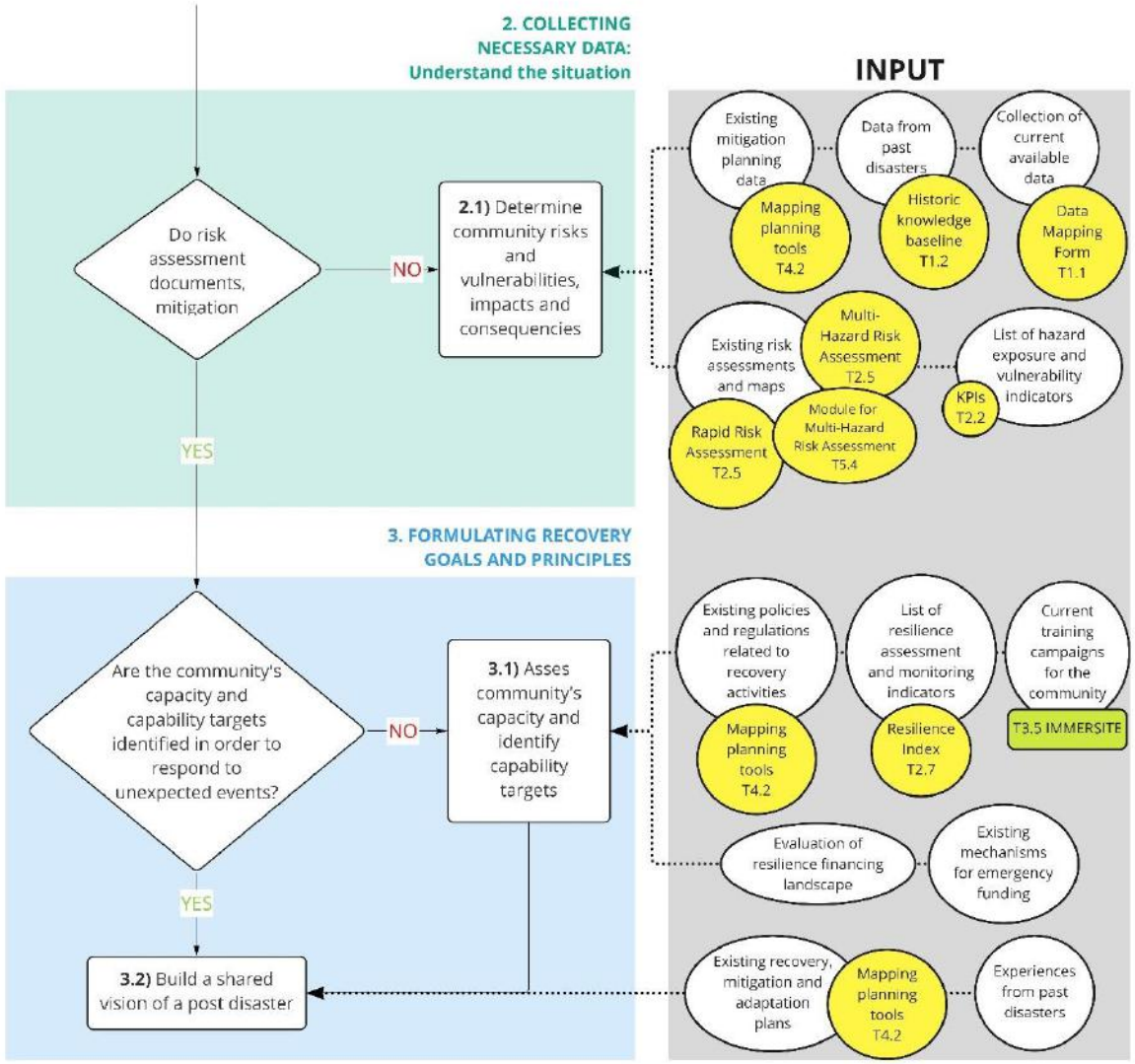

Figure 11. Pre-Disaster Recovery Roadmap flowchart – phase 2-3

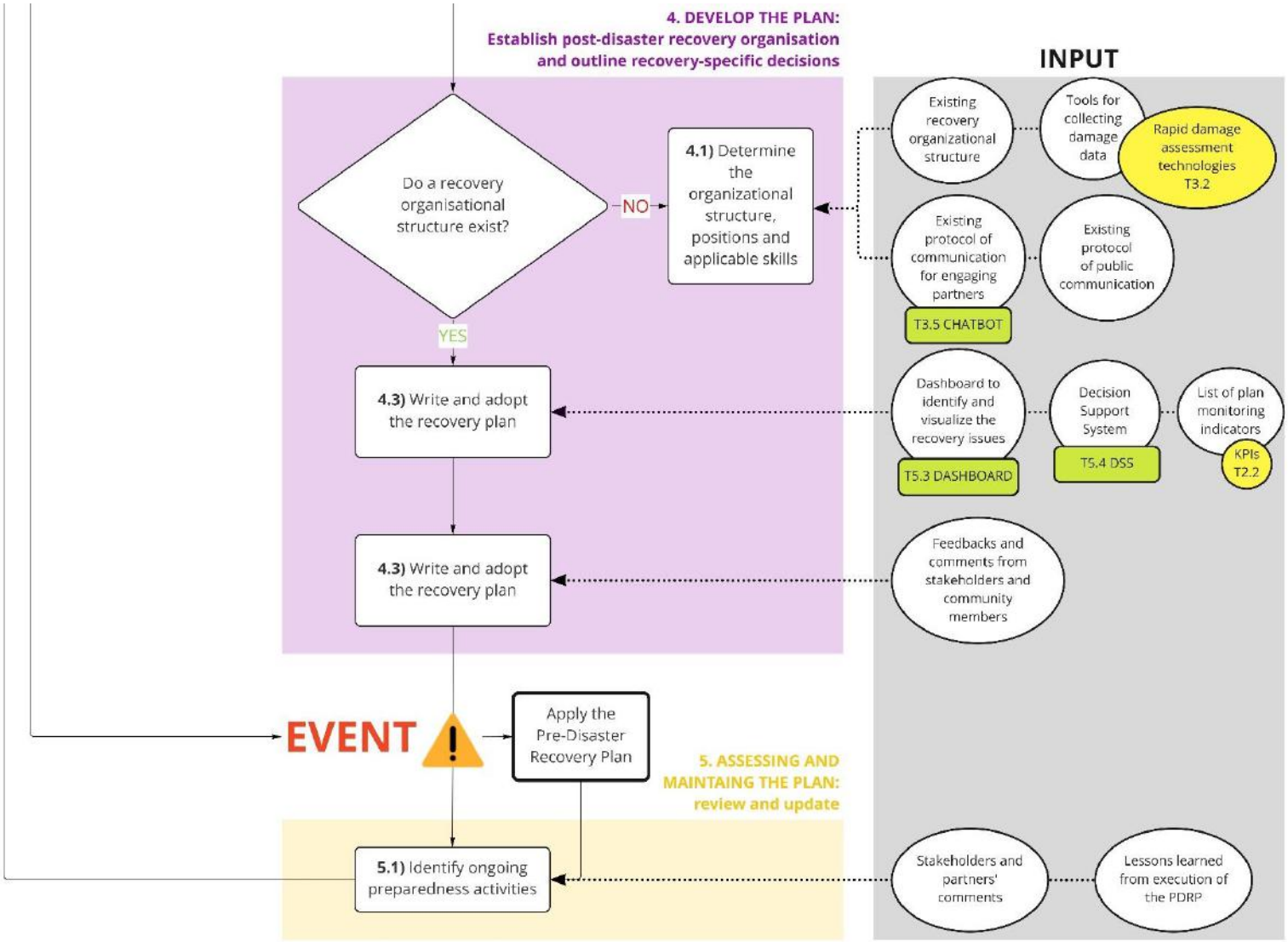

Figure 12. Pre-Disaster Recovery Roadmap flowchart – phase 4-5

4.3 The five phases

The planning process, as mentioned above, is divided into five different phases (Figure 13). The first four steps focus on the elaboration of the PDRP, instead, the fifth phase consists of the implementation and maintenance of the previously developed plan, after the disaster's occurrence. Each phase has one or more key-activities. The key-activities are intended to serve as additional considerations to expand the five steps and focus more specifically on the challenges for successful pre-disaster recovery planning. To make clearer what is to be achieved by each key-activity, the overall aim is described.

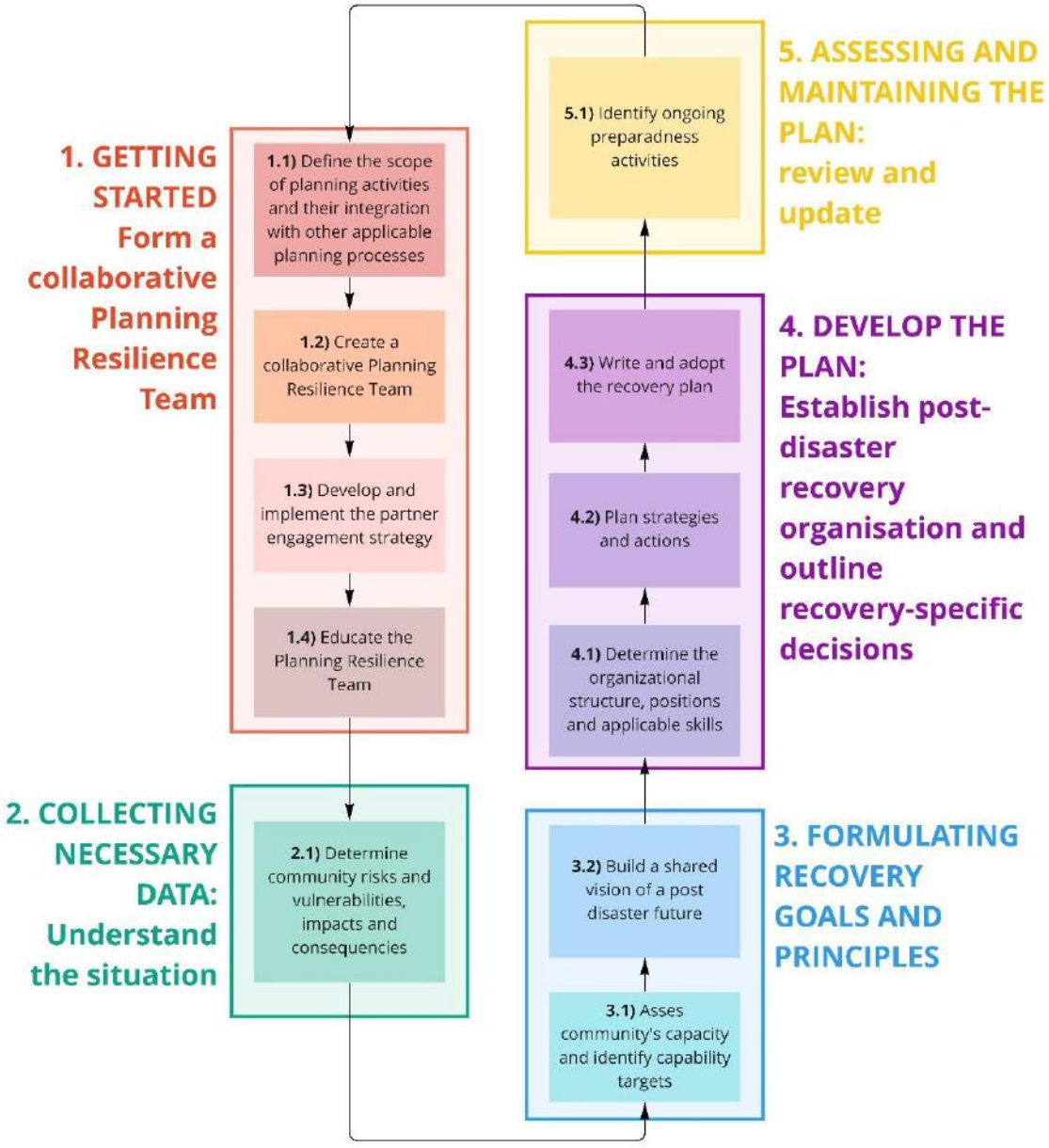

Figure 13. The five phases and their key-activities in the PDRR

The five phases are provided with input-output diagrams, which summarize in a schematic way the inputs and the outputs of the activities. The schematic drawing (Figure 14) is divided into three boxes: the inputs of the phase analysed, the phase's key-activities, the phase's outputs. In each input box, there could be external input, identified by with circle with black contour line, and output derived from a previous activity, that became input for the step concerned in the diagram, distinguished in a white circle with a coloured contour line and the reference to the phase. In order to clarify and make the understanding easier, connecting arrows provided with "in" or "out" writings link the activities with the respective circles.

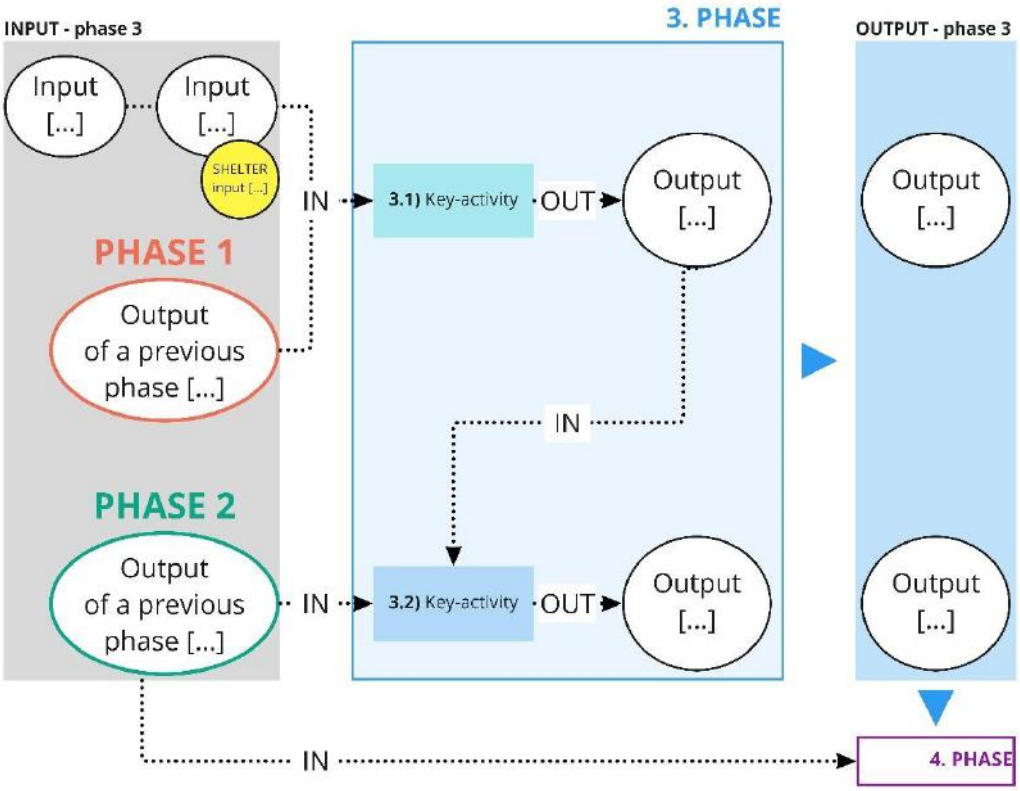

Figure 14. Input – output diagram template

In addition, the development of the roadmap contains also some sub-activities for each key-activity, that provide more information regarding the necessary steps to follow. These additional notes are helpful to better specify the objectives of the activity and the actions that should be taken. For this reason, each sub-activity has a related checklist: it summarizes the detailed activities of the roadmap and can be used to understand if each element has been taken into account, to track progress and to identify what could be done or implemented.

Since this roadmap is developed within the SHELTER framework, for some additional sub-activities it was possible to recognize a link with the project: the yellow circles include references to other Work Packages or Tasks in which the specific activity is already developed or on going, or references to the tool created in SHELTER, that should be used to carry out the specific activity.

Furthermore, the icons of CH and NH, taken from the SHELTER Core Vocabulary are added near some sub-activities (Figure 15): they are useful to visualize immediately in which steps or the roadmap more attention should be paid to considering specific focuses on CNH.

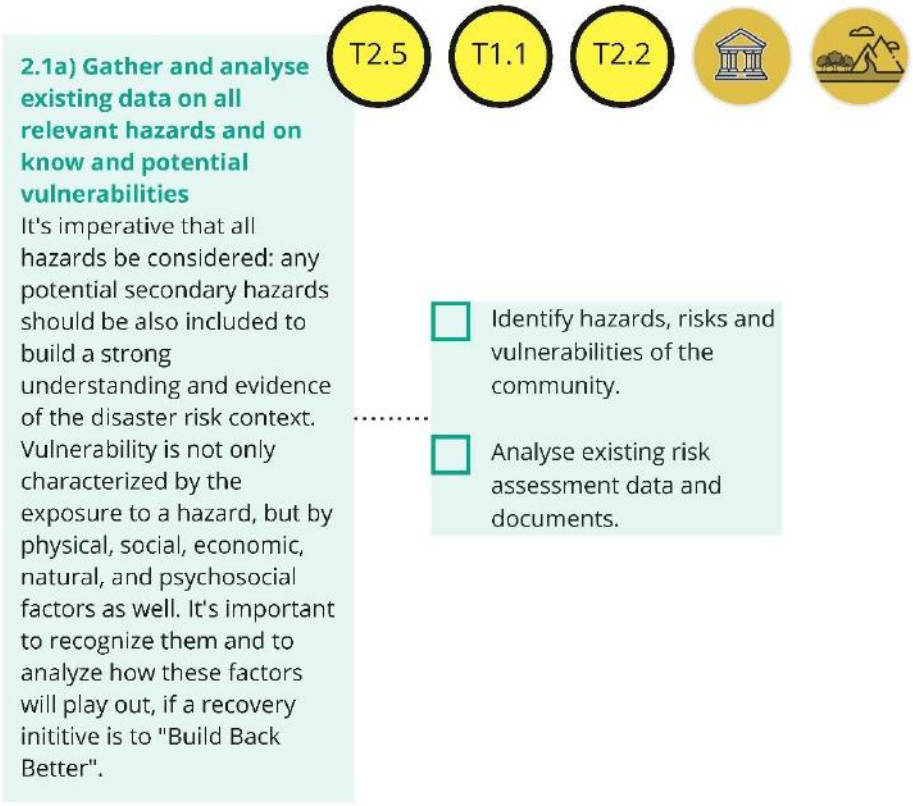

Figure 15. Example of sub-activity with the related checklist

In addition to the diagrams and the detailed descriptions of the activities, the PDRR is provided with examples applied in various location of the world in order to indicate how achieve a specific task, making the planning process clearer.

4.3.1 Phase 1 – GETTING STARTED: Form a collaborative Planning Resilience Team

The first step of the methodology for building a PDRP is "Getting started: Form a collaborative Planning Resilience Team" (Figure 16).

Planning Resilient Team (PRT)

It is a group of people who work together to lead the recovery planning process and to steer the community through the steps needed to be prepared for recovery and to enhance its resilience against a disaster.

This phase is extremely important to get started since operational planning is best

performed by a collaborative team, that can help build and expand relationships to bring creativity and innovation to planning.

A community benefits from the participation of a diverse variety of stakeholders in the planning process. The strength is to allow open discussion during this process: in fact, interactions among planners contribute to a common operational understanding (FEMA, 2021).

It is important to engage the whole community because planning decisions impact not only infrastructures and environment but primarily the society. Involving people in the process helps in building awareness of disaster risk, validating plan activities and establishing a relationship for response and recovery.

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

Define the scope and timing of recovery planning activities

As explained by the first step of the Community readiness and Resilience Toolkit[4], before any in-depth planning can begin, it is necessary to identify the scope of the recovery planning process, to determine the path forward to successfully execute the project and ensure that the community continues to thrive.

The first activity is the identification of the risk to be addressed and the definition of the geographic area to be served by recovery preparedness activities. It is also important planning the timeline for performing the resilience planning process. If the involved area is covered by local, statal, regional or multi-jurisdictional recovery plans, it is important to consider these plans because they can help establish common processes as well as facilitate mutual aid for longer-term recovery activities. Planners need to consider the current mitigation plans and hazard information when determining geographic scope.

Determine whether existing community planning documents can be leveraged or built upon to inform recovery planning

A recovery plan should not duplicate, but rather complement, key elements of recovery that are already addressed in other planning documents. The aim is to build on the community's existing plans, inform recovery planning and capitalize on past planning efforts. For this reason, it must be determined whether existing community planning documents can be leveraged. Policies and requirements that support recovery, operational processes and guidelines, key people and partners with their recovery roles and responsibilities, and their resources may be documented in the community's other existing planning documents: those elements from other planning documents should be summarized or consolidated in the pre-disaster recovery plan and referenced appropriately.

[4] The Community readiness and Resilience Toolkit is available at: https://www.coresiliency.com/resilience-step-1

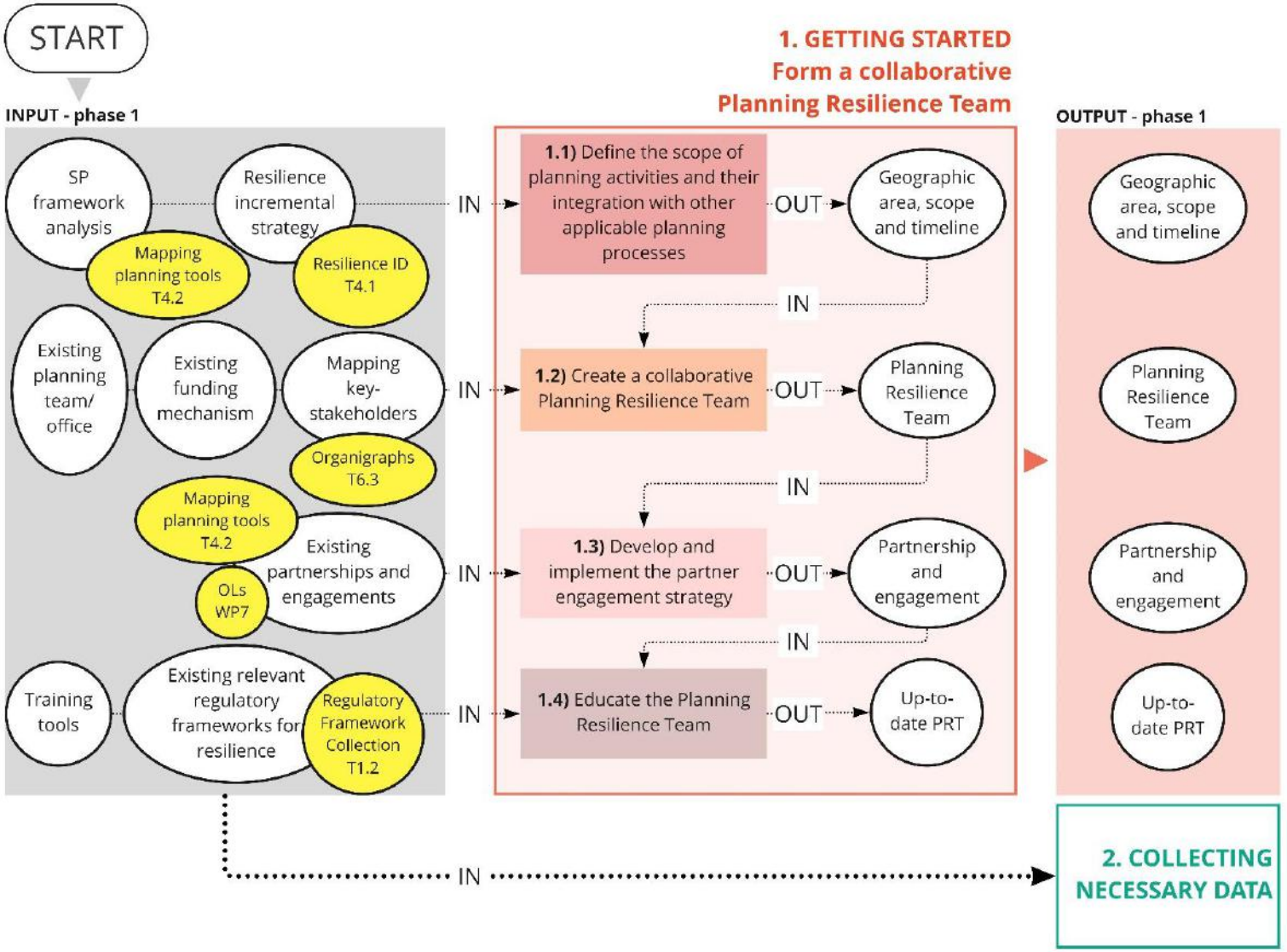

Figure 16. Phase 1

For example, hazard mitigation, development, or cultural heritage priorities in other community plans should be consulted during the recovery period, in order to guide disaster-specific decisions on these topics. Therefore, the disaster recovery plan should note the existence of such plans and summarize the information contained in those documents, as well as suggest how and when those planning documents should be incorporated post-disaster (FEMA, 2017).

Inputs from SHELTER

- Task 4.2 *Definition of protocols, plans and guidelines for CCA/DRM and integration within planning policies*: the SP framework analysis is done within this Task, that collects plans, guideline and regulations to build the state-of-the-art for each country involved in the project's OLs, concerning SP, CHM, DRM and CCA. In this key-activity, all tools regarding community capacity to plan in a pro-active way to respond to consequences of disaster can be considered. Plans, policies and strategies with specific references to SHELTER hazards, to the DRM and to objectives of resilience and adaptation are relevant.

- Task 4.1 *Resilience ID incremental strategy*: the strategy developed in this Task implements the Resilience ID, that comprises adaptation and early recovery roadmaps, risk management plan and protocols, maintenance and adaptation scheduler and back-up 3D models to provide all the required information for reconstruction and staff and occupancy training requirements.

Activity 1.2 - Create a collaborative Planning Resilience Team

Resilience planning requires a diverse set of expertise, as well as a significant amount of time, effort, and energy. The core team will develop, coordinate, manage, and support every step in the process until its completion.

Build political support

First of all, a PDRP process will require political support both to secure fundings and the multi-sector engagement needed for its success.

Collaborative recovery PRT representatives can be identified from departments or agencies with roles in community planning, development, recovery sectors, and disaster recovery. Often, the emergency manager is the elected and/or appointed official's policy advisor for mitigation, response and recovery strategies, as well as overall preparedness. He may also be the prevention and protection advisor, if a law enforcement official or other designated advisor does not fill that role. Emergency managers are responsible for coordinating and developing a recovery plan, acting as lead planner (FEMA, 2021).

Take into account:

- offices for CNHM

- experts in CNHM to be involved in the team

Ensure broad stakeholders representation

It is important to impress upon potential participants that the recovery planning process is not intended to be limited to those typically involved in emergency planning. Hazard mitigation experts are also valuable contributors to the PRT. Mitigation planners can provide information on hazard analysis, critical facilities and funding availability. Including mitigation promotes continuity throughout emergency planning and helps reduce the number of physical constraints by leveraging resources to address anticipated operational requirements. Recovery planners or specialists could be involved, since they help transition from response to recovery, focusing on longer-term functions such as community planning and capacity building, economic recovery, health and social services, housing, infrastructure systems and natural and cultural resources (FEMA, 2021).

In this sense, the process has to ensure a broad stakeholder representation: collaboration among a broad and diverse array of actors is required to address the wide range of impacts after a disaster – from damaged and destroyed homes to upset livelihoods, from disrupted education and health services to damaged critical natural resources (UNDRR, 2012).

The following list could be used to take into account some organizations that should offer planners to form the collaborative PRT (FEMA, 2017):

- Agriculture
- Animal Control
- Childcare
- Civil, social, faith-based, educational, professional, advocacy, trade and other non-profit organizations
- Community planning and economic development
- Cultural Institutions
- Cybersecurity
- Education
- Emergency management
- Environmental Protection
- Fire services
- Health Services
- Historic Preservation Boards or Commissions
- Housing authority
- Law enforcement

- Local elected or appointed officials (government)
- Private sector
- Public Works
- Social Services
- Transportation
- Utility operators

In this step is fundamental to ensure there are many and different skills needed for the pre-disaster recovery activities. The organizations and agencies, considered as planning partners, have to provide additional expertise and support needed to plan for and implement recovery activities. After NGOs and other community organizations are identified for partnership, the PRT has to consider formal agreements with organizations that may provide or support local services after a disaster. NGOs and other organizations should be aligned with the agencies or departments that serve similar functions (FEMA, 2017).

Enable strong community/public participation

Since this type of planning process is community-based and many planning assumptions and response activities directly impact the public at large, it is important to involve the whole community in identifying PRT members and potential stakeholders. This ensures that the collaborative PRT includes voices from a wide range of perspectives and fosters wide-ranging support for both pre-disaster plan development and post-disaster plan implementation.

To enable stronger public participation, developing an awareness-raising campaign is worth consideration. Holding public forums such as town hall meetings is one common way to raise awareness of the need for PDRP and the key role the community has to play. Yet, more proactive measures should also be taken. Working through popular and accessible media outlets, NGOs, faith-based organizations, community associations, special interest advocacy groups, and others will enable a greater understanding of PDRP and more effective participation of the broader public. (UNDRR, 2012).

Inputs from SHELTER

- Task 6.3 *Adaptive governance schemes mapping*: within this Task, to identify and design key variables and conditions to develop adaptive schemes at different staged of DRM, the key-stakeholders are mapped for each OL. The Organigraphs provide a platform to develop an innovative and collaborative tool to present the key stakeholders, responsibilities, and interactions within the DRM governance.

Activity 1.3 - Develop and implement the partner engagement strategy

This key-activity aims to evaluate continually additional stakeholders and new partners to be included as needed throughout the planning process. During planning development,

stakeholders and partners involved will likely change over time. As risks, impacts, consequences, capability gaps, and capacity are determined, additional partners will need to be identified (FEMA, 2021).

Define the scope of stakeholder engagement

One approach is to build upon existing partnerships with organizations that have already been identified and included in a planning team.

In order to improve and make a more efficient identifying stakeholders, the following questions can help (UNDRR, 2012):

- Who has been involved in past recovery initiatives?
- Whose membership will strengthen political and financial support of the planning process?
- Who can provide the technical expertise needed to develop the plan?
- Are typically marginalized or more vulnerable populations effectively represented?
- In a future disaster, who would provide administrative, logistical, information management, and communication services?
- What individuals or groups might oppose the recovery plan or create obstacles to an effective planning process?
- How well does a potential member represent a particular stakeholder group?
- Who can bring decision-making authority?
- Are there any network or umbrella organizations that may represent a large number of smaller groups?

In this step, the PRT needs also to set expectations for stakeholder involvement and define the contribution needed from them throughout the process.

Establish recovery activity support roles for all governance level

Community leaders have a keen understanding of their community's needs and capabilities and are valuable stakeholders who can support the planning process (FEMA, 2021). They need to coordinate with recovery counterparts from the regional and national level to ensure effective disaster recovery operations. Identifying which agencies have the related mission expertise or resources to support recovery activities during the Pre-Disaster Recovery Planning process will help to facilitate implementation after a disaster. Through Pre-Disaster Recovery Planning, organizations with similar missions and functions will already be aligned and have established relationships (FEMA, 2017).

Establish external partnerships

Since disasters do not recognize political boundaries, external partnerships can facilitate the sharing of resources across and between jurisdictions and can help compensate for local capability deficits. Pre-disaster communication and coordination among external partners help ensure that these partners are prepared to help the community recover

more quickly after a disaster. It should be noted that external partners must be aligned with the local recovery organization's structure and process.

Review the core group of stakeholders

In this phase, it is crucial to be resourceful and remain flexible. The identification of the members of the PRT, the core group of stakeholders and additional partners, agencies and organizations, should be periodically revised. The actors involved in the planning activities have to be changed and re-identified, according to the challenges and opportunities that present themselves along the process.

Inputs from SHELTER

- Work Package 7 *Open Labs*: the community-centred approach is based on the OLs, that function as knowledge generator, evaluation frameworks and demonstrations sites, long-term thinking transitions labs and learning environments. They are the core of a large range of partnerships and engagements.

- Task 4.2 *Definition of protocols, plans and guidelines for CCA/DRM and integration within planning policies*: the tools collected within this Task, regarding SP, CNHM, DRM and CCA, can provide relevant information regarding collaborations and participatory processes, followed in their development or implementation. These networks are useful to implement the partner engagement strategy in this phase of the PDRR.

Activity 1.4 – Educate the Planning Resilience Team

Once the PRT is formed, it is fundamental to ensure that its members are continually supported in their activities: communicate with them clearly, give them the skills and knowledge they need to succeed, support the capacity building of the core team, and share with them essential information about the planning process.

Begin with a shared understanding of Pre-Disaster Recovery Planning

A good strategy could be beginning with a shared understanding of the Pre-Disaster Recovery Planning. It may be completely foreign to many of the PRT members. How well the process progresses will be greatly determined by how well those participating understand what PDRP is, why it is being done, and what role they are to play. An excellent educational method could be organizing meetings with recovery managers to speak with the PRT members (UNDRR, 2012).

Define a recognizable structures and terminology

Considering a potentially large stakeholder group, and also the addition of more members once the process begins, it is necessary to create an organizational structure to keep the process on track and ensure it works well (UNDRR, 2012). To achieve this,

it could be helpful to establish a standard terminology to be used by all, ensure that all PRT members and stakeholders have clear roles and responsibilities, based on their competences and skills. It is necessary to ensure integration, coordination and cooperation among multiple actors, in order to facilitate a greater acceptance of the PDRP and strengthen its sustainability.

Inputs from SHELTER

- Task 1.2 *Codification of existing knowledge*: within this Task, there is a mapping of DM policies, emergency protocols and CCA strategies, helpful to develop a global database, focused in case-study countries, for comparison and build a common reference regulatory framework for defining replication condition. The OLs has an up-to-date codification of existing knowledge regarding the DRM and CCA.

EXAMPLE: Building Local Alliances in Post-Disaster Reconstruction, Aceh, Indonesia (from How To Make Cities More Resilient A Handbook For Local Government Leaders, UNDRR, 2017)

Aceh Province in Indonesia was ravaged by the Indian Ocean tsunami in 2004. The level of devastation was beyond the scope and capacity of the existing disaster management agency. This led to the establishment of an ad-hoc body at the ministerial level, The Rehabilitation and Reconstruction Agency for Aceh Nias (BRR); thus, became responsible for leading post-disaster reconstruction initiatives.

Creating partnerships between communities, the private sector, and local authorities was acknowledged as a top priority for sustainable reconstruction and in order to develop a sense of ownership among the partners. Consequently, the local community and civil society were involved in all phases of the reconstruction process from planning to project implementation. Local officials and public figures were invited to provide commentary and advice. At the implementation stage, local personnel constituted the majority of the BRR staff. Whenever possible, local companies were also given priority in the tendering process and encouraged to create joint ventures with larger national companies. A joint secretariat at the regional level included representatives from the local governments in order to improve coordination and accelerate the reconstruction process (Gencer, 2017).

EXAMPLE: The Makati City Participation Strategy: The Makati Mobile Knowledge Resource Center (MKRC), Makati, Philippine (from How To Make Cities More Resilient A Handbook For Local Government Leaders, UNDRR, 2017)

Since 2010, the City of Makati has been actively engaged in the Making Cities Resilient (MCR) Campaign. As a pilot city, Makati City has been involved in the promotion and accomplishment of the original Ten Essentials.

The City Government of Makati recognizes the importance of building alliances with all relevant stakeholder groups including, among others, the different City Government offices (internal stakeholders), national/regional government agencies, academe, public utilities, technical experts, civil society organizations, and community organizations. Recognizing that building alliances with all relevant stakeholder groups is critical to the process, the City of Makati partnered with SEEDS Asia to develop the Makati Mobile Knowledge Resource (MKRC) Project to enhance DRR knowledge and capacities of the citizens and barangay officials.

The First Phase involves the training of trainers in all 33 barangays of Makati through practical workshops and community risks assessment (using town watching for disaster education as methodology). The Second Phase entails the roll-out of activities in communities. The end goal is to establish a mobile resource center readily accessible to the community. MKRC is envisioned to be a platform for capacitating community members in terms of knowledge and ability to respond to different hazards (Gencer, 2017).

4.3.2 Phase 2 – COLLECTING NECESSARY DATA: Understand the situation

In the second phase (Figure 17), the PRT identifies threats and hazards and assesses the community and its heritage risks. This phase outlines the need to focus on impacts and a broader range of consequences specific to recovery. In order to develop the PDRP, the PRT starts with the evaluation of previous disaster events, their impacts and all the existing planning products to obtain specific recovery solutions.

Disaster Risk Assessment

It is a qualitative or quantitative approach to determine the nature and extent of disaster risk by analysing potential hazards and evaluating existing conditions of exposure and vulnerability that together could harm people, property, services, livelihoods and the environment on which they depend. It includes: the identification of hazards; a review of the technical characteristics of hazards such as their location, intensity, frequency and probability; the analysis of exposure and vulnerability, including the physical, social, health, environmental and economic dimensions; and the evaluation of the effectiveness of prevailing and alternative coping capacities with respect to likely risk scenarios (UNDRR).

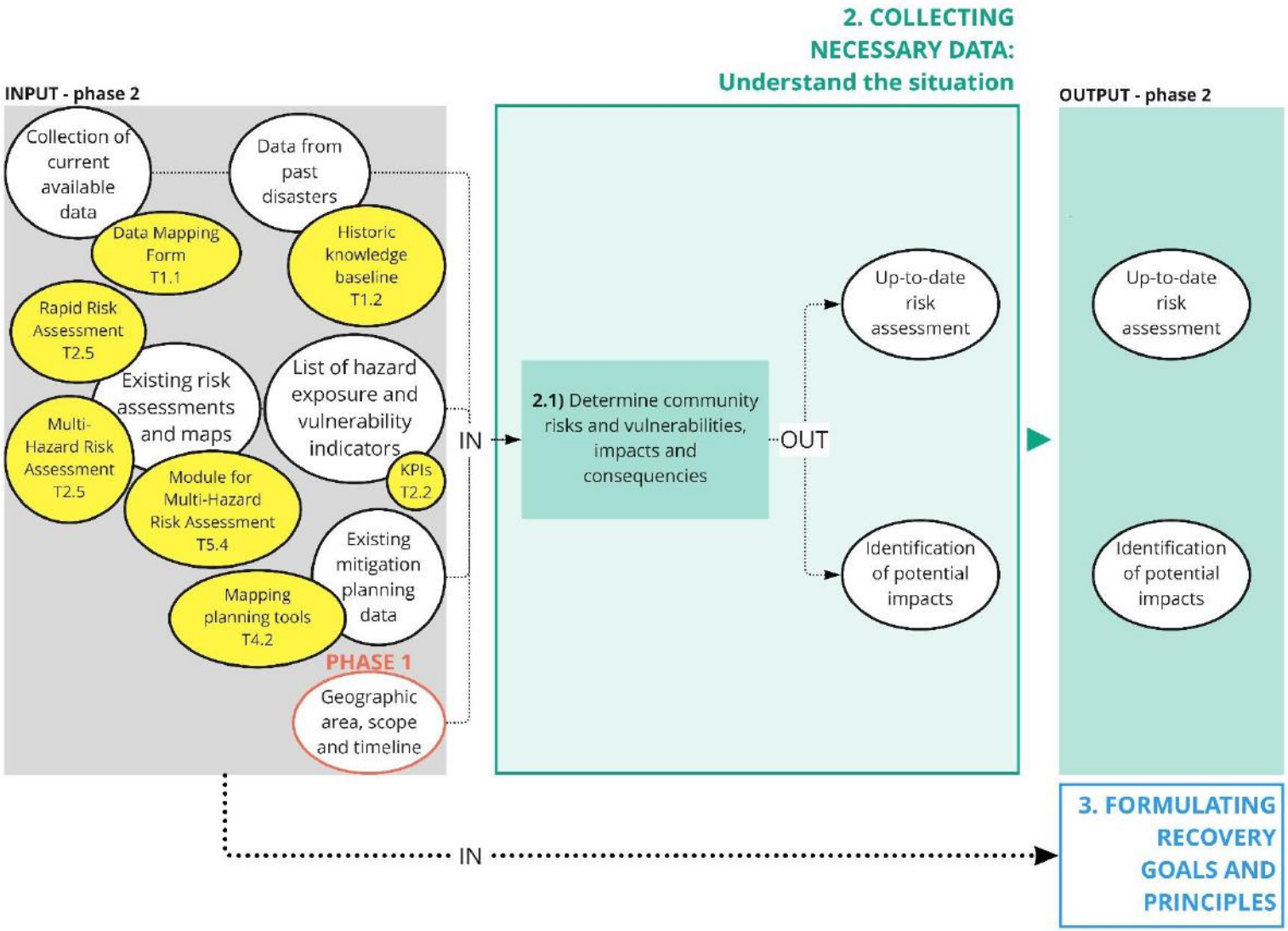

Figure 17. Phase 2

Activity 2.1 - Determine community risks and vulnerabilities, impacts and consequences

Gather and analyse existing data on all relevant hazards and on known and potential vulnerabilities

First of all, it is imperative to gather and analyze existing data on all relevant hazards and vulnerabilities that the community could address.

The Sendai Framework stresses that policies and practices for disaster risk management should be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment. Risk assessment can be defined as the identification of hazards that could negatively impact the life of the community, the analysis and the evaluation of the risks associated with those hazards. Vulnerability is not only characterized by the exposure to a hazard, but by physical, social, economic, natural and psychosocial factors as well, and it comes in many forms, determining not only how people and assets are impacted by a disaster. While it may not be initially feasible to analyze how all these factors will play out, it is important to recognize them to promote a real BBB (UNDRR, 2012).

The risk assessment provides a basis for the development of DRR action plans and resource allocation.

Take into account:

- elements of CNH to be protected in the area

Analyse existing disaster and community planning products

The planners should begin by assembling all available, up-to-date risk assessment data. The key to determining risks, impacts and consequences is to know the community and understand what defines the community's identity, using existing data that may be available in local planning documents. Reviewing these plans helps planners throughout the recovery planning process to identify threats and hazards, and will also serve as a baseline for determining existing roles and responsibilities, and existing policy and capability gaps. Examples of existing documents to review and consider include (FEMA, 2017):

- Emergency operations plans
- Local hazard mitigation plans, including risk assessments
- Floodplain management regulations and policies
- Continuity of operations plans
- Local agency program operations/guidelines
- Local or county comprehensive plans or masterplans
- Capital improvement or facilities plans
- Regional transportation plans

- Local or regional Comprehensive Economic Development Strategies
- Climate action plans
- Resiliency plans
- Community visioning document or statement(s)
- Sector or facility-specific disaster mitigation, recovery, or preparedness plans (i.e., plans for schools, child care facilities, and hospitals)

Since these existing data are available in local, regional and statal community organizations, it is important to engage representatives of all these organizations to facilitate access to information.

Reviewing plans, policies, or initiatives already in place during Pre-Disaster Recovery Planning will help minimize conflicts during post-disaster recovery planning and implementation. Analyzing and understanding the laws and authorities that govern the recovery process helps to avoid problems.

There should be clear linkages defined among existing plans and the recovery plan, which will foster more effective integration of government-level partners and their activities. In addition, connecting to existing plans and programs can help leverage available resources and reduce duplication of effort. Finally, building upon existing programs helps foster the integration of other government agencies in the recovery planning process and post-disaster implementation processes (FEMA, 2016).

Take into account:

- planning tools with specific references to CNHM

Identify community direct/indirect impacts

The PRT should use the risk assessment information and the existing plans to conduct additional analysis to identify the broad range of recovery-specific impacts and consequences. PRT members can focus recovery planning efforts, by understanding the impacts and determining potential capability gaps according to sector-specific impacts (FEMA, 2017).

In this step, the PRT should identify potential direct impacts on communities assets and systems (e.g., infrastructures, cultural sites and protected natural areas); potential indirect impacts (e.g., access to health care, business disruptions from relocation of workforce and population shifts); government and other organizations that will have an increased workload; impacts on disadvantaged and vulnerable individuals.

It is important to look at the interdependencies and connections among the identified impacts and highlight to all participants the ramifications of the indirect, cascading, and long-term impacts of a disaster across the community. This understanding motivates not only a stronger commitment to participate in a recovery process, but also a stronger interest in taking mitigation actions in advance to reduce losses and lessen those

potential consequences. Collectively, understanding the potential impacts, and taking steps to reduce potential losses and consequences, helps improve community resilience.

Inputs from SHELTER

- Task 1.1 *Identification of data and knowledge sources and integration and interoperability requirements*: a collection of current available data is offered by the Data Mapping Form created in within this Task. It identifies, classifies and evaluates useful data sources; data assessment criteria are defined in terms of quality, readiness, relevance, usability and availability in mid/long term, historic archive, geographical representativeness and thematic relevance. This Task implements the integration strategy that establish the data, the knowledge, the formats, the interfaces, the concepts, the requirements and the constraints that must be considered for the data driven platform design and implementation.

- Task 1.2 *Codification of existing knowledge:* within this Task, the Historic Knowledge Baseline is developed. Historical events descriptions help to recognize trends correlating effects in terms of damages and socio-economic losses. The high value of historical events memory is linked to the fact that this kind of knowledge includes a wide range of heterogeneous information with various grades of impacts and reliability. This Task also defines a protocol to collect information about historical catastrophes and risks into a temporal dynamic framework, helpful to gather relevant historical data for the case studies.

- Task 2.2 *Systemic resilience assessment and monitoring framework for HA: structure of indicators, definition of KPIs and resilience co-monitoring strategy:* this Task provides the basis for a harmonise and multiscale indicator based risk dependent resilience assessment based on hazard, exposure and vulnerability. The hierarchical structure of indicators for resilience assessment will include the set of KPIs for establishing the baseline and monitoring strategy for case studies, measuring the success of adequate CCA and DRM policies and strategies, the integration of collaborative early warning systems, the adoption of appropriate contingency plans, emergency procedures and adaptive solutions reconstruction of those elements affected after disasters.

- Task 2.5 *Specific hazard risk assessment:* this Task is specifically oriented to define a spatially explicit methodology to assess the risk regarding specific hazards and their synergistic impact. It develops a methodological process for identification of required/existing data sources, definition to detect the techniques and needs for transform, standardize and impute missing values, algorithms and multiscale data analytics and geospatial computing required for indicators calculation, and methods for weighting and combining vulnerability/resilience factors and categorizing and performing sensitivity analysis.

- Task 4.2 *Definition of protocols, plans and guidelines for CCA/DRM and integration within planning policies*: in this step it could be useful to consider tools, collected within this Task, regarding SP, CNHM, DRM and CCA, with relevant information regarding risk assessments: overview of threats and hazards, presence of risk assessments and maps, identification of community vulnerabilities and any type of data and information that contribute to develop knowledge about these elements.

- Task 5.4: *Supporting resilience through strategic decision making:* this task is key since it develops a multihazard risk assessment tool based on the multiscale data model and on the methodology developed in T2.5.

EXAMPLE: Expanded Perspective on What Constitutes Hazards - Delgado, El Salvador and Guatemala City (from How To Make Cities More Resilient A Handbook For Local Government Leaders, UNDRR, 2017)

During a participatory process to identify geological and hydro-meteorological hazards, the municipalities of Ciudad Delgado in El Salvador and Guatemala City in Guatemala also diagnosed other risk factors related to daily practices among the population and in communities that led to the accumulation of garbage, pollution and poor access to water resources; and crime as a concern. Involving communities in assessing their own risks not only leads to a greater level of ownership of the knowledge generated, but also broadens their perspective regarding factors that contribute to risk. As in the case of many countries in Latin America, and worldwide, natural phenomena are not the only triggers.

Assessments of trans-boundary risks has also enhanced regional cooperation on risk reduction. They have already led to the creation of digital hazard maps to guide risk reduction actions at the community and municipal levels, such as regulations for land use planning by the municipal government or the adoption of community risk mitigation practices, such as garbage collection and small-scale construction projects to channel sewage (Gencer, 2017).

4.3.3 Phase 3 – FORMULATING RECOVERY GOALS AND PRINCIPLES

To build a PDRP, it is important to develop goals, objectives and principles based on community's priorities. These priorities have been identified in the previous phase "Collecting necessary data: Understand the situation", by analysing threats, hazards and risks.

This third step (Figure 18) focuses on important aspects of recovery, specifically directing the planners to evaluate a community's ability to address recovery needs and establish appropriate goals and objectives based on the community's capacity (FEMA, 2017).

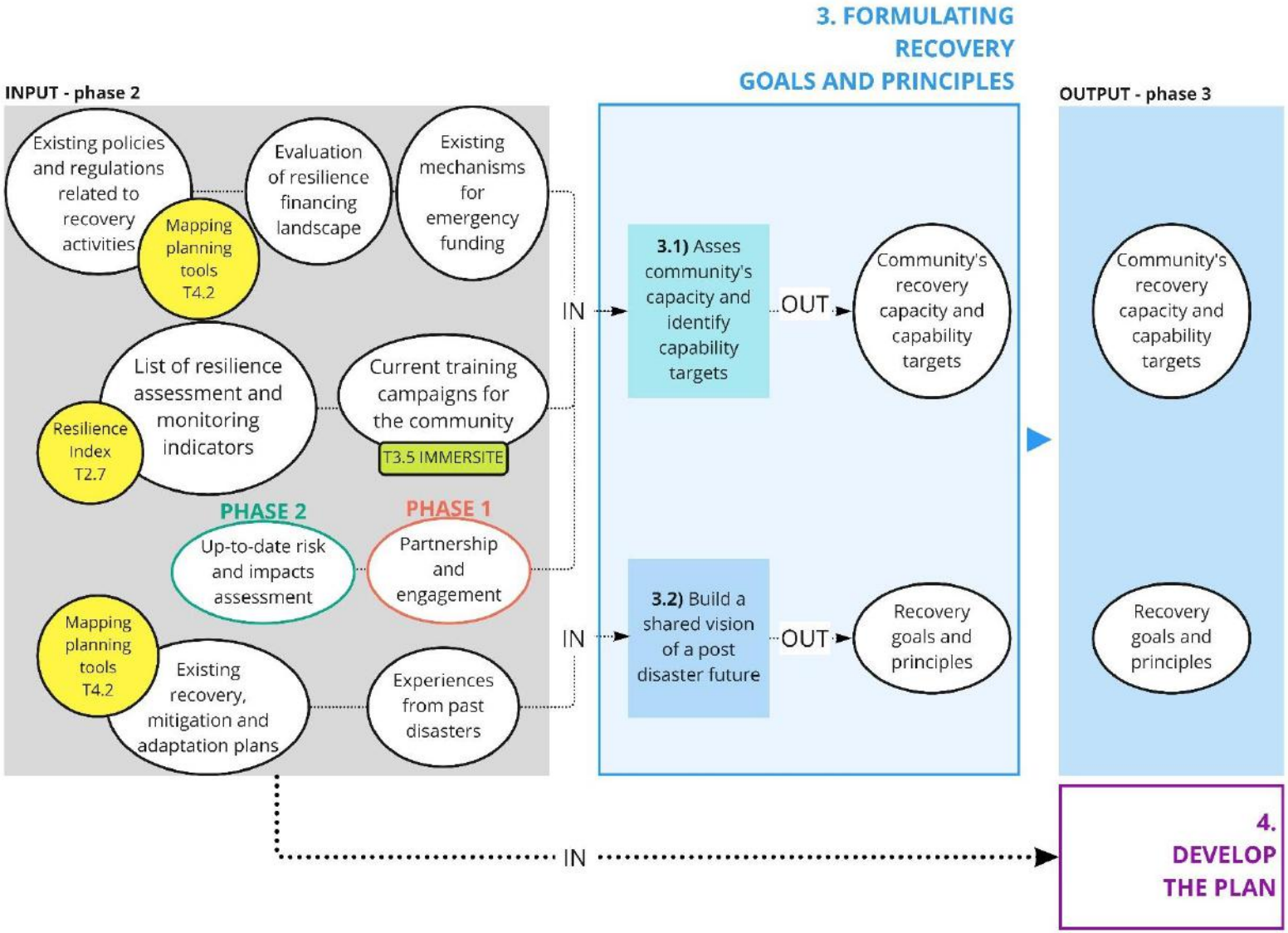

Figure 18. Phase 3

Community capacity

It is the combination of all the strengths, attributes and resources available within an organization, community or society to manage and reduce disaster risks and strengthen resilience. Capacity may include infrastructure, institutions, human knowledge and skills, and collective attributes such as social relationships, leadership and management (UNDRR).

Activity 3.1 - Asses community's capacity and identify capability targets

Based on the risk assessment and the identified recovery impacts, consequences and priorities, this key-activity helps the PRT evaluate the community's ability to face the recovery consequences. Completing the evaluation of community's capacities and comparing identified needs to established roles and existing community resources allows the community to identify gaps. On one hand, understanding capacity gaps will serve as the basis for resource and partnership decisions throughout the recovery planning process, on the other hand, the community should recognize its strengths to leverage its existing resources (FEMA, 2017).

This evaluation of recovery capacity can be framed around these core capabilities applicable broadly to disaster recovery:

- Planning
- Public Information and Warning
- Operational Coordination
- Economic Recovery
- Health and Social Services
- Housing
- Infrastructure Systems
- Natural and Cultural Heritage

The PRT should also consider additional capabilities or needs that may be relevant to recovery in the community (FEMA, 2017).

Evaluate Planning and Regulatory Strengths and Weaknesses

The actors involved in this planning process should inventory and review current plans, policies and regulations that relate to recovery operations or other potential post-disaster development activities. They should evaluate whether these policies and regulations work to support, or could potentially hinder, post-disaster recovery (FEMA, 2017). Examples of documents to consider could be:

- Planning documents, such as mitigation plans, land use plans, transportation plans, emergency preparedness and response plans
- Local ordinances

Some questions to consider in this review are:

- What current policies would encourage or inhibit recovery activities?
- Are there financial, staffing or other constraints that affect the community's ability to develop or update policies and regulations?

In order to ensure that local recovery can take place without violating policies from other levels of government, they should be considered, especially those that may impact local recovery efforts (FEMA, 2017).

Evaluate Organizational and Staff Resources Available

Inevitably, recovery operations create an increased workload for partners. During PDRP efforts, it is critical that partner agencies and organizations evaluate their staffing resources, not only to identify gaps in staffing quantity or expertise but also to define the strengths and capacities of partners and stakeholders (FEMA, 2017).

Some questions to consider in this evaluation are:

- What staffing resources are available to assist with the increased workload associated with recovery activities?
- Does the current staff have the subject matter expertise necessary to undertake recovery activities, develop new programs, or organize complex long-term projects?

Evaluate financial strengths and weaknesses

Since recovering from a disaster costs money, it is crucial to evaluate the costs of recovery management and activities.

Some questions to consider in this evaluation are:

- What financial resources are available to use for potential recovery activities?
- Are mechanisms in place for emergency funding and procurement after a disaster?
- Are financial reserves available to address potential risks? What is the ability of the local government and NGOs to apply for grants, establish lines of credit, or secure other funds needed for recovery?

The evaluation of financial strengths and weaknesses needs also to develop strategies for filling identified financing gaps, establishing mechanism for emergency fundings, if it is necessary. It is important to be aware that loans may be necessary to support recovery, especially in cases where grants and similar funds are not available or do not fully support recovery needs. Financial resources are not only needed for individuals and families, but for businesses and various sectors of the government as well (FEMA, 2017).

Evaluate Communication and Outreach Strengths and Weaknesses

Communication and outreach strategies are the foundation of developing inclusive partnerships and taking a holistic approach to both pre- and post-disaster recovery

planning. Pre-disaster, local governments and their partner agencies should identify their plans and resources available to conduct outreach. Attention should be paid to identify strategies to effectively communicate with citizens, especially with the most vulnerable ones (FEMA, 2017).

Take into account:

- to raise awareness about the importance of CNH

The PRT has to reflect on the community's capability to educate residents and other stakeholders about the importance of recovery planning and preparedness, to raise their awareness.

Inputs from SHELTER

- Task 4.2 *Definition of protocols, plans and guidelines for CCA/DRM and integration within planning policies*: in this step it could be useful to consider tools, collected within this Task, especially focused on crisis management and disaster response, that provide information regarding recovery organizations and structures, definition of roles and responsibilities in the stages of response and recovery, identification of services and resources to be used.

- Task 2.7 *Development the SHELTER cross-scale HA systemic resilience assessment methodology*: the procedure for the implementation of the systemic resilience assessment methodology at HA scale, developed in this Task, provides a HA Resilience Index, a list of resilience assessment and monitoring indicators. It is an easy tool and a self-assessment methodology able to measure the capacity of HA to adapt, cope and transform to better respond to hazards. This methodology establishes qualitative indicators, considering the nature and the specific components and characteristics of the HA and designing in order not to be hazard dependant.

Activity 3.2 - Build a shared vision of a post-disaster future

With a better understanding of potential hazards and existing vulnerabilities and a growing sense of the capacity and resources that may be available, the PRT can begin defining the overall recovery goals and principles. A recovery goal describes the vision of the recovered community, while the recovery principles define the values which will guide how the goals are achieved. These goals and principles will frame the strategic and action planning (UNDRR, 2012).

The recovery goals and objectives build a collective vision of the post-recovery future, for the community.

Define recovery goals and objectives

The recovery goals should be as specific as possible yet still applicable to recovery initiatives in any and all sectors. Likewise, it should align with the larger development goals of a population. How specific the recovery goals are will depend on the extent of damage incurred, the longer-term development goals and the priorities of public (UNDRR, 2012).

Examples of what might be included in the recovery goals include:

- An increased resilience to future disasters
- An improved quality of life
- A strengthened protection for CNH

The recovery objectives indicate what is needed to achieve the recovery goal. It's important to draft a proposed set of high-level objectives, identifying social, economic, political and environment priorities to create a recovery objective for each of the defined functions. This approach will enable a more seamless integration of recovery, DRM, and development plans. In this sense, a review of relevant development plans could help to ensure that the recovery objectives reflect a desired future state (UNDRR, 2012.)

In this step, it is important to determine the key-areas of intervention, to identify the broad categories in which to frame recovery needs and corresponding interventions.

Examples of key-areas include:

- Housing
- Infrastructure systems
- Economic development
- Health and psycho-social well-being
- Natural and Cultural resources

Take into account:

- to consider CNH as key-areas of intervention

Identify principles to guide recovery

A crucial point is how recovery actors work to achieve their goals and objectives. Recovery principles are the values which guide how recovery will take place. The recovery PRT has to define the more relevant and applicable principles to its context.

Examples of recovery principles include (UNDRR, 2012):

- Strong coordination amongst recovery actors
- Decisions concerning recovery needs and services made by affected communities and local leaders
- Maximized use of local resources

- Transparent yet expedited flow of funding and resources
- Pro-active communication with affected communities through contextually relevant mediums

Ensure a participatory and iterative process

Short, medium and long-term goals should be defined in a participatory, inclusive and negotiated manner. Involving the public in defining how the recovery goals and objectives are to be achieved will enable greater public trust and collaboration in government-led recovery efforts. Community representatives often possess a more complex understanding of how a disaster affects the population, how affected communities cope and recover, and how recovery assistance has/will impact those recovering from a disaster. This knowledge is critical to ensure that the recovery principles align with the values and priorities of those affected (UNDRR, 2012).

Furthermore, research on local past disasters should certainly provide relevant lessons: in fact, strong recovery principles are drawn from actual experiences and the corresponding lessons learned.

The recovery goals and objectives can be also revised and adjusted, in an iterative process. The strategy should be flexible to accommodate changes and include periodic evaluations to monitor progress, assess gaps and identify changing conditions. The PRT should also to consider identifying additional capabilities or needs that may be relevant to recovery in the community.

Inputs from SHELTER

- Task 4.2 *Definition of protocols, plans and guidelines for CCA/DRM and integration within planning policies*: in this step, it could be helpful to consider recovery, mitigation and adaptation plans, collected within this Task, that are explicit goals and objectives such as the improvement of community resilience, the reduction of CNH vulnerabilities, and the reduction of losses and ecological, economic and social consequences of a disaster.

EXAMPLE: Assessing Capacity Throughout the Process - Panama City and New York City (from Pre-Disaster Recovery Planning Guide for Local Governments, FEMA, 2017)

While an initial capacity assessment is needed to successfully launch the recovery planning process, it is important to continuously evaluate capacity to provide current feedback and information for the future.

In Panama City, FL, assessments of institutional capacity carried out during the planning process noted a number of issues that were successfully addressed. One issue was that coordination between participating agencies on recovery-related subjects had been limited in the past. To address this during the planning process, emphasis was placed on defining how post-disaster roles and responsibilities could be best coordinated. This additional work was successful in developing a strong foundation for recovery but did affect the schedule for the overall planning process.

Information on capacity gaps can also be identified through a review of past recovery activities. When reviewing its response to Hurricane Sandy, New York City found that the large number of volunteers and unsolicited material donations overwhelmed the non-profit organizations that were helping the city coordinate this assistance. In its recommendations, the city noted the need to improve its processes for pre-identifying partners assisting with this work, so that adequate capacity is available to address both the scale of these resources and the need to distribute them over large geographical areas.

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

The fourth phase (Figure 19) is the heart of the planning work: understanding how the community will be affected by a disaster and identifying its ability to address it, the PRT must develop the PDRP, establish the post-disaster recovery organization and outline the recovery-specific decisions.

Leadership, resources, organizational process, preventive actions for effective resilience, roles and responsibilities are important decisions that should be carefully developed, analysed and compared during the pre-disaster process. These decisions serve as the basis for the written PDRP.

Activity 4.1 - Determine the organizational structure, positions and applicable skills

To manage efforts in order to prepare the community for post-disaster activities, it is crucial to have the right people in place and to determine which positions and applicable skills are necessary.

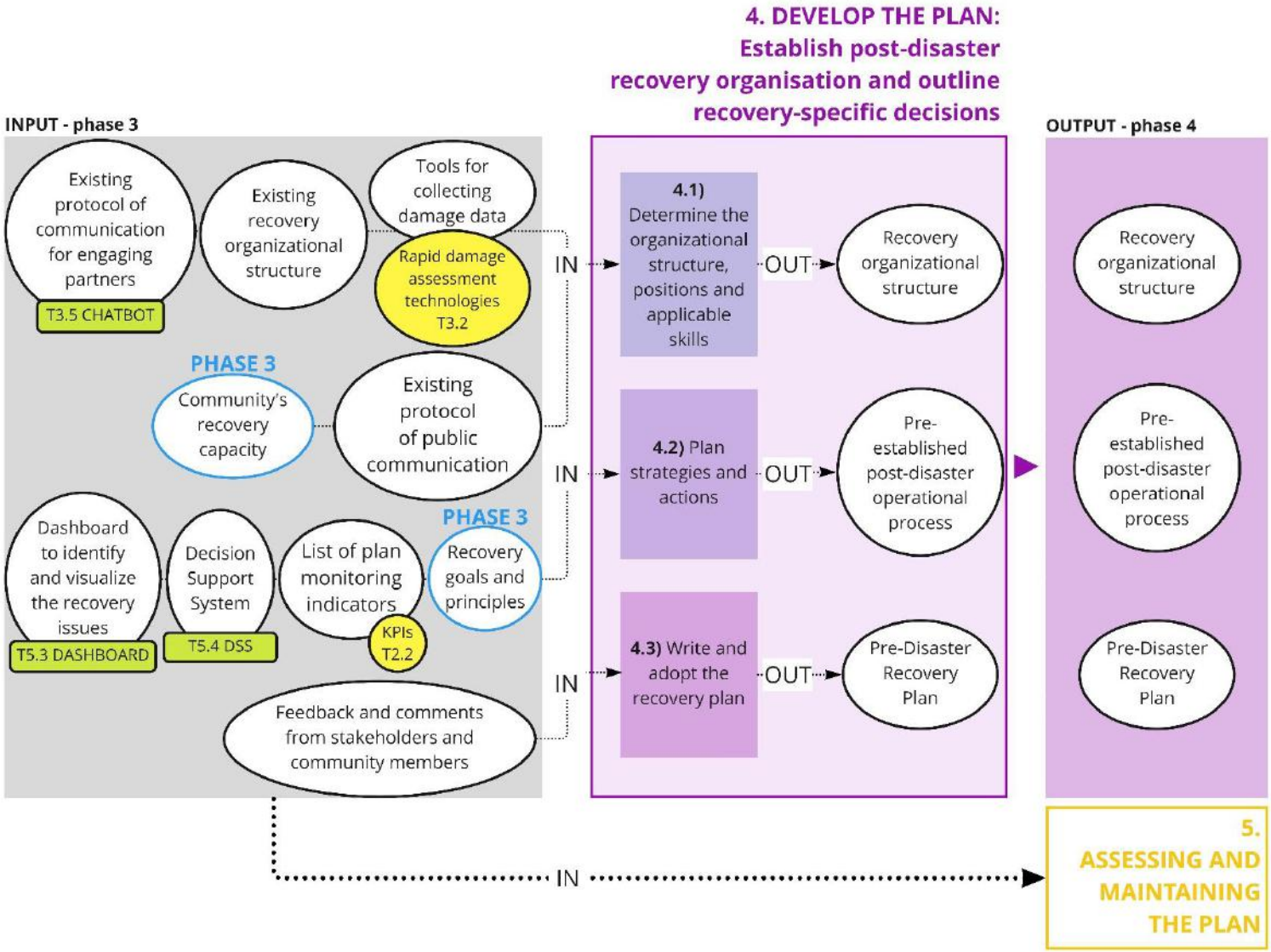

Figure 19. Phase 4

Establish an organizational structure

It is imperative to define how the recovery has to be organized. First, it is necessary to identify a Local Disaster Recovery Manager (LDRM), that organizes, coordinates and advances recovery at the local level. To cover this position, with responsibility both pre- and post-disaster, it is required knowledge of the community, relationships with other local leaders, the ability to pull a team together to develop a long-range vision, strong communication skills, and experience in community planning (FEMA, 2017).

The LDRM needs to have a specific quality, such as:

- Authority, to convene and coordinate all recovery actors
- Accountability, to be responsible toward stakeholders and the community
- Attitude, to be persistent but patient in working with local stakeholders and partners to manage the recovery process
- Aptitude, to think strategically and to be flexible in using nontraditional approaches and resources.

Strong leadership is critical for successful recovery, so the identification of such leadership must be a high priority. A strong leader makes securing partnerships easier: the LDRM ought to also have the relationships and expertise necessary to ensure that all recovery activities are closely coordinated with response and mitigation efforts. Partnerships across the various mission areas need to be made long before a disaster (FEMA, 2017).

After the manager has been selected, planners must decide which agencies and organizations will serve in leadership roles and which will provide support during the post-disaster recovery process. It could be useful to work in sub-groups: since the team is large, it could be divided to look at issues related to a particular function or topic area. For each sub-group, it is helpful to have a coordinator who would also be the primary point of contact for recovery in that subject area and would provide updates and other situational awareness to the LDRM.

Take into account:

- to involve an expert on CNH in each sub-group of work

Ensure recovery resource identification, management and coordination

Each sub-group, previously identified, must have a clear and well-defined its role and responsibilities. The identification, acquisition, and coordination of resources play a significant role in post-disaster recovery. Resources employed to facilitate recovery may include shared information, such as data, intelligence, and key stakeholders contacts, technical assistance, subject matter expertise, and funding mechanisms, such as existing financial reserves, grants, and loans. A lack of resource coordination among recovery participants can lead to conflicts and inefficiencies.

After recovery leadership positions and their responsibilities are determined, identifying general administrative coordination and planning activities that occur during a recovery process is a fundamental step (FEMA, 2017).

Develop a process for notifying and engaging recovery partners in preparation for or immediately after a disaster

Creating a chain of communication and pre-determined locations for convening partners enables recovery planning and implementation to be initiated in a timely manner. The use of technology for virtual coordination and information sharing can be considered.

Care should be taken in this step to clearly delineate responsibility for leading the engagement of recovery partners either in preparation for or immediately after a disaster has occurred (FEMA, 2017).

Prepare a process for gathering damage information and assessing impacts to evaluate and support recovery activities through the long-term

One of the first post-disaster recovery activities is to assess the damage and gather information. While each disaster impacts a community in a different way, steps can be taken during the pre-disaster planning process to establish information-sharing practices. The full range of partners identified through the planning process assists with preparing a broader and longer-term statement of impact needs. Sector-specific coordinators and other community leaders should identify, pre-disaster, what sorts of information they need and how best to obtain that information. Consideration must also be given to data collection mechanisms and long-term impact analysis. Information sharing and analysis processes should be considered with partners from all sectors to ensure that the products can be used by all partners involved in the recovery process.

Take into account:

- procedures to collect data regarding damages on CNH

Develop guidelines for recovery-related public communications

Coordinated messaging is a challenge in any disaster. The recovery organization needs a defined position dedicated to ensuring that information related to the recovery effort is being effectively communicated to the public in accessible formats. The PRT should determine who is responsible for delivering effective public communication, how this will be accomplished, how often, in what formats, and for what purposes. To the extent possible, it is important to be transparent in informing the public so that expectations can be identified in advance, properly addressed, and clarified, since transparency helps to build public confidence in the recovery effort (FEMA, 2017).

Inputs from SHELTER

- Task 3.5 *Crowdsourcing solutions for citizens engagement in preparedness and response*: this Task develops the tool Chatbot, to deliver as well as retrieve multimedia geolocated contents from people smartphones, targeting citizens living in the surrounding of HA. The Chatbot is useful to to increase the level of situational awareness and support the in-field operations of professional users as well as citizens before, during, and after an emergency

- Task 3.2 *Rapid damage assessment technologies*: this Task provides an advanced web data platform to offer satellite images and geospatial data, that will be used to map the extent of the event or assess the potential damages.

Activity 4.2 - Plan strategies and actions

The recovery actors are now ready to identify recovery issues and create the strategies and actions to address them, outlining the effective PDRP.

Identify recovery issues

The PRT has to predict the issues they will need to address, in order to assist the population's recovery. Disasters are complex and they manifest as a series of related impacts, beginning with the damage and loss of human life and assets. It is crucial to recognize as many issues as possible. While no exhaustive list can be predicted and some of the issues identified may not come to pass, simply the awareness of these possibilities will strengthen recovery planning and outcomes. Prioritizing the list of issues once it has been compiled will help to make the process more manageable. While addressing the issues of highest priority, those issues of lesser priority can be placed in the plan to be treated at a later time (UNDRR, 2012).

The criteria to prioritize the issues will be various between communities. The following list of questions may be used as starting point:

- Does the issue represent an immediate threat to human life, health, or safety?
- Does significant capacity exist to address the issue?
- How does this issue impact the pace and quality of the recovery process?
- Must the issue be resolved in order to address other issues?
- How many people will be affected by this issue?
- How does the public rank the importance of the issue?

Identify recovery stages

Working from the list of potential recovery issues, the PRT should now be prepared to identify strategies and actions to address them, both before and after the disaster.

In general, strategies and actions can be categorized as pre or post disaster. Yet many governments have defined more specific phases of recovery such as early and long-term recovery or reconstruction, rehabilitation and recovery. If recovery is divided into various stages, then it should be decided if specific strategies and actions will be defined for each of these stages (UNDRR, 2012.)

Develop recovery strategies

For each recovery issue, a recovery strategy can be considered. It may be easiest to begin by considering the recovery strategies for the post-disaster period. In doing so, many of the pre-disaster strategies will emerge. For developing a strong strategy, it's crucial to have a clear idea about (UNDRR, 2012):

- Theme addressed, to identify the key-area the strategy addresses
- Ideas for implementation, to describe how the strategy will be implemented locally
- Coordinating organization, to define the group that is willing and able to organize resources, find appropriate funding and oversee implementation, monitoring and evaluation
- Supporting partners, to identify who may be able to assist in the development of the strategy, providing relevant resources to the coordinating organization
- Resources, to identify what is needed to implement the strategy
- Timeline, to know if the strategy is either pre- or post-disaster and when it should be implemented

Create actions

The coordinating organization and partners identified for each strategy should meet to determine how the strategy will be operationalized. The type of actions to be taken will depend on the strategy. Examples of recovery actions can be the creation of a policy, an application for funding, the development of a program, or the establishment of a partnership (UNDRR, 2012).

The PRT has to adopt an incremental approach in order to complete the initial plan within a reasonable period of time and allow implementers to begin taking action. The team prevent the plan remains simply a document, assigning responsibility for each action to one or more entities, creating deadlines for completion of pre-disaster actions, and specifying the resources required and the means to obtain them (UNDRR, 2012).

Define a process for monitoring recovery actions

Recovery strategies and actions will need to be monitored, evaluated and adjusted over time, to be effective. Regular assessments and willingness to redirect them are important to obtain a long-term success. The monitoring of the plan will assess if strategies and actions are consistent with the community post-disaster vision and recovery goals.

In this step, it is fundamental to identify a procedure to monitor the effectiveness of the actions in the PDRP, determining some indicators of successful recovery. It could be

useful to have a person who is responsible for monitoring this process. The PRT has to establish also when and often to monitor the recovery actions, and especially how to introduce corrective measures, if it is need.

Inputs from SHELTER

- Task 5.3 *Historic Areas Resilience Dashboard*: the dashboard generated within this Task helps to know the current status of the information and its evolution over different variables, in order to help managers in the process of strategic decision making, adaptations of solutions to new ones or program scheduled actions. It includes data from rapid damage assessment technologies post disaster, citizen engagement tool, resilience index monitoring and resilience ID visualization.

- Task 5.4 *Supporting resilience through strategic decision making*: within this Task, a strategic DSS is developed as support for the final prioritization of the interventions within the holistic strategy for adaptation and early recovery roadmaps. Expert system considers all available information (urban model, solutions, indicators and methodologies) weighing pros and cons to achieve the best decision. The results of this exploration are presented to the user as thematic maps and visual maps of solution combinations together with diagrams providing insight into the matching scores for different resilience dimensions, like Kiviat diagrams, charts and timelines.

- Task 2.2 *Systemic resilience assessment and monitoring framework for HA: structure of indicators, definition of KPIs and resilience co-monitoring strategy:* this Task provides the basis for a harmonise and multiscale indicator based risk dependent resilience assessment based on hazard, exposure and vulnerability. The hierarchical structure of indicators for resilience assessment will include the set of KPIs for establishing the baseline and monitoring strategy for case studies, measuring the success of adequate CCA and DRM policies and strategies, the integration of collaborative early warning systems, the adoption of appropriate contingency plans, emergency procedures and adaptive solutions reconstruction of those elements affected after disasters.
The following is a non-exhaustive list of indicators, proposed in T2.2, that can be taken into consideration for this activity:

- 223 - Coordination with other government bodies
- 250 - Available (collective) equipment to limit damage
- 322 - Emergency response planning and implementation of warning systems
- 326 – Rehabilitation and reconstruction planning
- 329 – Budget allocation and mobilization

Activity 4.3 – Write and adopt the recovery plan

This key-activity outlines how information, documentation and decisions made in previous steps are consolidated to form a written effective plan.

Write the Pre-Disaster Recovery Plan

The plan must be concise and it has to clearly communicate the decisions made by the PRT to stakeholders, partners, and the public in an accessible format. The plan ultimately provides a framework for action, accounting for known pre-disaster issues and resource gaps, and addresses leadership, partners, priorities, and policies for recovery (FEMA, 2017).

An indicative structure of the plan is provided below.

1. *INTRODUCTION: including the purpose of the plan; the scope and structure of the plan; the territorial framework; and the Spatial Planning framework analysis*
2. *CURRENT SITUATION: providing a description of the risk and vulnerabilities; and the community's capacity*
3. *RECOVERY VISION: here recovery goals; and recovery principles should be clearly stated*
4. *RECOVERY ORGANIZATION: including roles and responsibilities; information on the coordination team; notification and partners engagement; and communication strategies*
5. *RECOVERY INTERVENTION MODEL: including recovery strategies and actions*
6. *MONITORING SECTION: explaining the monitoring process, what/how to evaluate and how it is intended to be updated and adapted to changes that will occur.*

Approve the Pre-Disaster Recovery Plan

Community members should be invited to review and provide feedback ahead of final approval and publication of the plan. It should be made available by various means, including printed and electronic versions, and in formats accessible to those with communication access needs. A short non-technical summary of the plan and/or plan topics should also be developed as the plan is finalized to serve as a quick reference that facilitates the understanding of the project by the whole community.

Notification to the community about this review process may include traditional means, including print media, as well as non-traditional means, such as social media or other online forums. Public outreach should be used to determine accessibility needs. Furthermore, planners must be sure to consider the use of appropriate auxiliary aids and services (e.g., interpreters, captioning, alternate format).

After an appropriate period of time to allow for comments, planners need to hold hearings to adopt the plan and any ordinances, resolutions, or other authorities needed to support plan implementation and other recovery activities (FEMA, 2017).

Disseminate the Pre-Disaster Recovery Plan

Once the PRDP is approved, planners can officially launch and inform about the national DRR strategy and related development processes. This could include a dedicated

webpage that allows for civil society's contributions, views and future communications (news, updates to all stakeholders, surveys).

EXAMPLE: Establishing Leadership Roles, Beaufort County, SC (from Pre-Disaster Recovery Planning Guide for Local Governments, FEMA, 2017)

Under Beaufort County's Disaster Recovery Plan, existing county officials are given responsibility for managing long-term recovery activities (as well as short-term recovery and response activities): i) The County Administrator oversees recovery activities and is responsible for establishing recovery policies and procedures. ii) The Deputy Administrator for Public Services and Land Management serves as the Disaster Recovery Coordinator. iii) The County Administrator for Public Services and Land Management and the Deputy Administrator for Community Services are responsible for recovery operations and coordination. Each of these positions coordinates recovery activities for the agencies they regularly oversee. iv) A Recovery Task Force, staffed by representatives of county agencies as well as some outside organizations, provides advice and assists with coordination. This approach to defining leadership roles facilitates involvement of high-level officials as needed while not burdening them with responsibility for day-to-day operations.

4.3.5 Phase 5 – ASSESSING AND MAINTAINING THE PLAN: review and update

The planning process does not end when the PDRP is approved and released. This last phase (Figure 20), after the event, encourages planners to identify training and exercise opportunities and to establish a schedule for revision and review of plans. In recovery actions to increase overall preparedness and community resilience and capacity are vitally important to the success of a Pre-Disaster Recovery Plan. Review and revisions of a PDRP should be based on real-world and exercise experiences, as well as lessons learned.

Activity 5.1 – Identify ongoing preparedness activities

Ongoing preparedness activities ensure that the plan remains a useful document for the community and the stakeholders are prepared to implement the plan if it is necessary.

Undertake Regular Activities to Increase Preparedness

To maximize understanding and build capacity in the recovery process, communities should establish a regular schedule of training, exercises, and document review, revision, and update. This will enable planners to address outstanding capability or process gaps, mitigation needs, and other preparedness needs. Recovery plan–focused exercises should be integrated into other community preparedness activities. Considerations for recovery operations guided by the PDRP should be included in exercises of the emergency response plans for the community (FEMA, 2017).

Take into account:

- specific trainings on CNHM

Evaluate new vulnerabilities

Characteristics of a community may change over time, which means that planners must regularly reevaluate the threats, hazards and vulnerabilities of their community. Pre-disaster recovery planners need to work closely, and regularly, with hazard mitigation experts to research and understand changing community vulnerabilities. Hazard mitigation is a fundamental cornerstone of preparedness, and opportunities to mitigate should be considered and utilized. Planners must also consider new community vulnerabilities that arise from changes in policies at all governance levels (FEMA, 2017).

Conduct regular reviews of the Pre-Disaster Recovery Plan

As a community's population, economic base, leadership, and demographics shift, local capabilities and capacity may change, it is important to periodically take stock of the community's capabilities and capacity to support recovery. This may include new or previously ignored assets and capabilities that may come with those shifts.

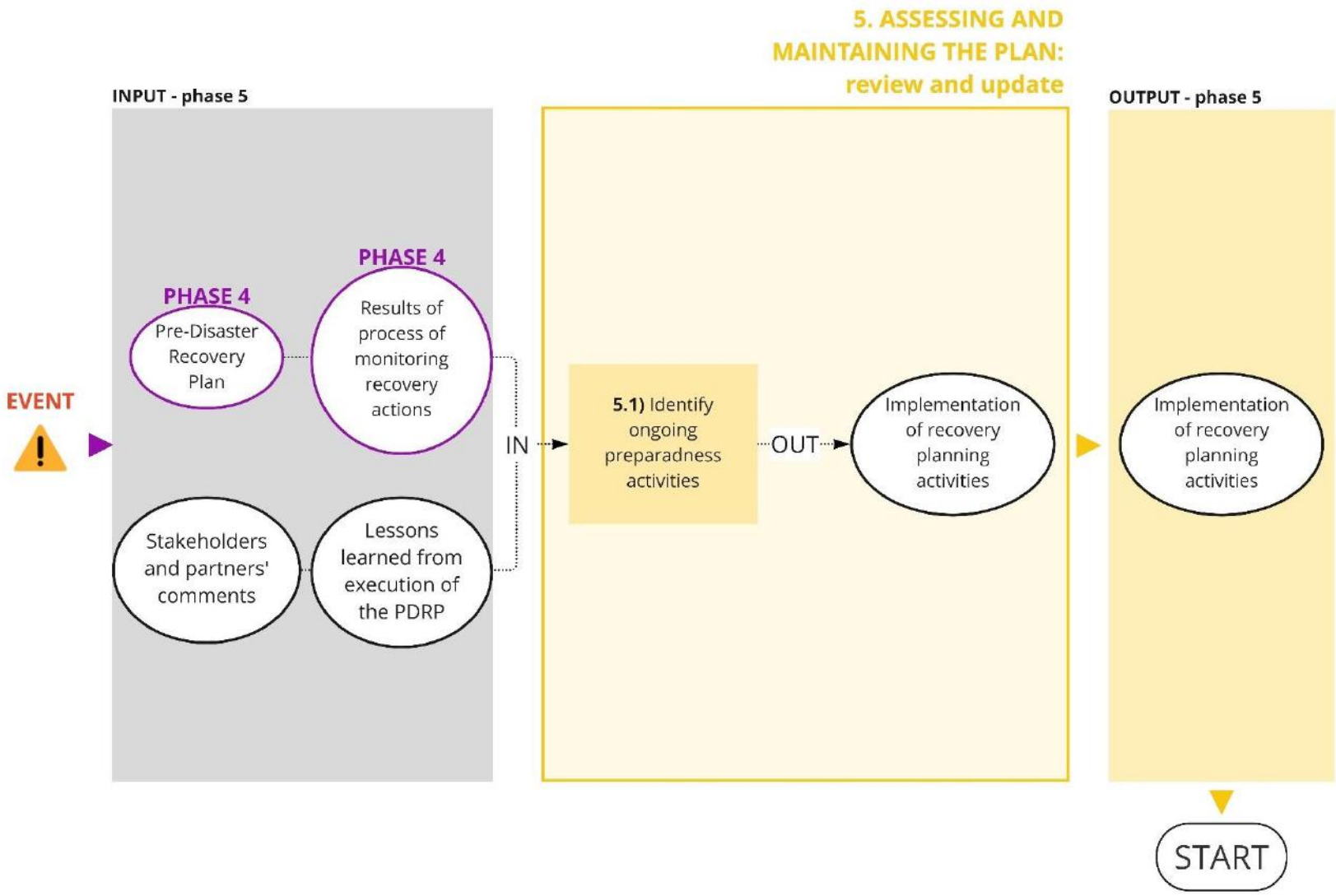

Figure 20. Phase 5

Based on the periodical review of the community's capabilities and capacity to support recovery, and on the evaluation of new vulnerabilities, stakeholders, partners and the public should be regularly invited to comment on the plan, provide their concerns and suggestions to review and update the contents of PDRP.

Document best practices and lessons learned

As the final activity in developing a PDRP, the collaborative PRT should document the steps that were followed in the planning process. It is important that planners take time to collect best practices and lessons learned. Analysis of the planning process and defined areas for improvement in future planning efforts benefit the community and partners as well. Lessons learned from the planning process, or from the execution of the plan post-disaster, should also be used to guide future revisions of the pre-disaster plan (FEMA, 2017).

EXAMPLE: Pre disaster recovery exercises – Tokyo (from Guidance note on recovery: Pre-Disaster Recovery planning, UNDRR, 2012)

The Tokyo Metropolitan Government's pre disaster recovery plan consists of three documents: the grand design, a recovery manual for officers (outlining municipal responsibilities), and a recovery manual for citizens. To test their recovery plan and familiarize citizens with their recovery roles and responsibilities, the TMG conducted a unique exercise to help place the planning participants in the disaster scenario. With a worst-case earthquake scenario in mind, participants were brought to a selected area of the city and briefed on hazard characteristics and known vulnerabilities.

While walking through the city, they were first asked to observe the infrastructure around them and describe their predicted damages and the ensuing recovery issues. In a worst-case scenario earthquake, many of the houses would be destroyed and one short term recovery issue would be to identify where temporary shelters could be erected to house people. Reflecting on the issue of transitional shelter, participants were next asked to identify vacant lots which could be used to shelter people temporarily. To enhance the experience, the TMG rented a school gymnasium in the area, set it up as a shelter and had the participants spend the night there on cots as if they had evacuated their own homes. Finally, participants were asked to define how they would like to redevelop the city and present it to the planning team (UNDRR, 2012).

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

In this chapter, the SHELTER 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. Miro[5] 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.

The following paragraphs describe five Roadmaps and highlight the most important elements for Ravenna, Dordrecht, Seferihisar, Galicia and Sava River Basin Open Labs.

5.1 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.

[5] Miro | Online Whiteboard for Visual Collaboration, available at: https://miro.com/

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

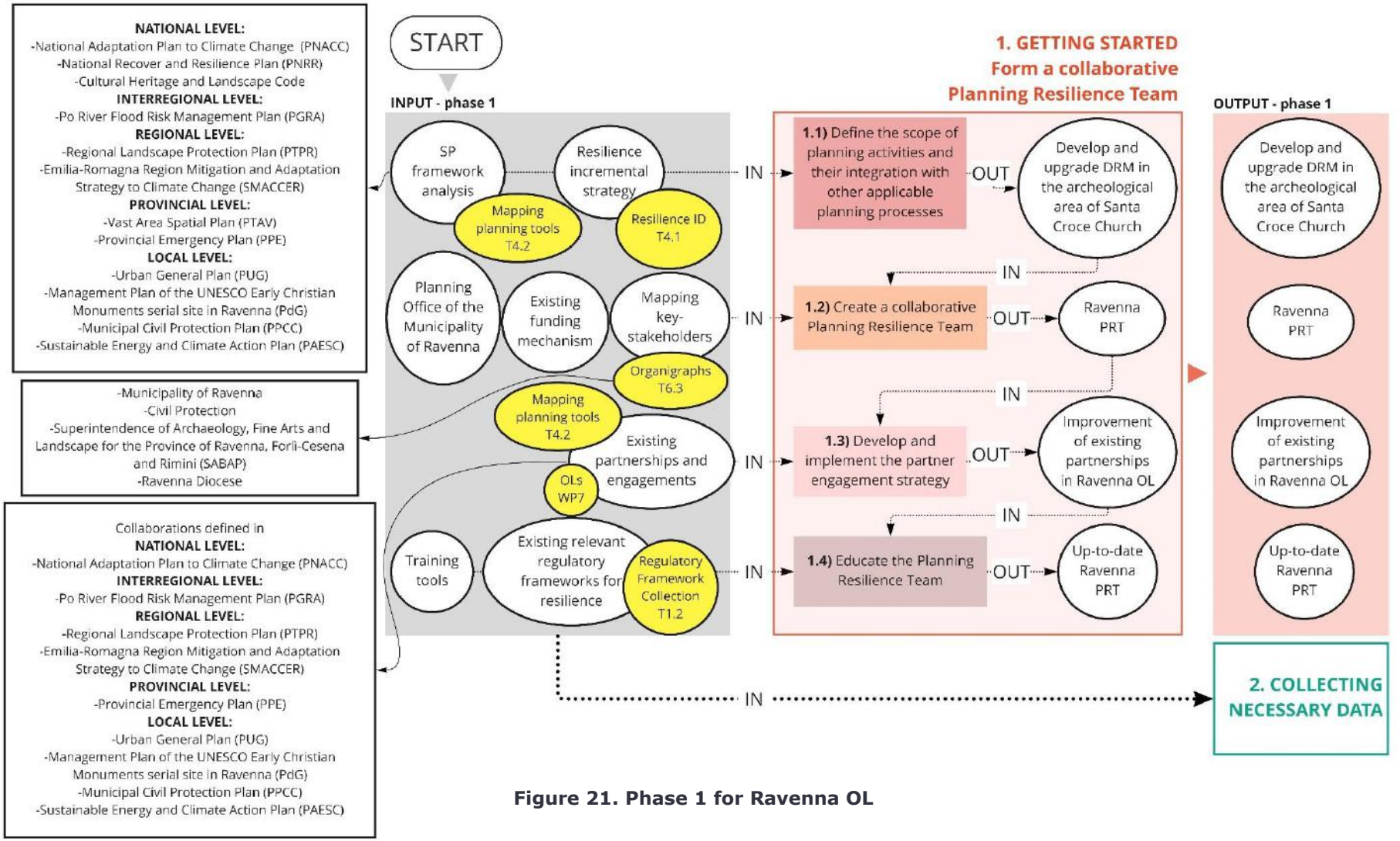

Figure 21. Phase 1 for Ravenna OL

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

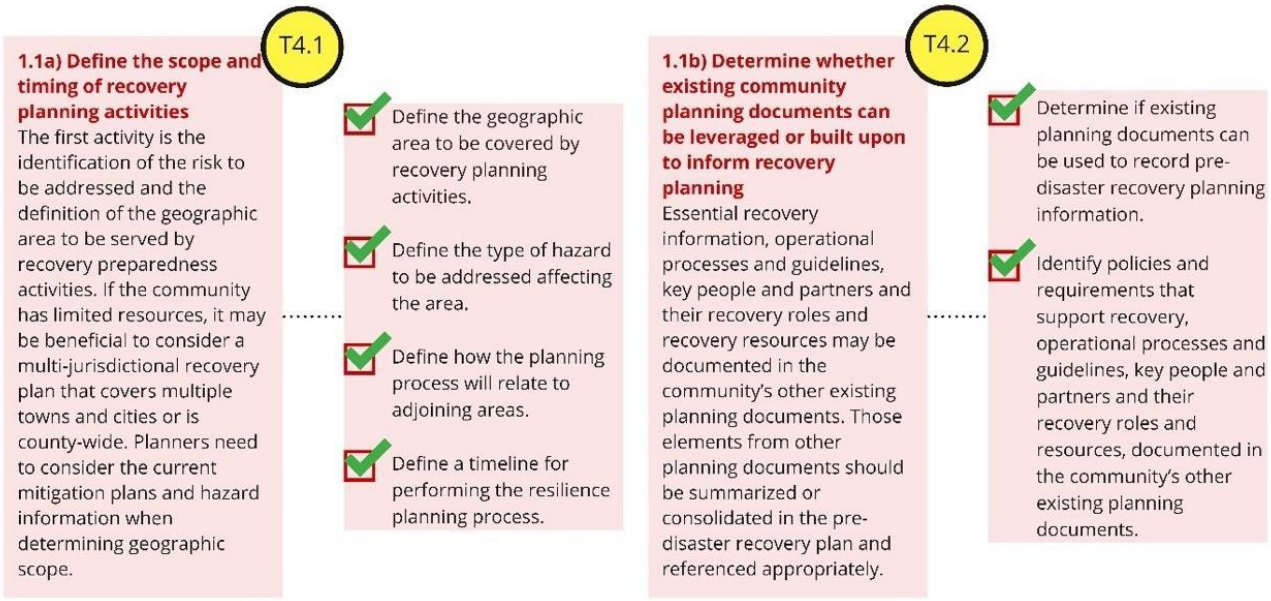

Figure 22. Key-activity 1.1 for Ravenna OL

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 2. 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)

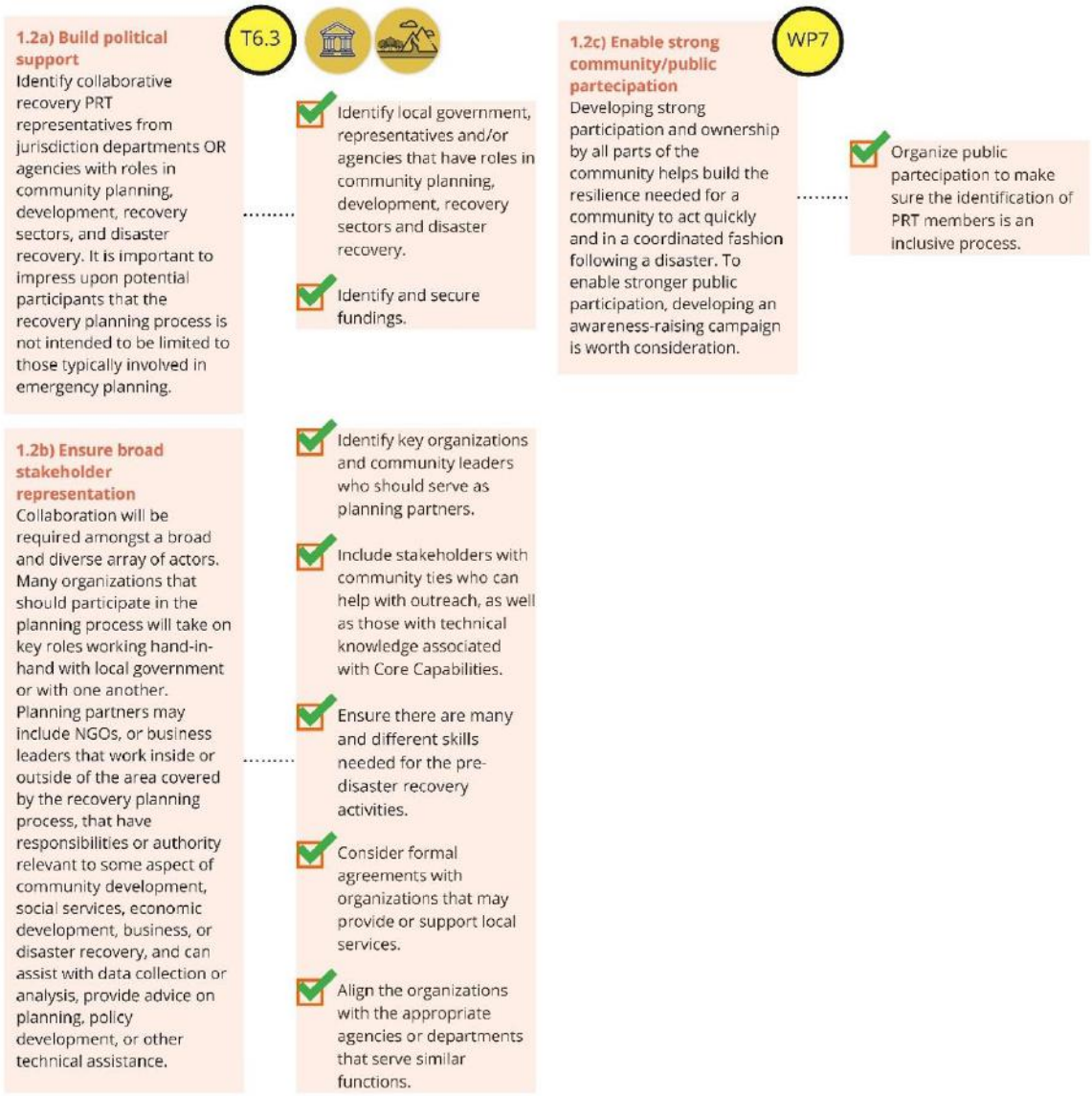

Figure 23. Key-activity 1.2 for Ravenna OL

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)

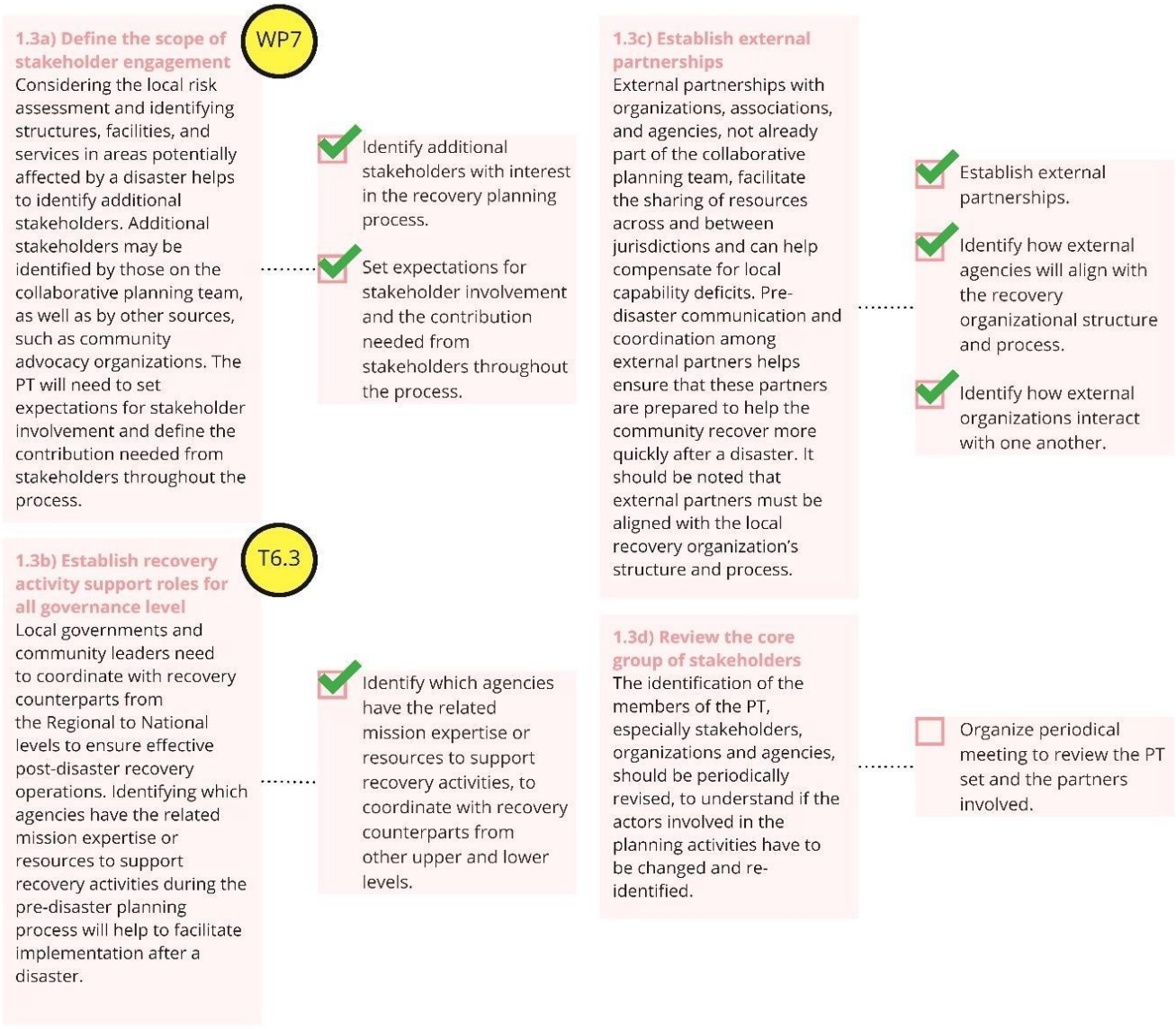

Figure 24. Key-activity 1.3 for Ravenna OL

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 3. 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 aides the community and the PRT in understanding its role in recovery preparedness and plan implementation.

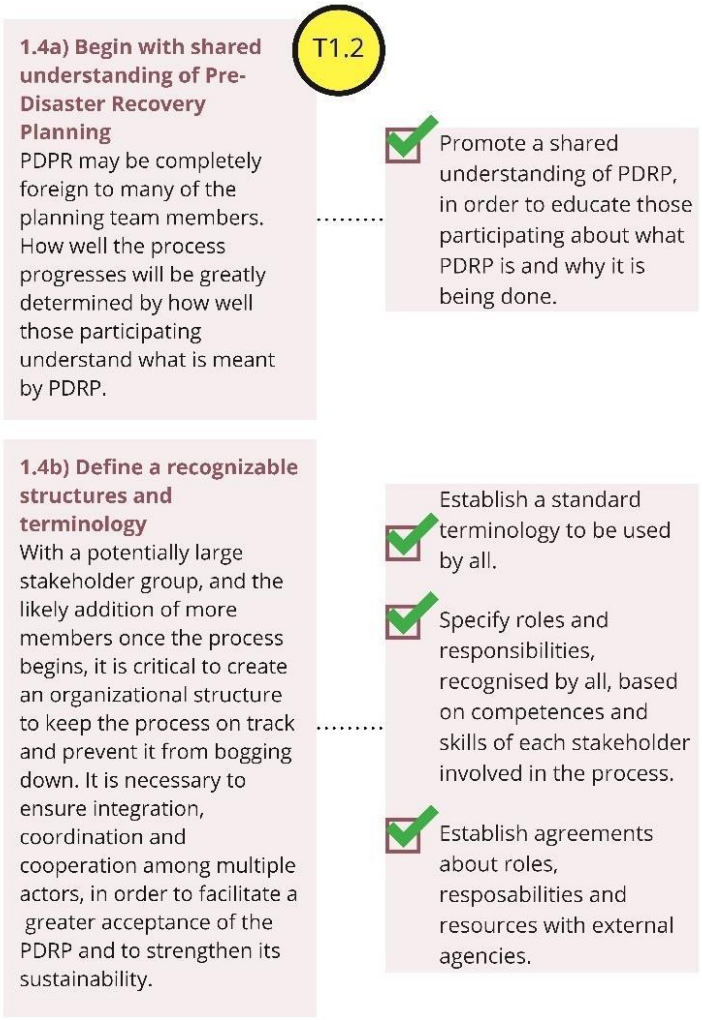

Figure 25. Key-activity 1.4 for Ravenna OL

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.

5.1.2 PHASE 2 – COLLECTING NECESSARY DATA: Understand the situation

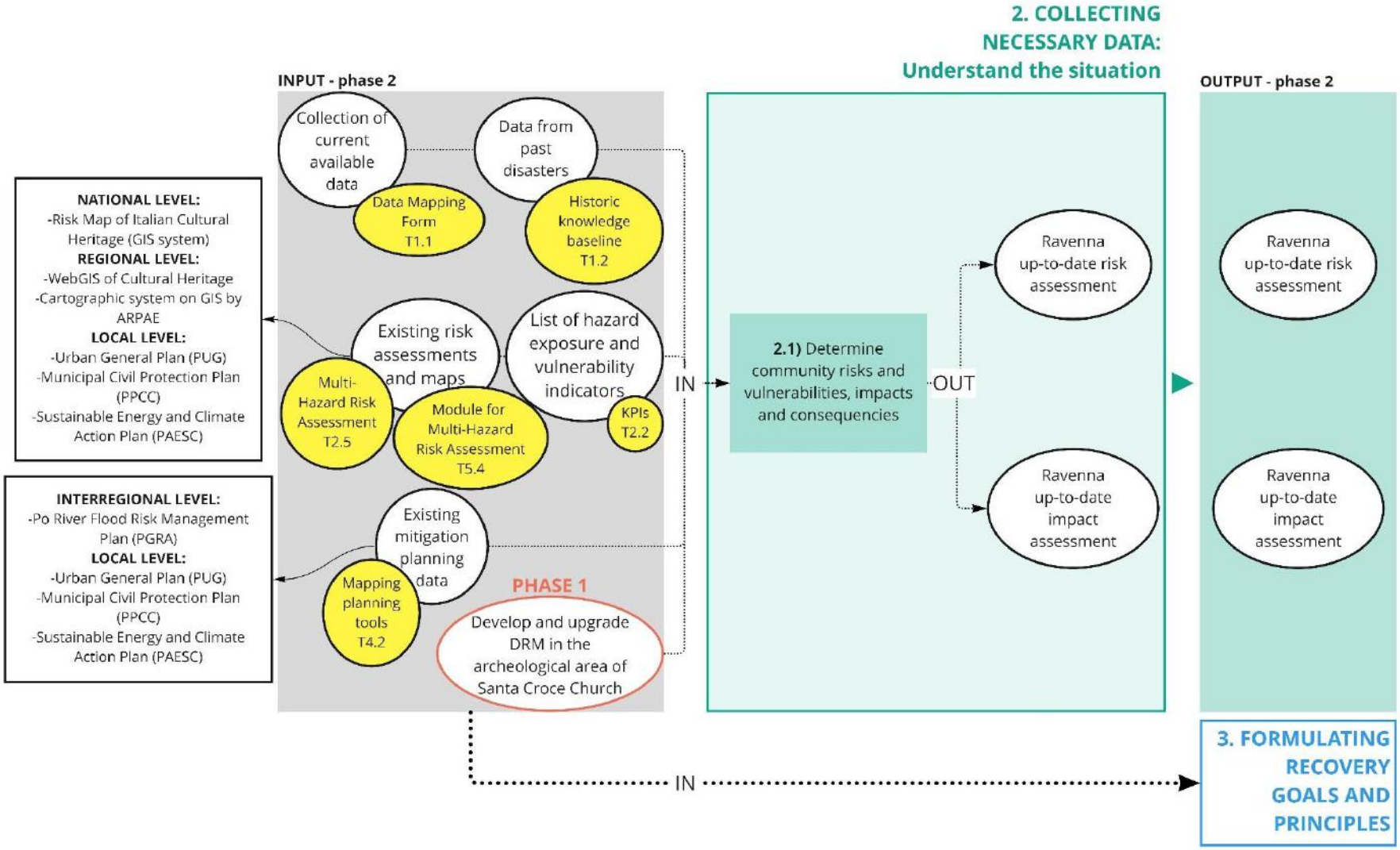

Figure 26. Phase 2 for Ravenna OL

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 (PGRA-Po)
Local level	Urban General Plan (PUG)
	Municipal Civil Protection Plan (PPCC)
	Sustainable Energy and Climate Action Plan (PAESC)

Table 4. 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.

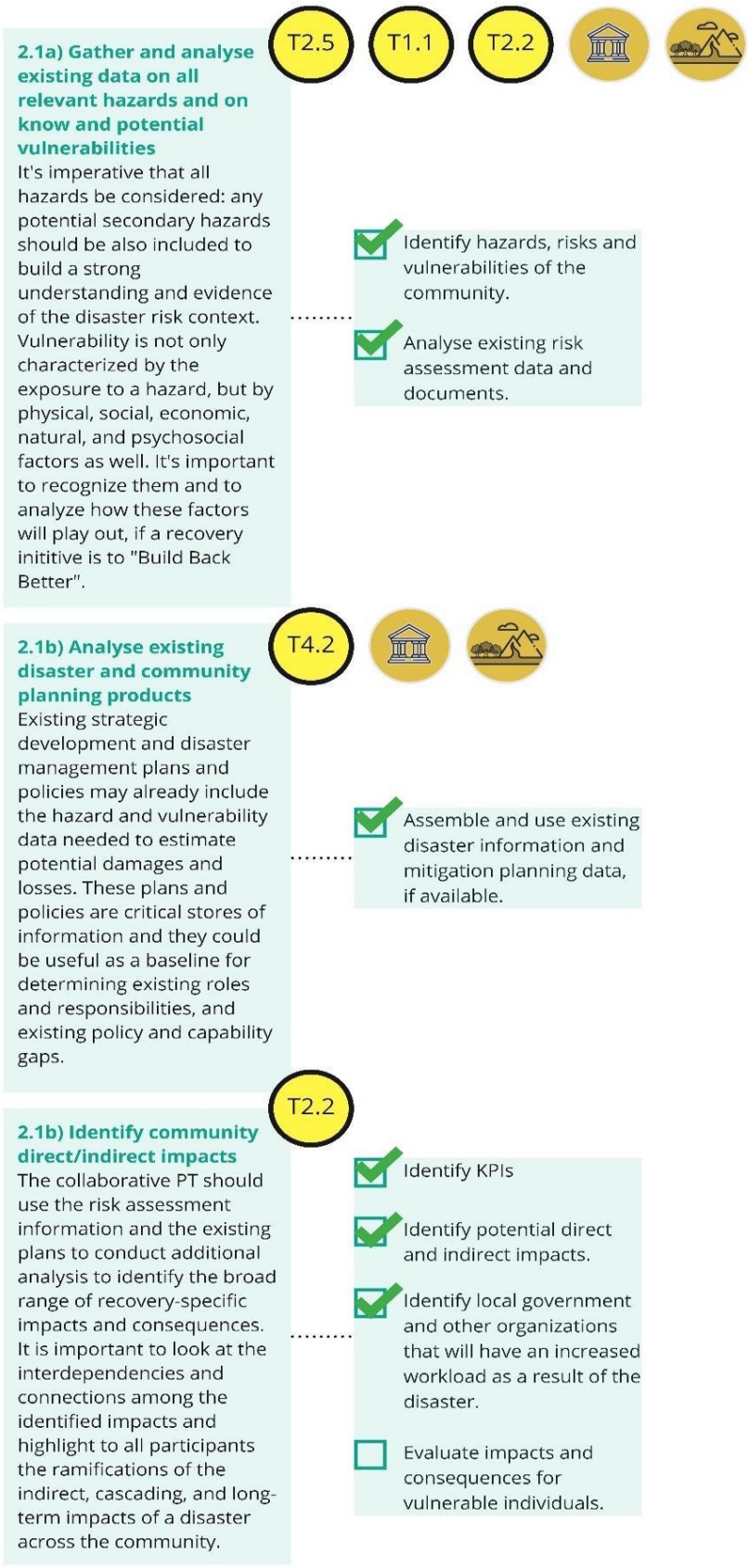

Figure 27. Key-activity 2.1 for Ravenna OL

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.

5.1.3 PHASE 3 – FORMULATING RECOVERY GOALS AND PRINCIPLES

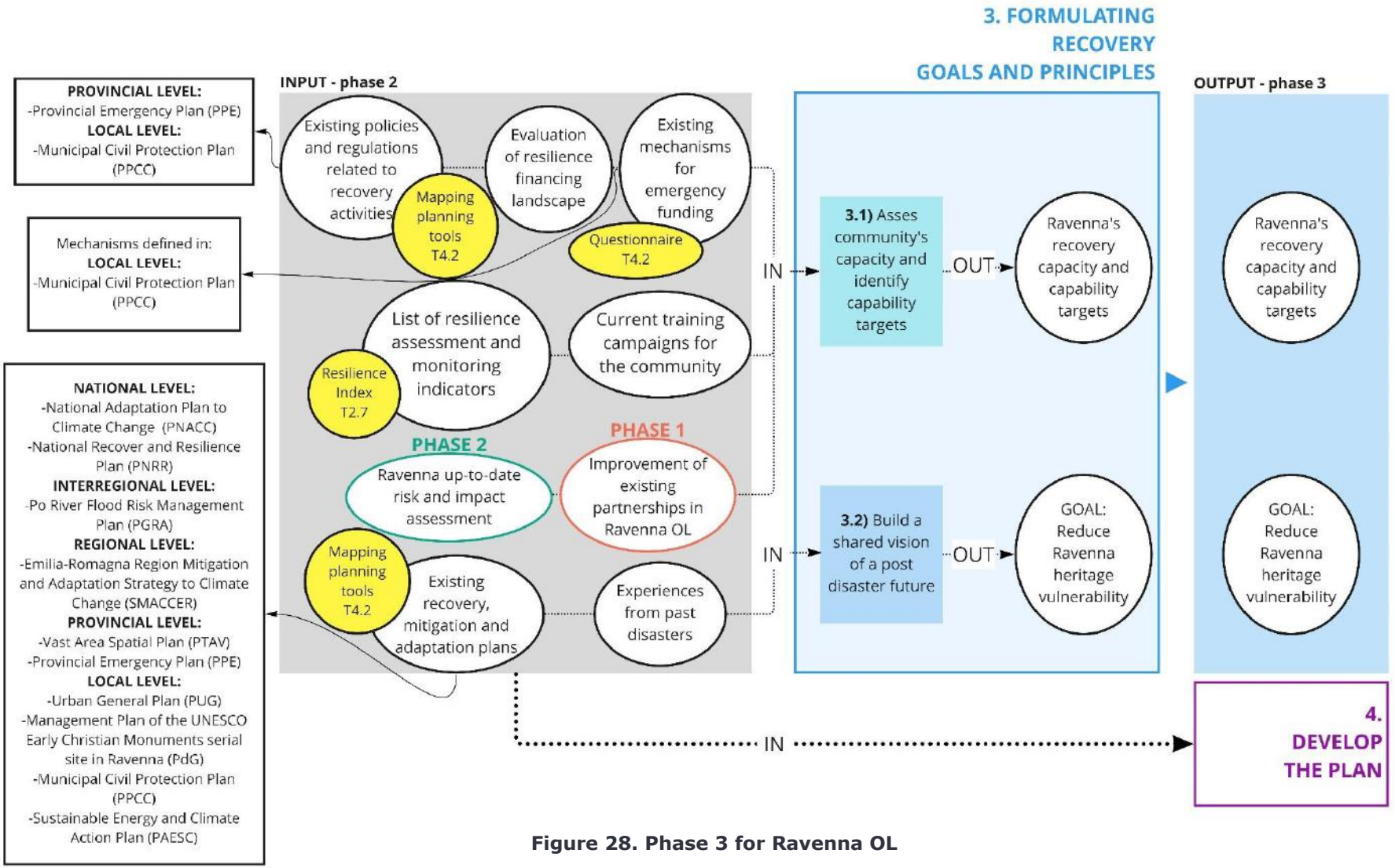

Figure 28. Phase 3 for Ravenna OL

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 5. 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 trough training projects, simulation exercises, educational lessons in schools, etc.

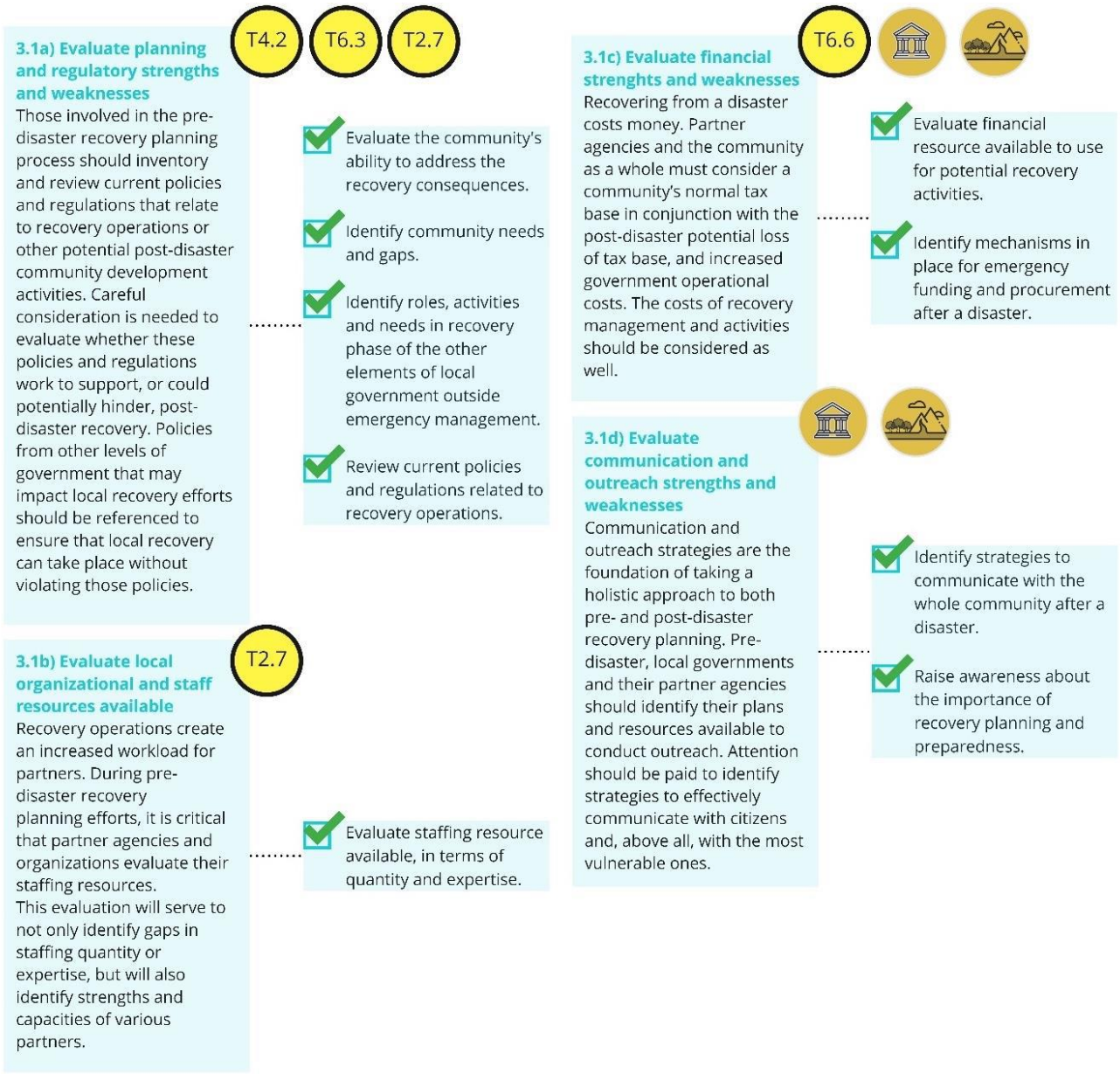

Figure 29. Key-activity 3.1 for Ravenna OL

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 (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 6. Relevant SP tools for Ravenna OL for Activity 3.2

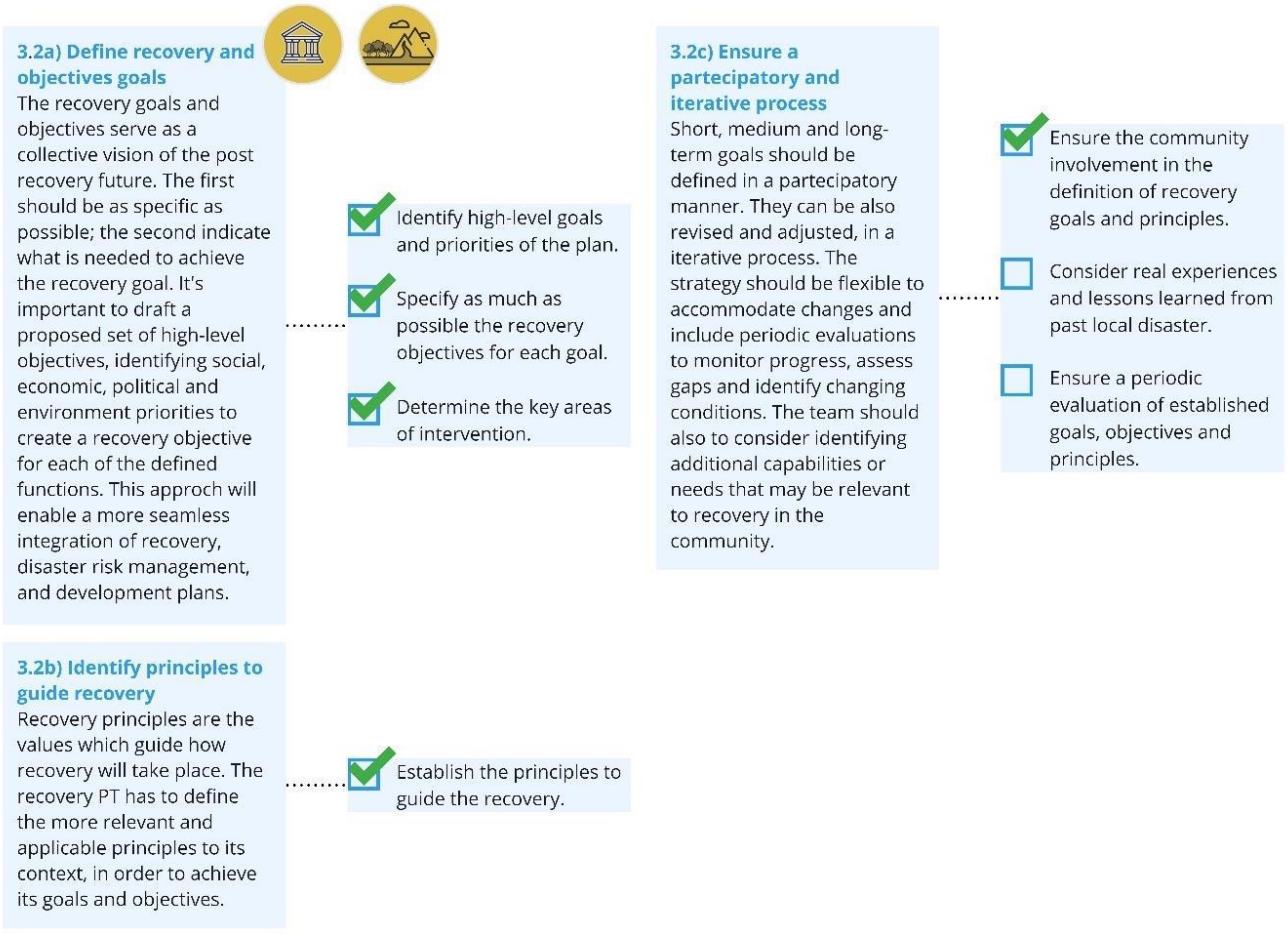

Figure 30. Key-activity 3.2 for Ravenna OL

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.

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

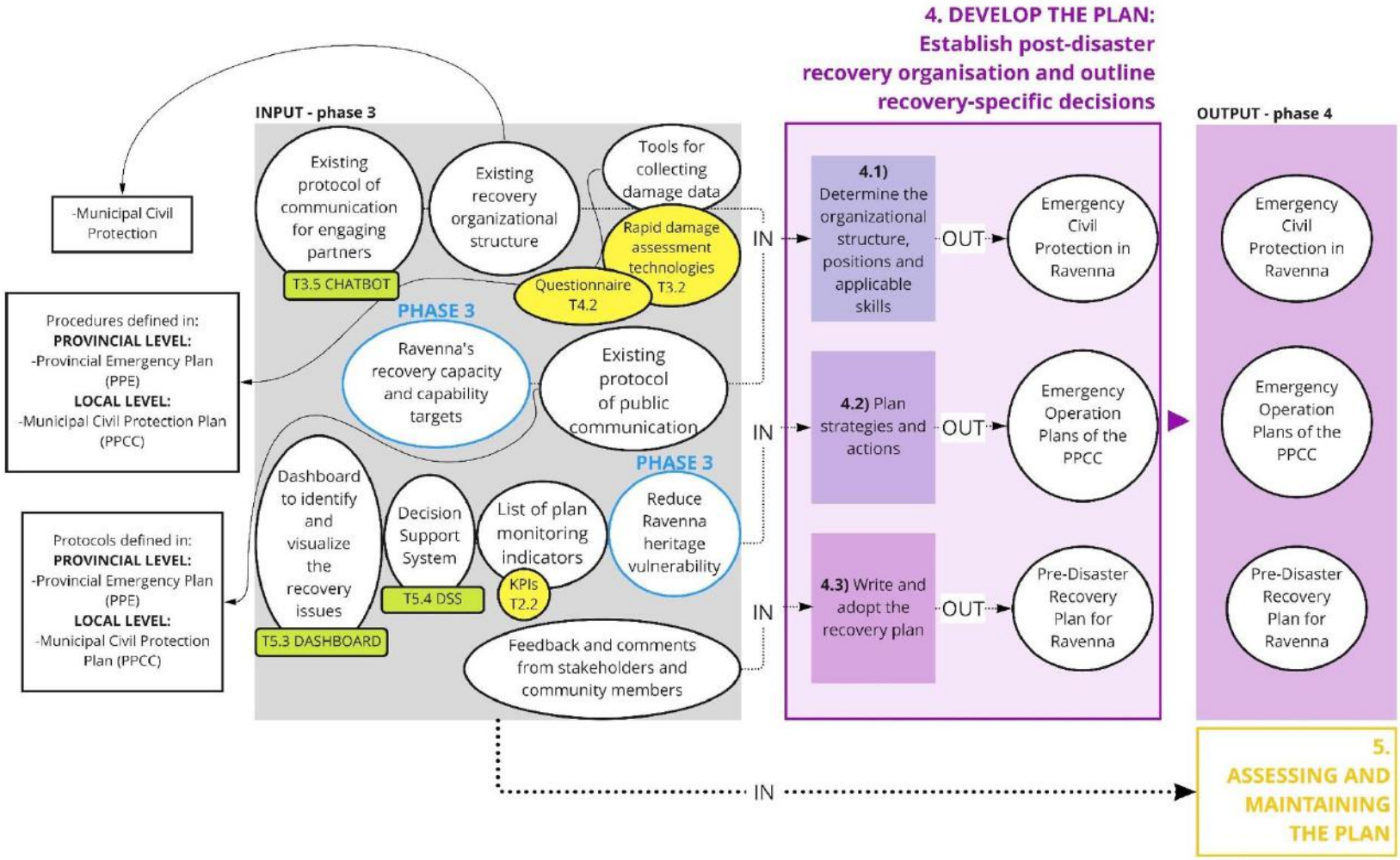

Figure 31. Phase 4 for Ravenna OL

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 32. 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.

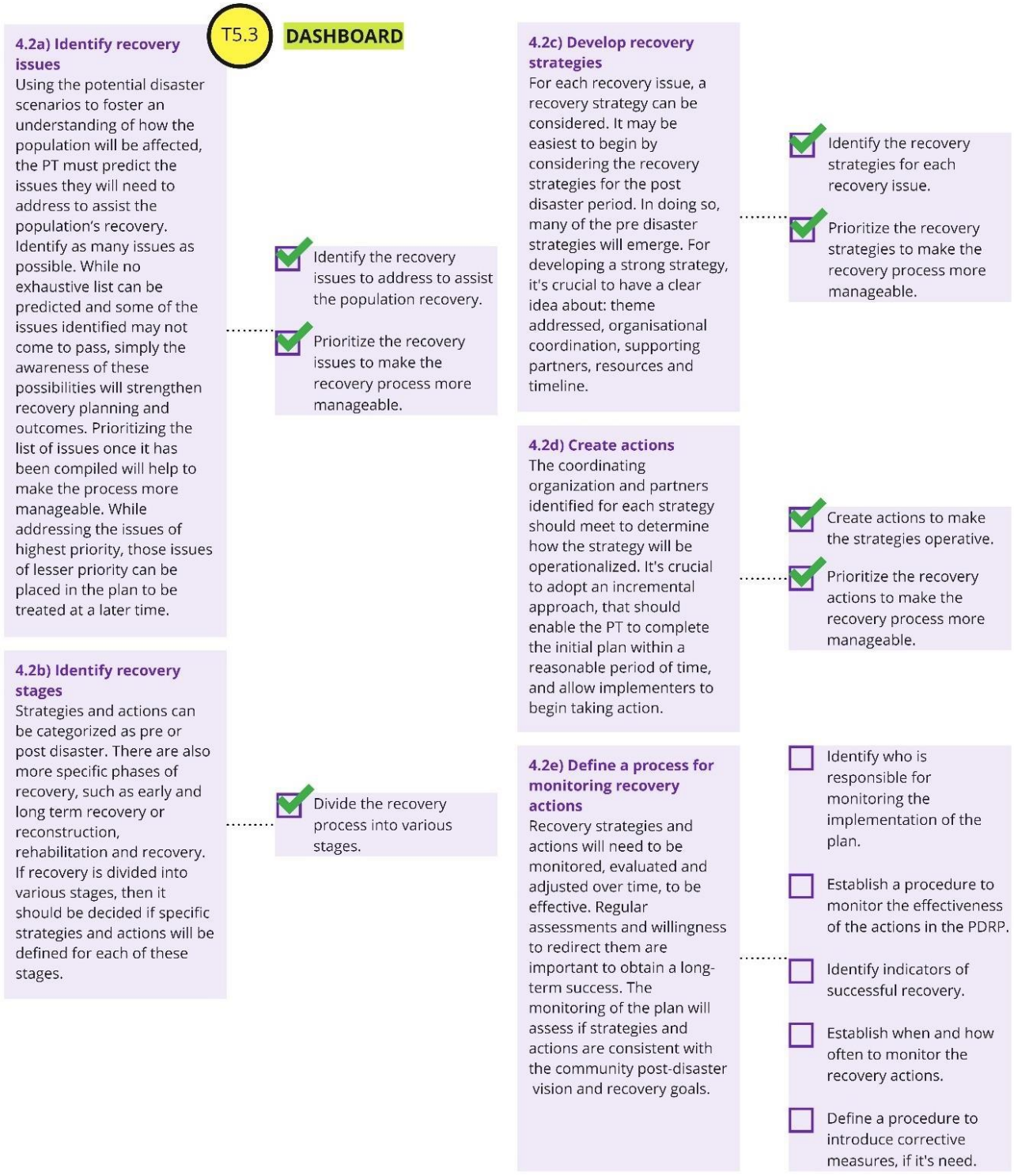

Figure 33. Key-activity 4.2 for Ravenna OL

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 34. 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.

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

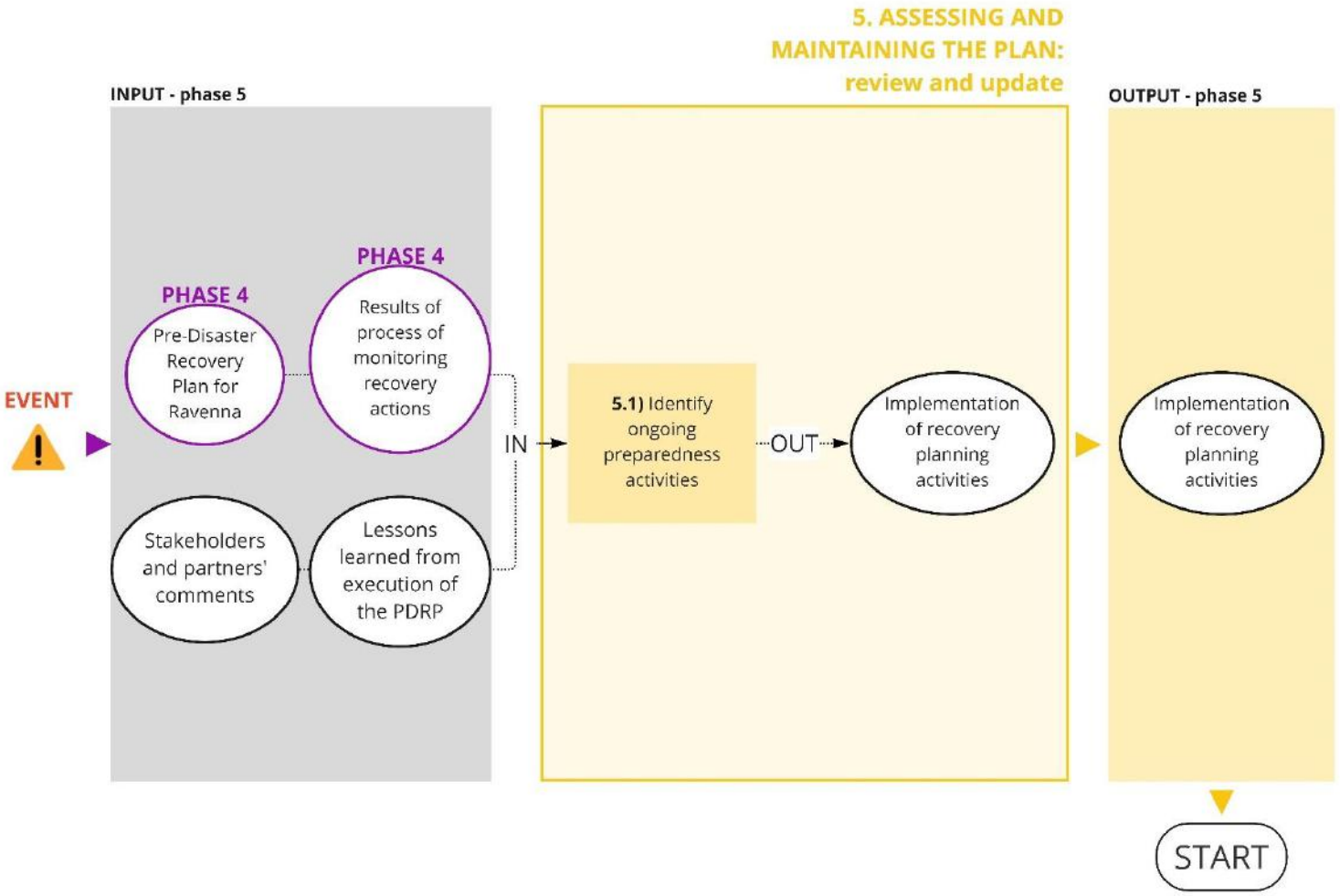

Figure 35. Phase 5 for Ravenna OL

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 36. 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.

5.1.6 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.

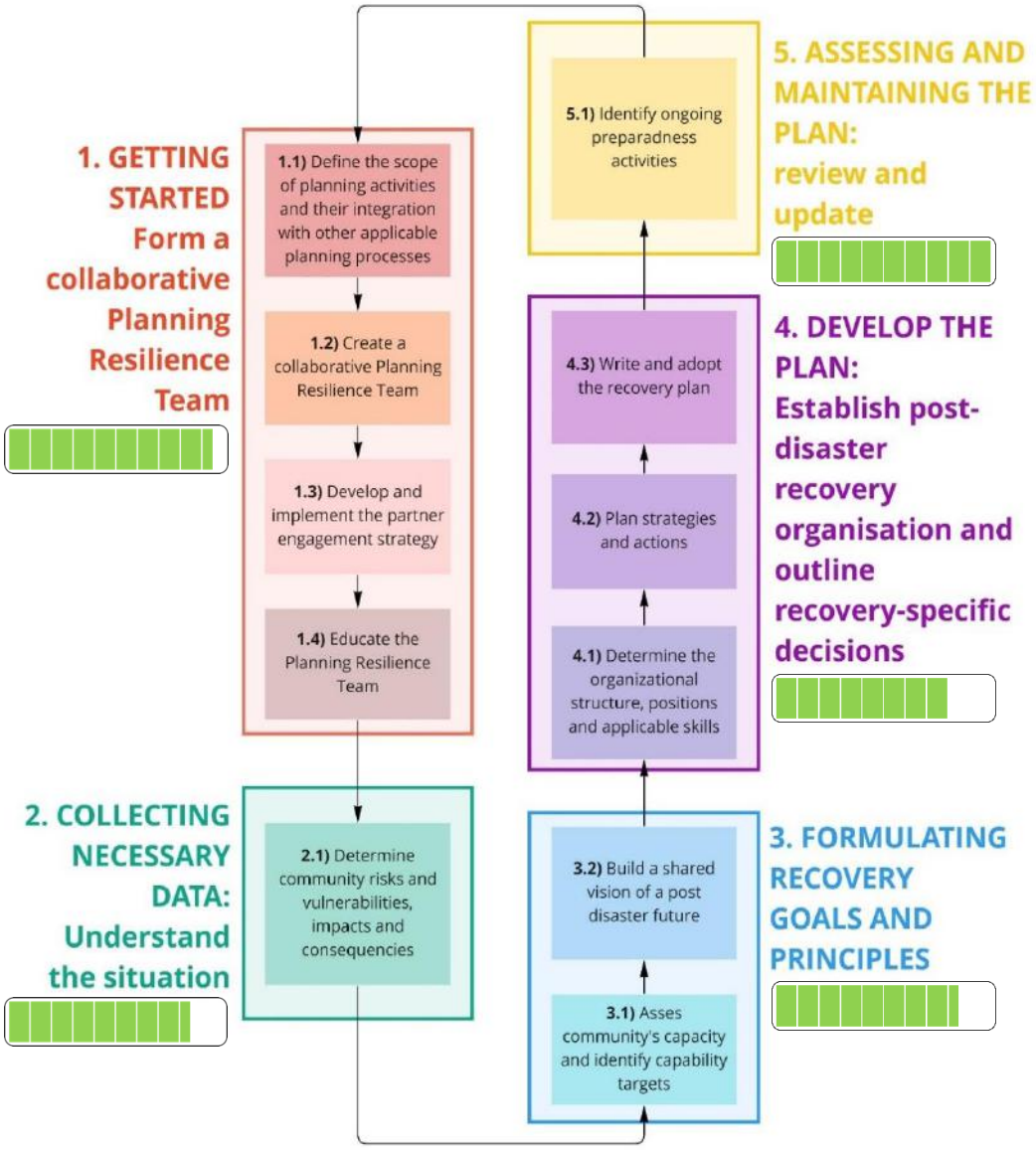

Figure 37. Progress in the PDRR for Ravenna OL

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 partecipation 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 strenghts 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 partecipatory 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 7. Completed/pending activities for Ravenna OL

5.2 Dordrecht Open Lab

The Dordrecht OL is an urban OL, located in the Rhine-Meuse delta in the Netherlands. Water levels are influenced by both the sea and the rivers and, due to climate change, they will be higher in the future. Consequently, the HA will be periodically flooded as it is located on the lowest-lying area, as well as the rest of the areas located outside the dikes.

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

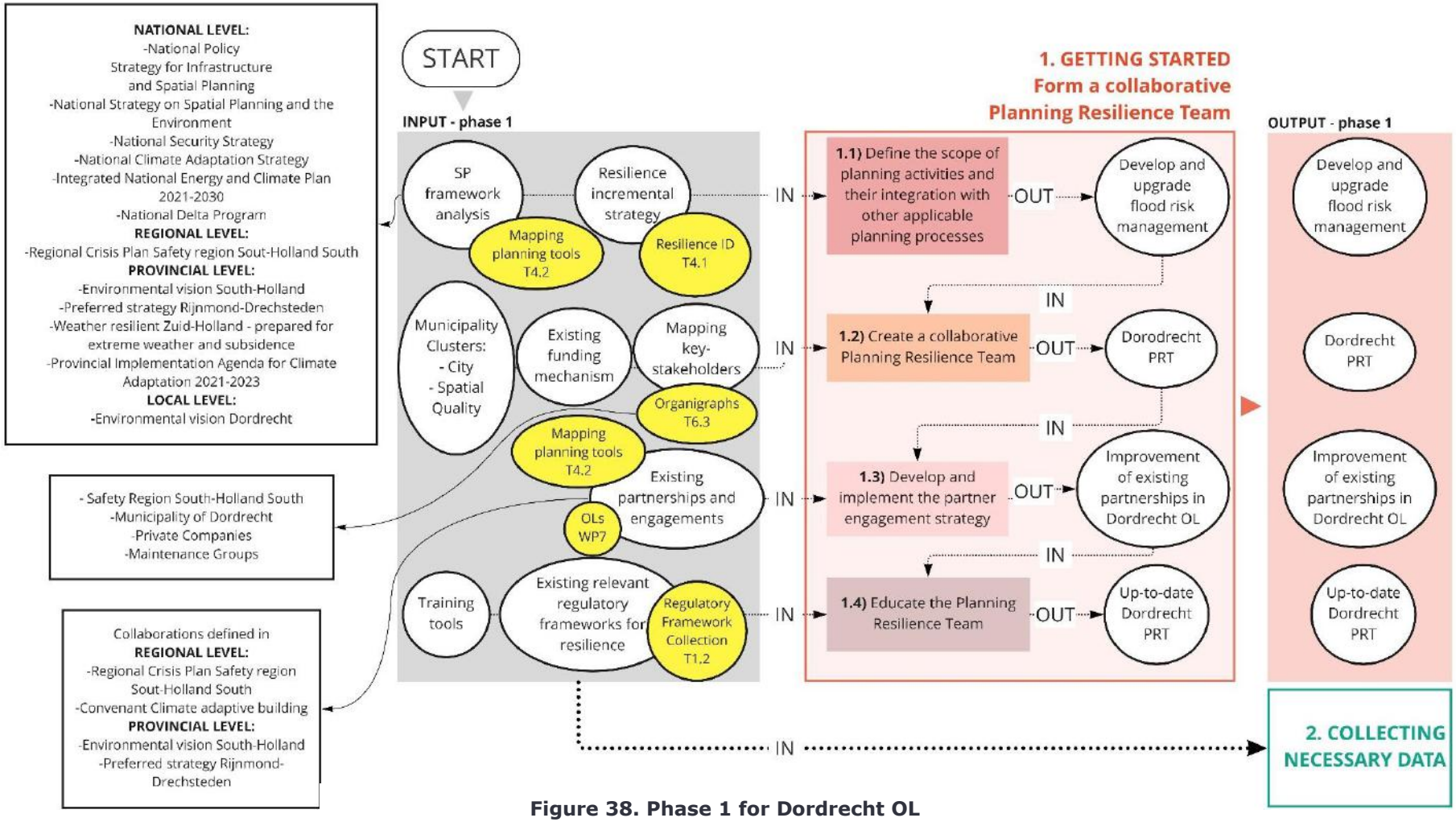

Figure 38. Phase 1 for Dordrecht OL

Activity 1.1 - Define the scope of planning activities and their integration with other applicable planning processes (Figure 39)

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 8).

LEVEL	SP TOOL
National level	National Policy Strategy for Infrastructure and SP
	National Strategy on SP and the Environment
	National Security Strategy
	National Climate Adaptation Strategy
	Integrated National Energy and Climate Plan 2021-2030
	National Delta Program
Regional level	Regional Crisis Plan Safety region South-Holland South
Provincial level	Environmental vision South-Holland
	Preferred strategy Rijnmond-Drechsteden
	Weather resilient Zuid-Holland - prepared for extreme weather and subsidence
	Provincial Implementation Agenda for Climate Adaptation 2021-2023
Local level	Environmental vision Dordrecht

Table 8. Relevant SP tools for Dordrecht OL for Activity 1.1

From the analysis of the SP framework, it can be defined that the scope of the PDR planning for Dorodrecht OL is to develop and upgrade the flood risk management.

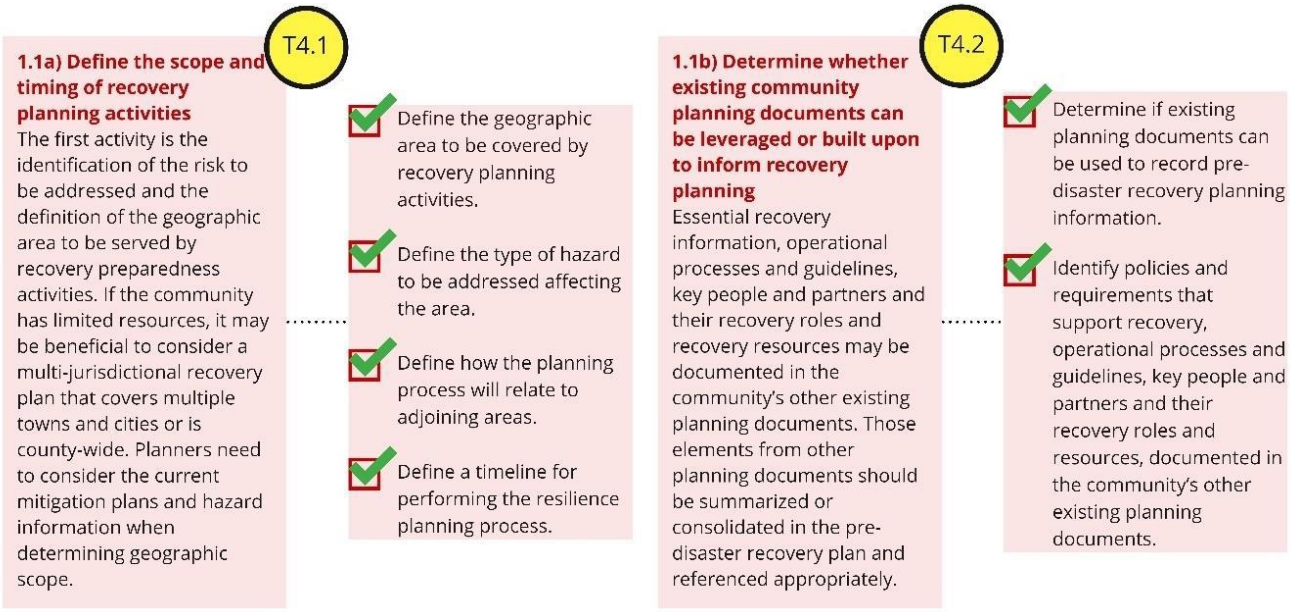

Figure 39. Key-activity 1.1 for Dordrecht OL

Activity 1.2 - Create a collaborative Planning Resilience Team (Figure 40)

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

The Municipality of Dordrecht, and especially the offices of its clusters City and Spatial Quality, can be considered as the starting point to form the team which leads the recovery planning process. According to the Organigraph, developed in Task 6.3, there are other political and technical entities that offer their contribution to the process such as:

- Safety Region South-Holland South
- Water Agencies
- Private Companies
- Maintenance Groups

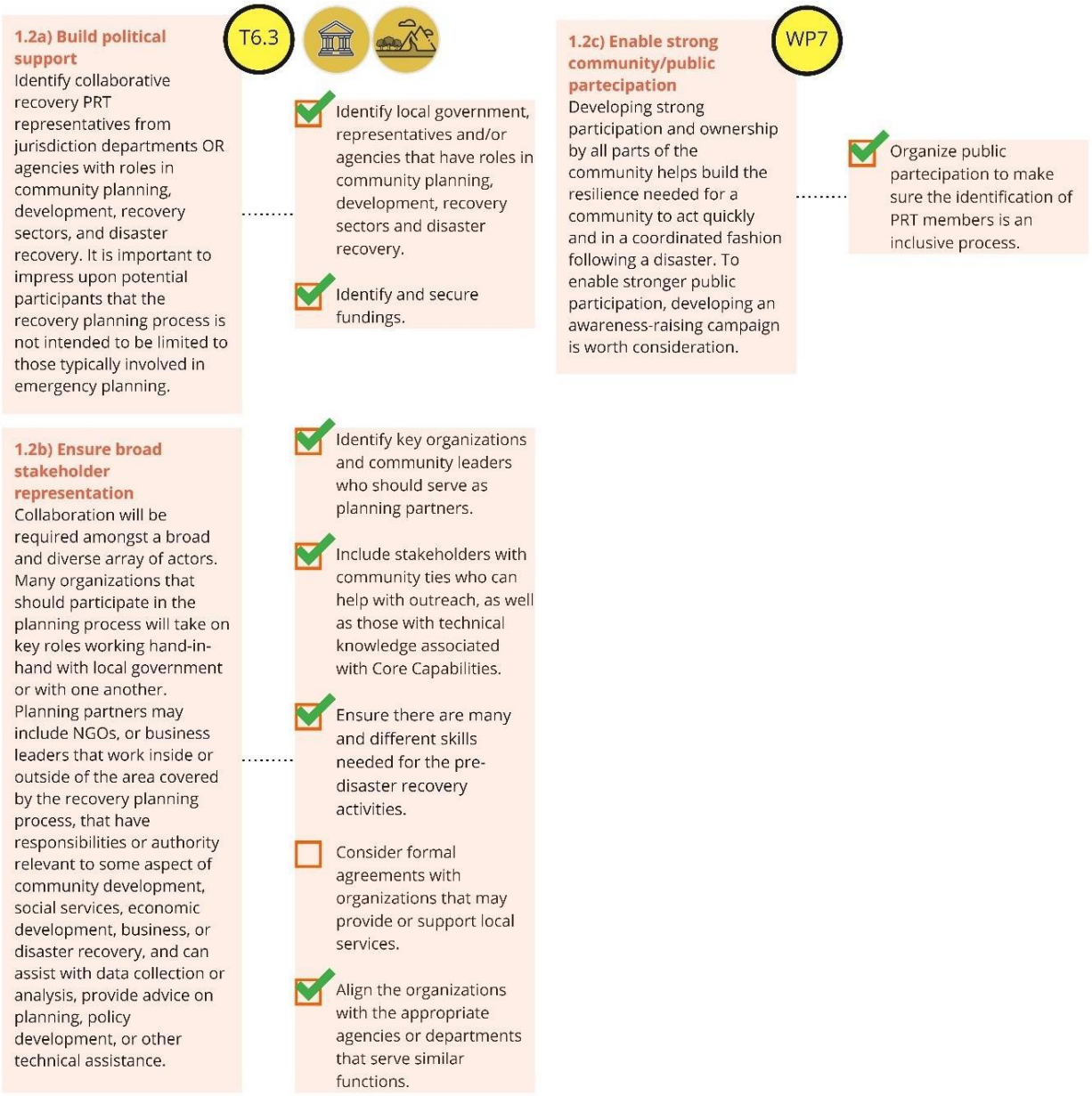

Figure 40. Key-activity 1.2 for Dordrecht OL

Activity 1.3 – Develop and implement the partner engagement strategy (Figure 41)

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 9).

LEVEL	SP TOOL
Regional level	Regional Crisis Plan Safety region South-Holland South
	Convenant Climate adaptive building
Provincial level	Environmental vision South-Holland
	Preferred strategy Rijnmond-Drechsteden

Table 9. Relevant SP tools for Dordrecht OL for Activity 1.3

The development and implementation of these planning tools foresaw collaborative processes among municipalities in South-Holland South, water agencies and other safety regions. Furthermore, construction companies, financiers and developers can be involved in this planning process. Local communities, civil society organizations and citizens do not participate in co-creation of planning tools, but public participation is an important part for their dissemination and implementation.

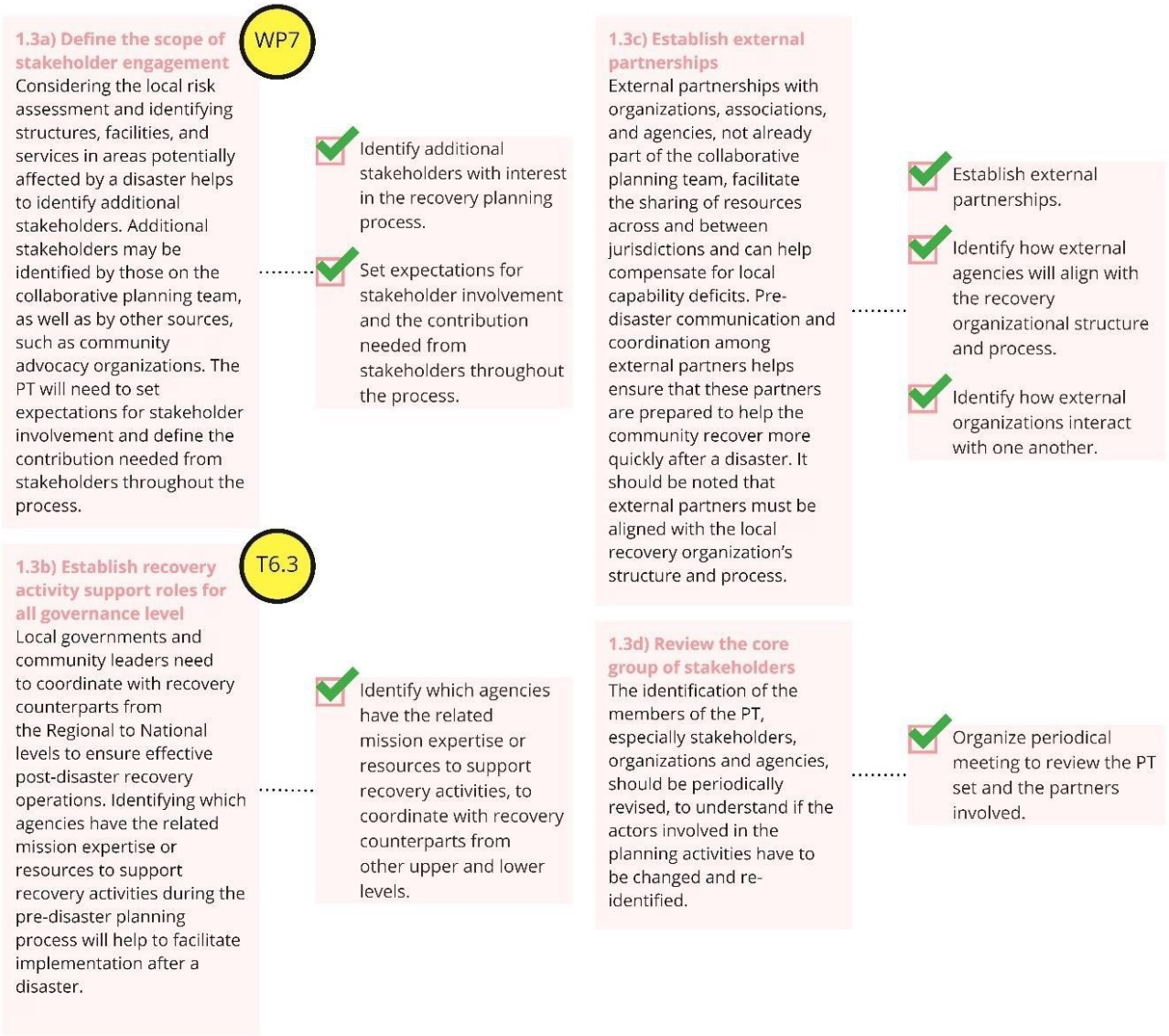

Figure 41. Key-activity 1.3 for Dordrecht OL

Activity 1.4 – Educate the Planning Resilience Team (Figure 42)

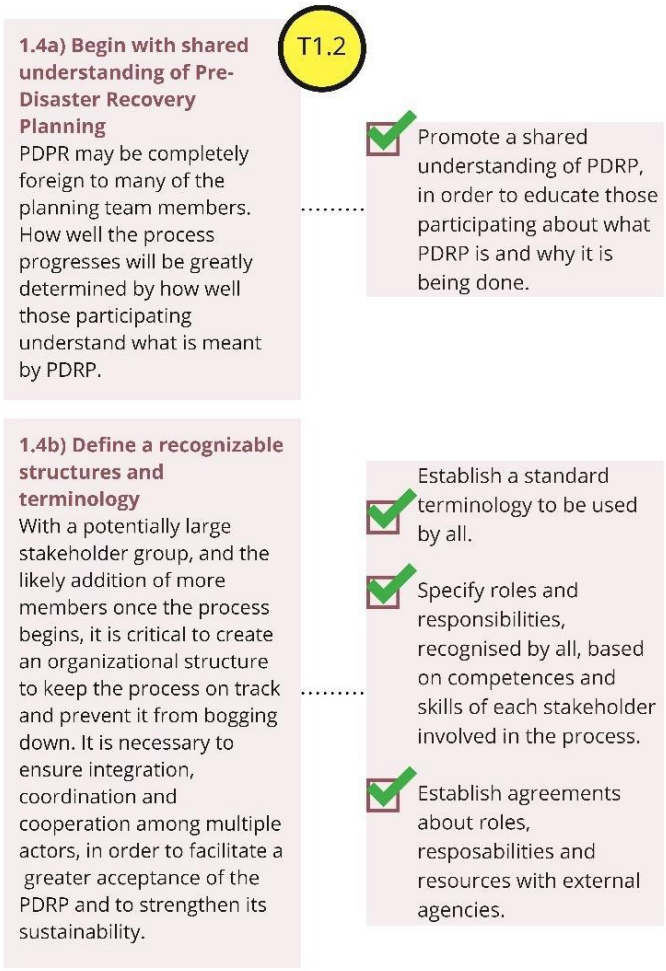

Figure 42. Key-activity 1.4 for Dordrecht OL

Regarding the first phase, it is possible to say that Dordrecht 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.

It is necessary to highlight that in the Netherlands there is a tradition of informal relationships among actors involved in the DRM, without formal agreements. However, all agencies and stakeholders have their roles and responsibilities and they are very well aligned together.

5.2.2 PHASE 2 – COLLECTING NECESSARY DATA: Understand the situation

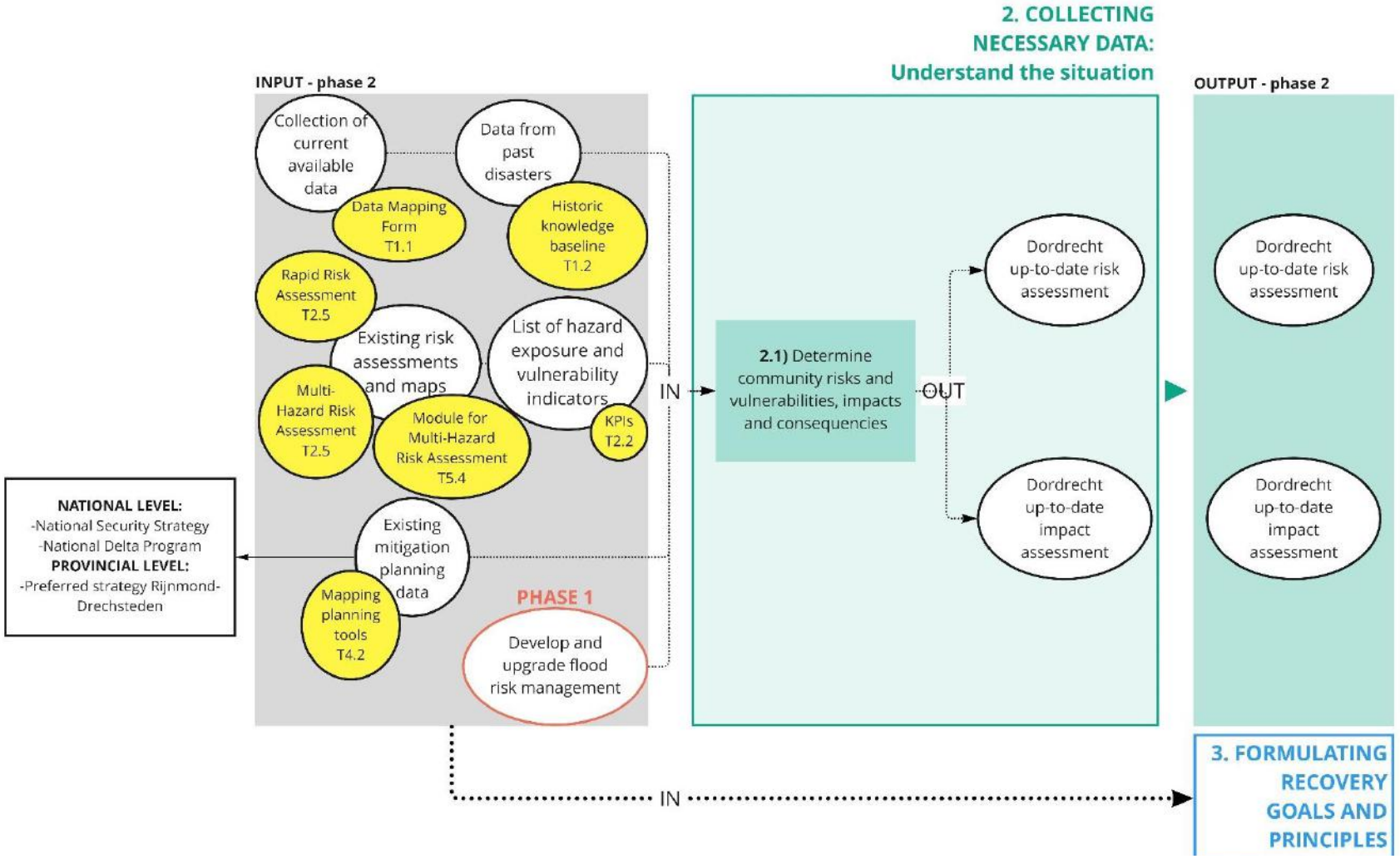

Figure 43. Phase 2 for Dordrecht OL

Activity 2.1 - Determine community risks and vulnerabilities, impacts and consequences (Figure 44)

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

From SHELTER, the available inputs are:

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

Furthermore, there are some planning tools, that provide also specific disaster risk information (Table 10).

LEVEL	SP TOOL
National level	National Security Strategy
	National Delta Program
Provincial level	Preferred strategy Rijnmond-Drechsteden

Table 10. Relevant SP tools for Dordrecht OL for Activity 2.1

At the national level, the *National Security Strategy (NSS)* provides an overview of all threats and risks and specifies their urgency, based on the degree of resilience and their coherence within the national security approach, in order to help protect social continuity and the democratic rule of law. Also, the *National Delta Program* can be considered a relevant tool: it focuses on flood risk management, developing measures, studies and projects to protect the Netherlands from flooding. The *National Delta Program* is detailed in the *Preferred strategy Rijnmond-Drechsteden,* at provincial level. The latter conducts risk dialogues and stress tests identifying threats and vulnerabilities, to formulate adaptive strategies of DRM.

Regarding the second phase, it is possible to say that Dordrecht OL has many available data, to gather information about hazards, risk and vulnerabilities to address in its territory. Impact analysis have been made as well as scenario's written out, identifying impacts and consequences.

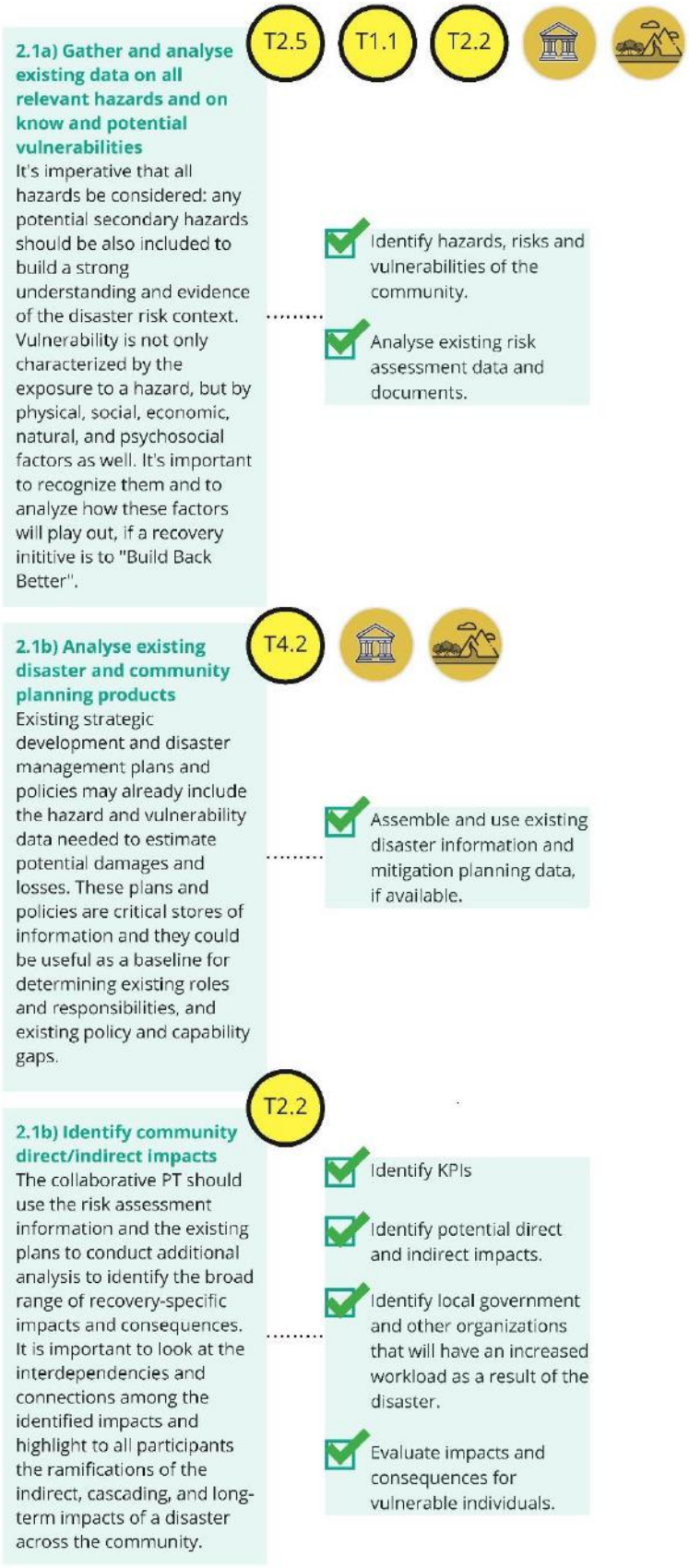

Figure 44. Key-activity 2.1 for Dordrecht OL

5.2.3 PHASE 3 – FORMULATING RECOVERY GOALS AND PRINCIPLES

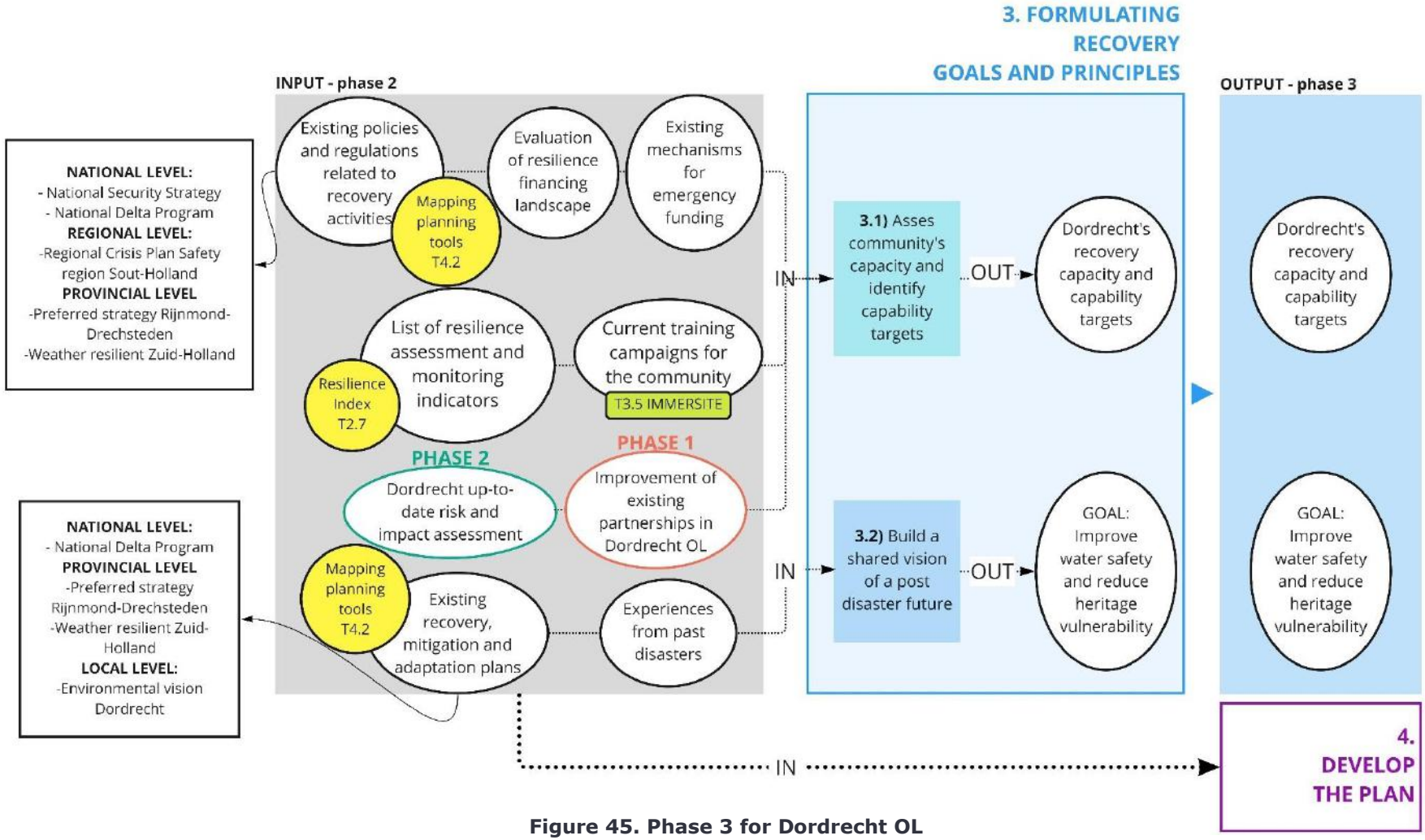

Figure 45. Phase 3 for Dordrecht OL

Activity 3.1 – Assess community's capacity and identify capability targets (Figure 46)

Based on the risk assessment of the previous phase, this activity is to evaluate strengths and weakness 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 tools are the followings (Table 11).

LEVEL	SP TOOL
National level	National Security Strategy
	National Delta Program
Regional level	Regional Crisis Plan Safety Region South-Holland
Provincial level	Preferred Strategy Rijnmond-Drechsteden
	Weather resilient Zuid-Holland

Table 11. Relevant SP tools for Dordrecht OL for Activity 3.1

From SHELTER, the available input is:

- Resilience Index, that 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 resource, in terms of quantity and expertise, and the financial resources available, identifying potential community needs and gaps.

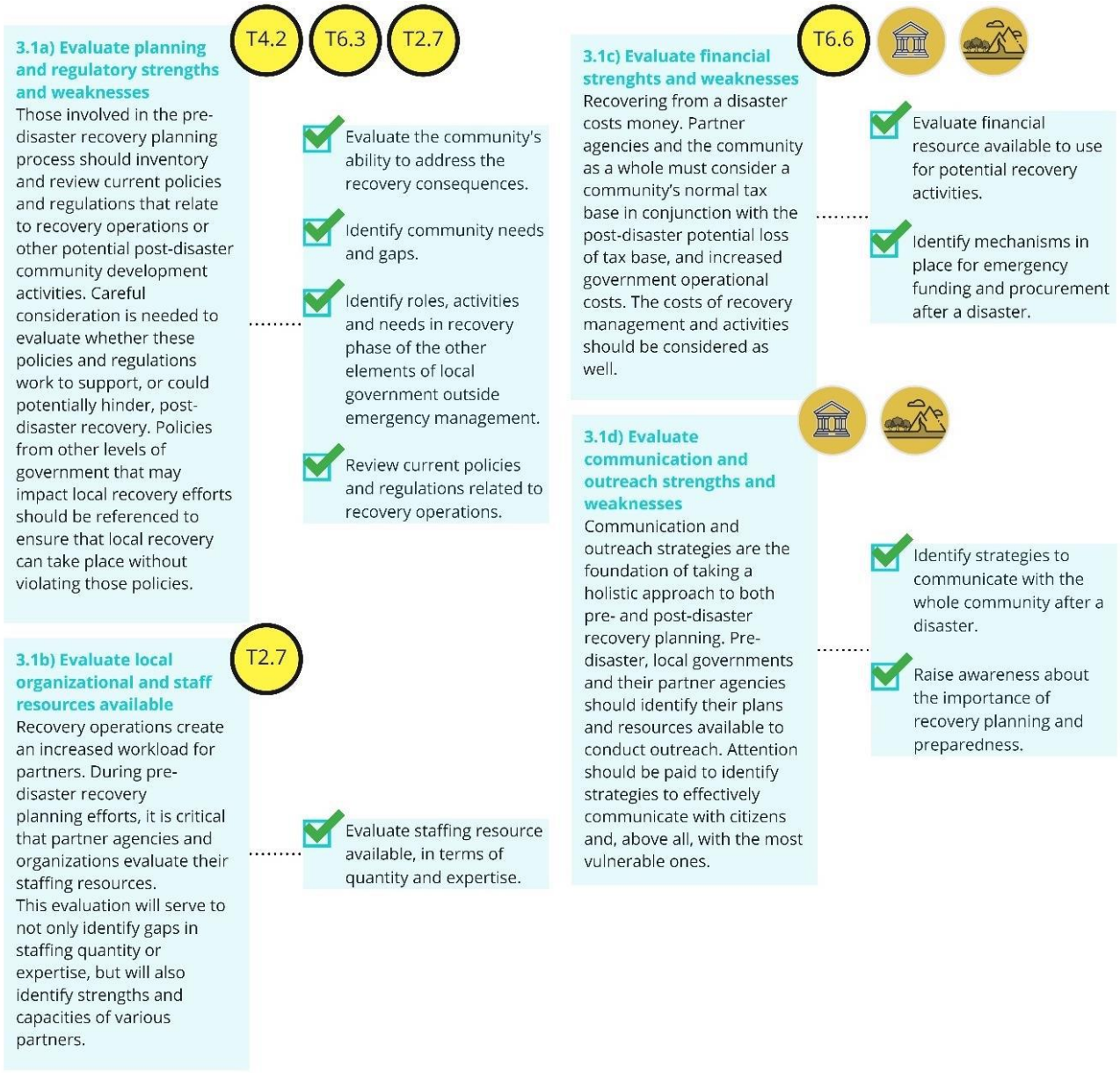

Figure 46. Key-activity 3.1 for Dordrecht OL

Activity 3.2 – Build a shared vision of a post disaster future (Figure 47)

The main potential recovery goal for Dordrecht OL could be: Improve water safety and reduce heritage vulnerability. This goal coincides with the overall aims and the objectives of the following planning tools (Table 12).

LEVEL	SP TOOL
National level	National Delta Program
Provincial level	Preferred Strategy Rijnmond-Drechsteden
	Weather resilient Zuid-Holland
Local level	Environmental vision Dordrecht

Table 12. Relevant SP tools for Dordrecht OL for Activity 3.2

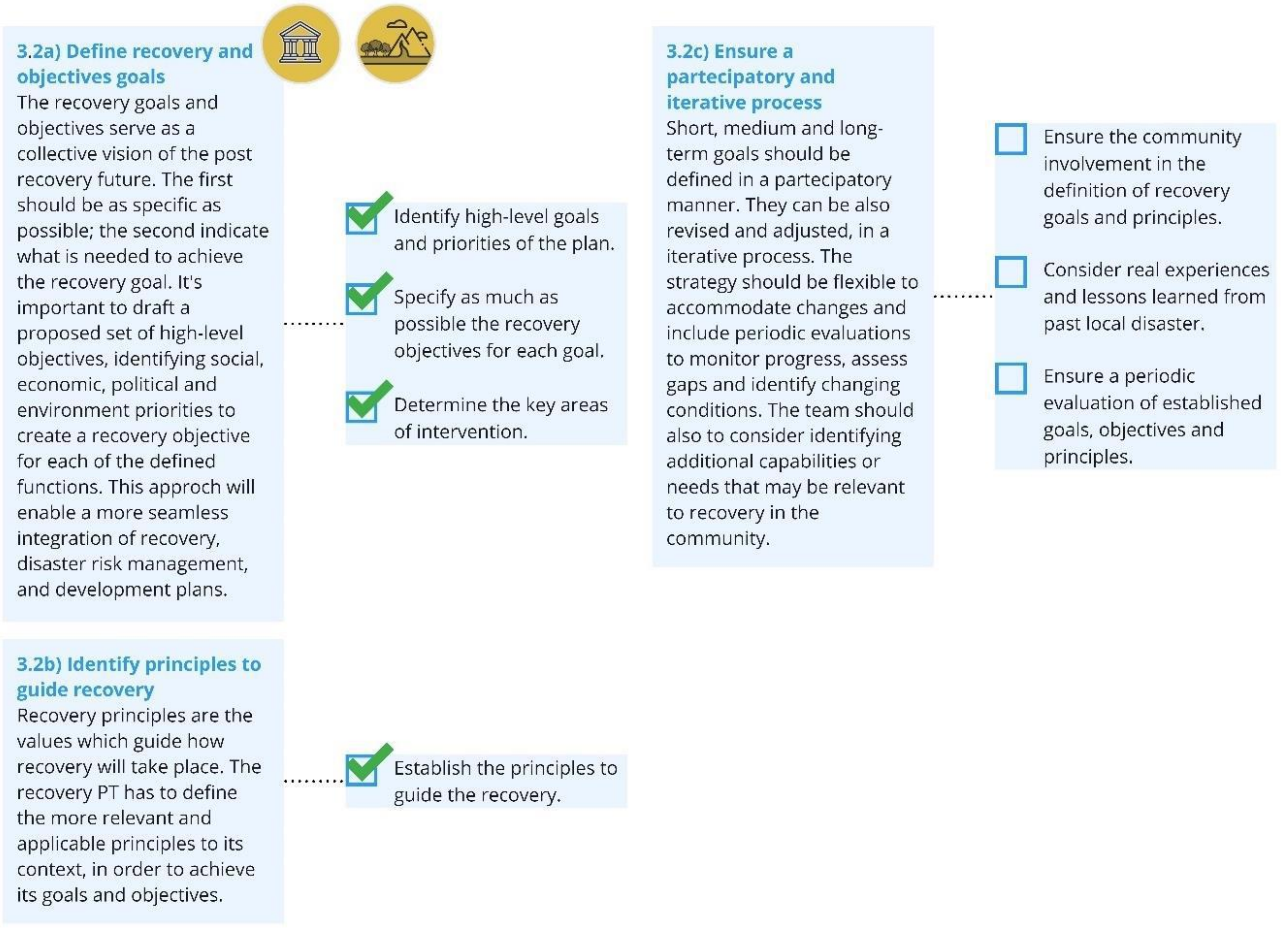

Figure 47. Key-activity 3.2 for Dordrecht OL

Regarding the third phase, it is possible to say that in Dordrecht OL the identification of community needs and gaps is very well-covered. For DRM and any potential recovery activities, there are financial resources and budget available mostly at the national level, but also at the lower levels. In addition, in the Netherlands there is a strong and well-defined strategy to raise awareness and preparedness regarding the importance of recovery planning, that involves all the community, starting from young people and children in schools. Citizens are also aware of the high value of the CH, and of the importance to protect it. In fact, many buildings and spaces in the area of Dordrecht are considered CH and both the government and the community are focused to safeguard and maintain them and people to continue living there.

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

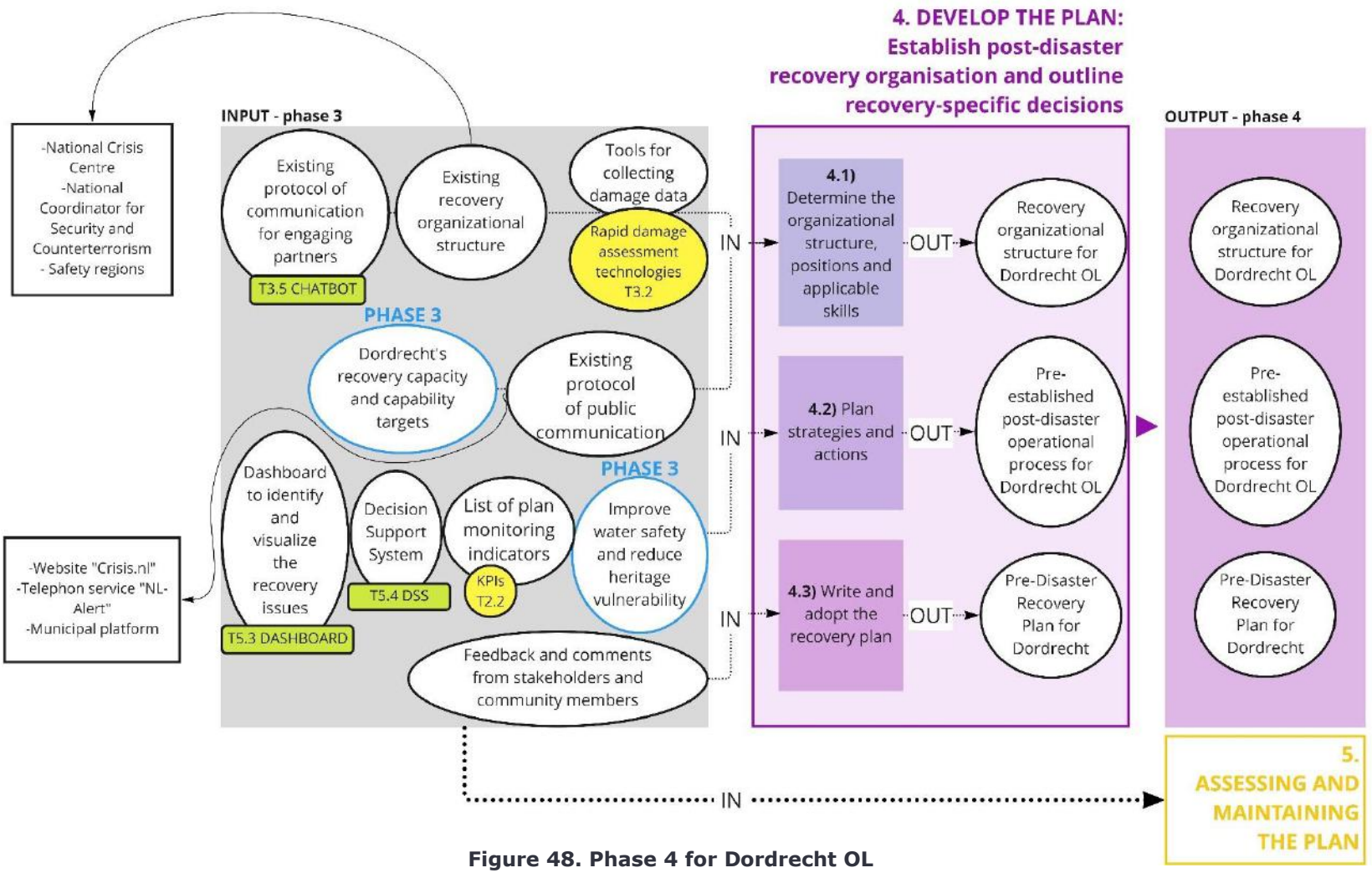

Figure 48. Phase 4 for Dordrecht OL

Activity 4.1 – Determine the organizational structure, positions and applicable skills (Figure 49)

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

In the Netherlands, there is a multi-layer DRM. This approach aims at reducing flood risks, according to three levels:

- Layer 1: defensive measures against floods
- Layer 2: resilient SP measures
- Layer 3: crisis management

The last layer is developed mostly by the Safety Region, a public body whose task is to facilitate regional cooperation in dealing with crises, disasters and disruptions of public order. Safety Regions must protect communities against risks and relief in case of disaster, promoting a centralized coordination among emergency and recovery actors and enhancing administrative and operational powers.

Dordrecht OL is part of the Safety Region South-Holland South. Within the municipality there is a Safety Department, that works with the Safety Region during an emergency. Thanks to the multi-layer approach, the organizational structure is well-established and there is a well-defined network of relationships to activate in case of emergency.

The main reference planning tool for this phase is the *Regional Crisis Plan Safety Region Sout-Holland South,* promoted by the Safety Region in according with the municipalities in South-Holland South. This plan lays down how to manage the efforts of emergency services and organizations in responding to crisis or disasters. It provides structure and uniformity in this cooperation and describes tasks, responsibilities and powers of people involved in disaster response and crisis management.

Within the multi-layer DRM, adopted in the Netherlands, protocols and procedures of communication and engaging recovery partners and mechanism for collecting damage data are well-established. In particular, there are tools such as a National Crisis website[6] and a telephone service of alert, but also local services like a municipal platform for communication about issues and problems in crisis situations.

From SHELTER, the available input is:

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

[6] www.crisis.nl

Figure 49. Key-activity 4.1 for Dordrecht OL

Activity 4.2 – Plan strategies and actions (Figure 50)

Considering the application of the multi-layer DRM and the *Regional Crisis Plan Safety Region Sout-Holland South,* it is possible to assert that in Dordrecht OL strategies and actions to address recovery issues, both before and after a disaster, are already defined. At the level of Safety Region, also the process for monitoring recovery actions is established.

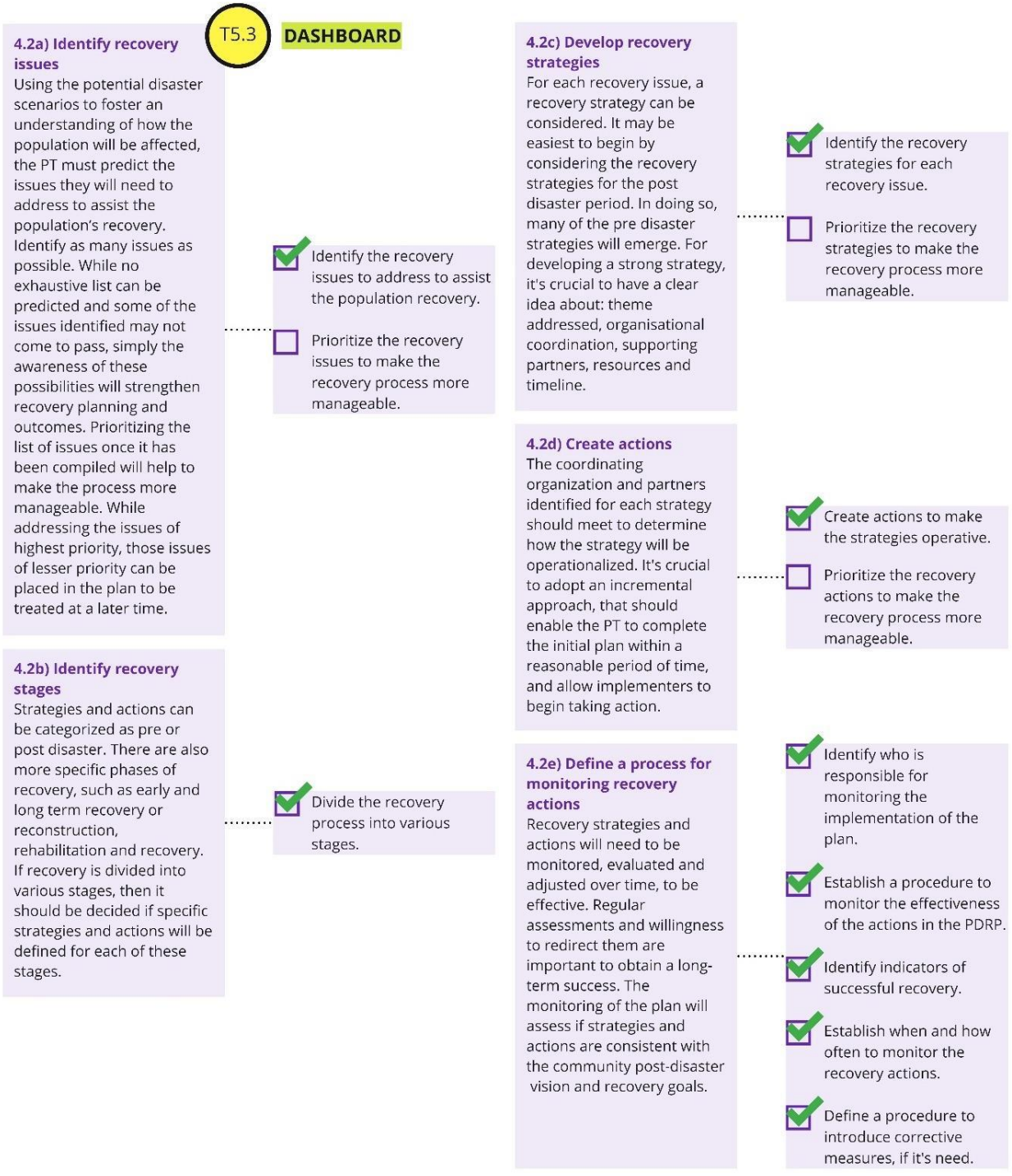

Figure 50. Key-activity 4.2 for Dordrecht OL

Activity 4.3 – Write and adopt the recovery plan (Figure 51)

If the community needs to develop a new PDRP, all information, documentations 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 consequently release.

As mentioned above, the public participatory of documents is mandatory, even if the community does not participate in co-design processes.

Figure 51. Key-activity 4.3 for Dordrecht OL

Regarding the fourth phase, Dordrecht OL is already provided with an effective post-disaster operational process. OL does not need to write and approve a new planning tool.

5.2.5 PHASE 5 –ASSESSING AND MAINTAING THE PLAN: review and update

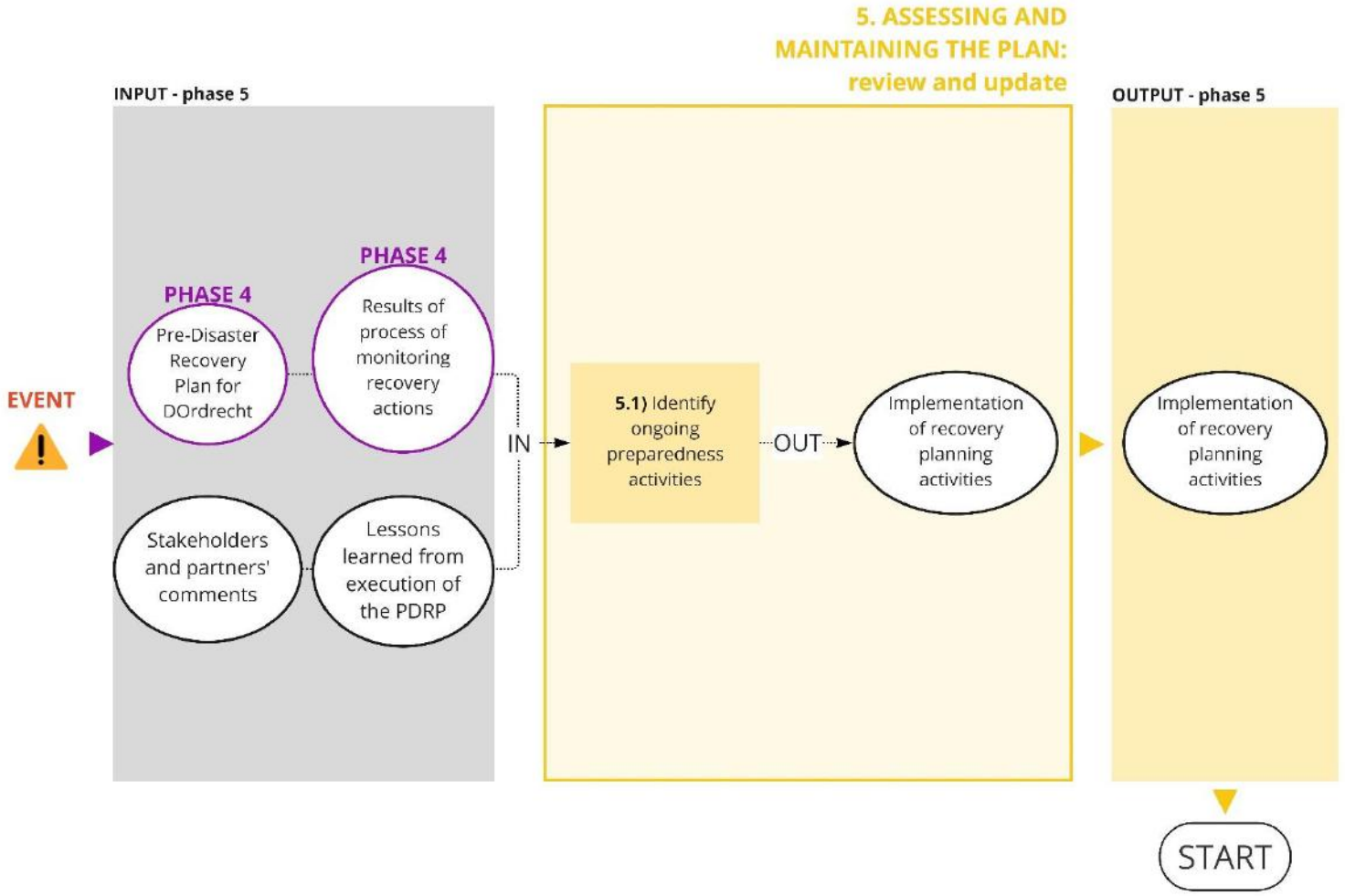

Figure 52. Phase 5 for Dordrecht OL

Activity 5.1 – Identify ongoing preparedness activities (Figure 53)

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 wildfires, 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 53. Key-activity 5.1 for Dordrecht OL

Another important ongoing preparedness activity is the regular evaluation and review of the PDRP, policy documents and ordinances, because 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 governments regulations and laws. Furthermore, lessons learned from execution of the plan in a post-disaster phase should be documented to guide future revisions of the plan.

In Dordrecht OL, discussion and reviewing of the post-disaster operational process is happening in collaboration with Safety Region and all actors and stakeholders are involved.

5.2.6 Summary of the Early Recovery Roadmap for Dordrecht OL

Figure 54 shows the progress of Dordrecht OL for each phase of the PDRR, through a qualitative indicator in the form of a loading bar.

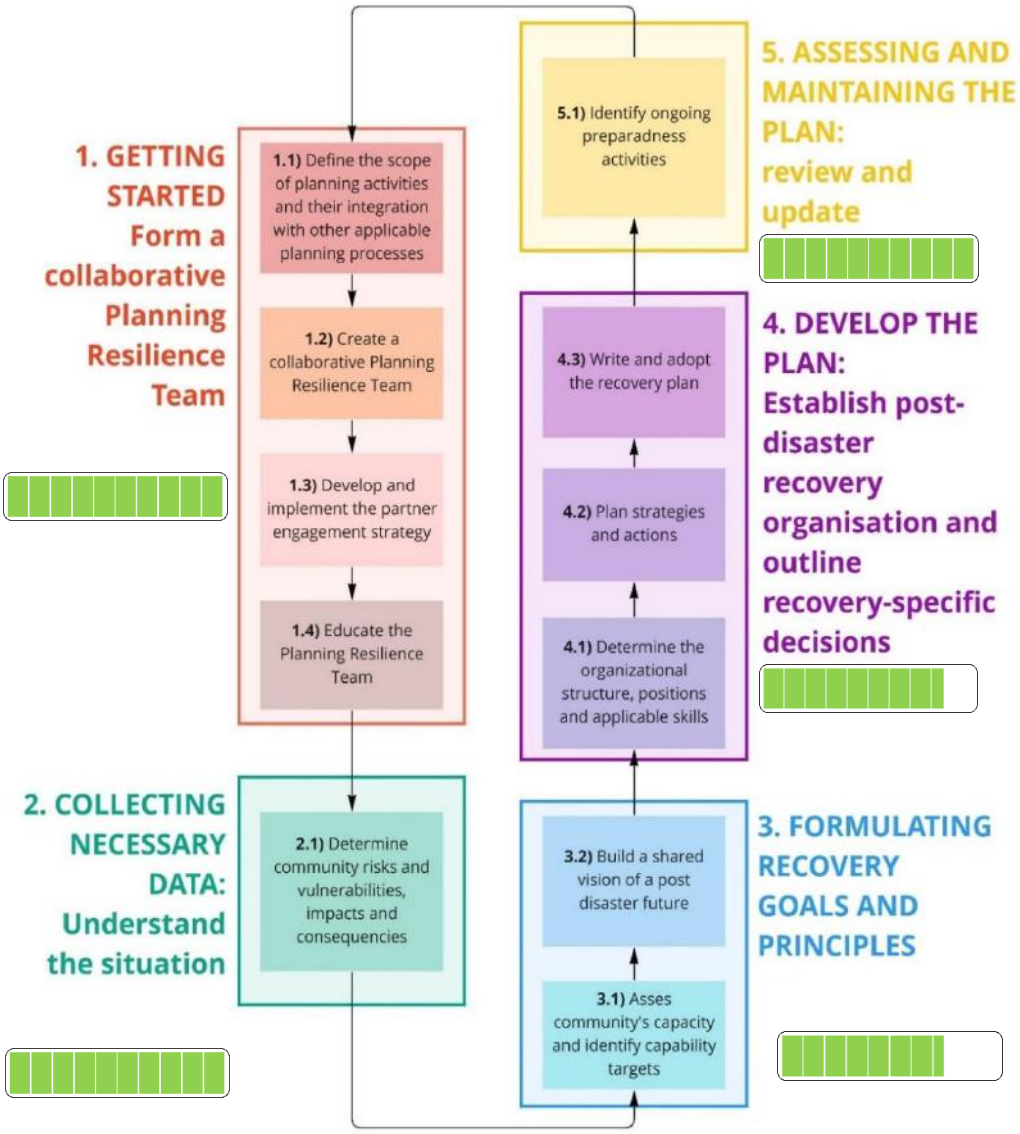

Figure 54. Progress in the PDRR for Dordrecht OL

In addition, the following summary list (Table 13) 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 Dordrecht 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 partecipation 1.3a) Define the scope of stakeholder engagement 1.3b) Establish recovery activity support roles for all governance level 1.3c) Establish external partnerships 1.3d) Review the core group of stakeholders 1.4a) Begin with shared understanding of Pre-Disaster Recovery Planning 1.4b) Define a recognizable structures and terminology
pending sub-activity	Consider formal agreements with organizations that may provide or support local services in sub-activity 1.2b
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 sub-activity	-
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 strenghts 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
pending sub-activity	3.2c) Ensure a partecipatory and iterative process
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 4.2e) Define a process for monitoring recovery 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	Identify the LDRM in sub-activity 4.1a

	Prioritize the recovery issues to make the recovery process more manageable in sub-activity 4.2a Prioritize the recovery strategies to make the recovery process more manageable in sub-activity 4.2c Prioritize the recovery actions to make the recovery process more manageable in sub-activity 4.2d
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 13. Completed/pending activities for Dordrecht OL

To summarise, the application of the early recovery Roadmap to the Dordrecht OL has shown that 3 out of 5 steps have been already completed thanks to the provisions included in national, regional, provincial and local policy and planning instruments. In addition, Dordrecht OL is provided with a policy instrument called *Regional Crisis Plan Safety Region South-Holland* that undertakes largely most of the activities and sub-activities foreseen by the Roadmap. A brand-new PDRP is not needed for this OL, and the few pending sub-activity identified regards the need of ensuring a participatory and iterative process in the definition of recovery goals and principles in phase no. 3, and the need of prioritizing recovery strategies and actions in phase no. 4.

5.3 Seferihisar Open Lab

The Seferihisar OL is an urban OL, located in the District of Izmir, in Turkey. It is characterised by rural areas and a historical coastal town. The district is in Seismic Zone 1, being the fault line directly beneath it and the whole peninsula subject to extreme heat waves and storms. The community is vulnerable to both earthquakes and extreme climate events.

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

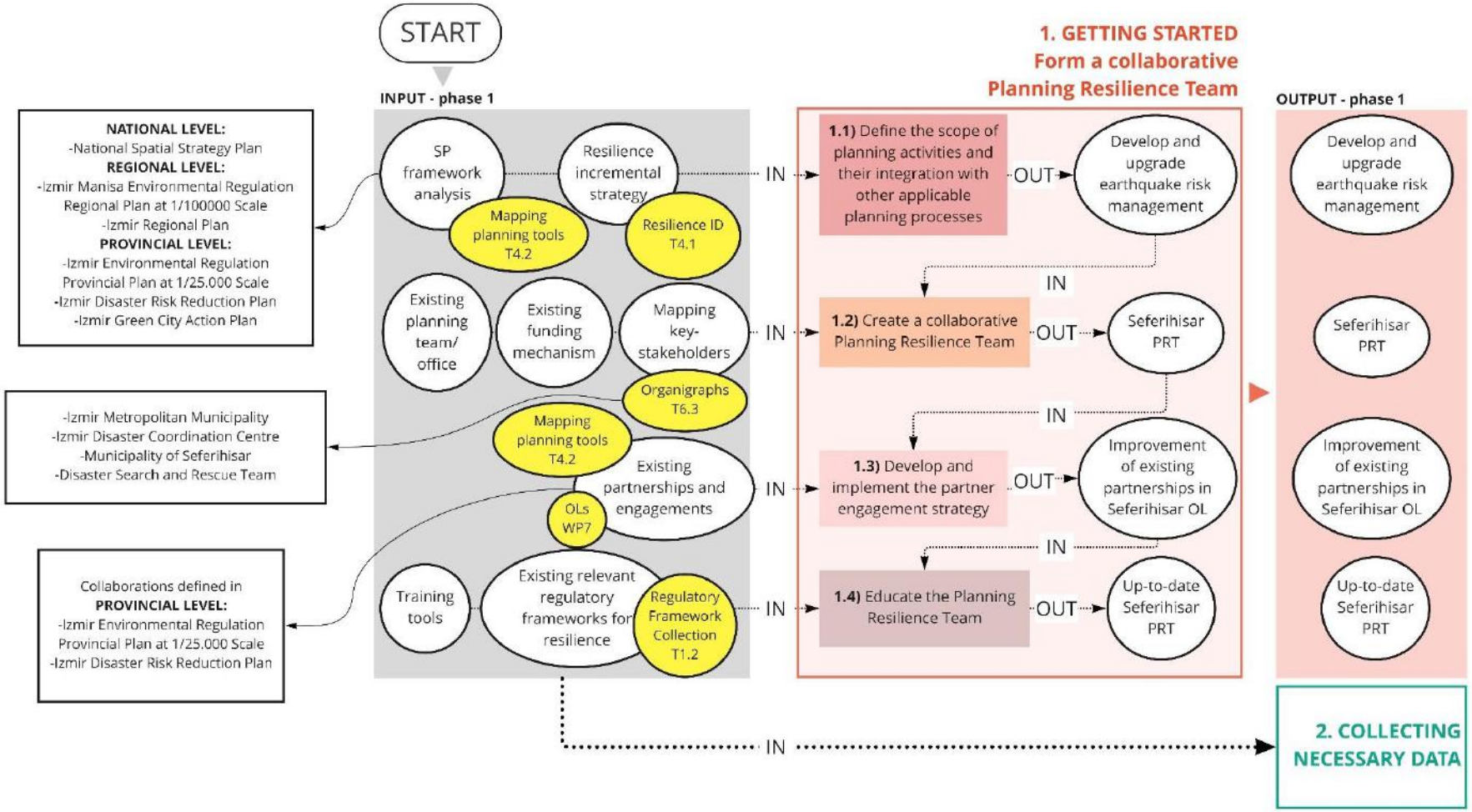

Figure 55. Phase 1 for Seferihisar OL

Activity 1.1 - Define the scope of planning activities and their integration with other applicable planning processes (Figure 56)

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 14).

LEVEL	SP TOOL
National level	National Spatial Strategy Plan
Regional level	Izmir Regional Plan
	Izmir Manisa Environmental Regulation Regional Plan at 1/100000 scale
Provincial level	Izmir Environmental Regulation Provincial Plan at 1/25000 scale
	Izmir Disaster Risk Reduction Plan
	Izmir Green City Action Plan

Table 14. Relevant SP tools for Seferihisar OL for Activity 1.1

From the analysis of the SP framework, it can be defined that the scope of the PDR planning for Seferihisar OL is to develop and upgrade earthquake risk management.

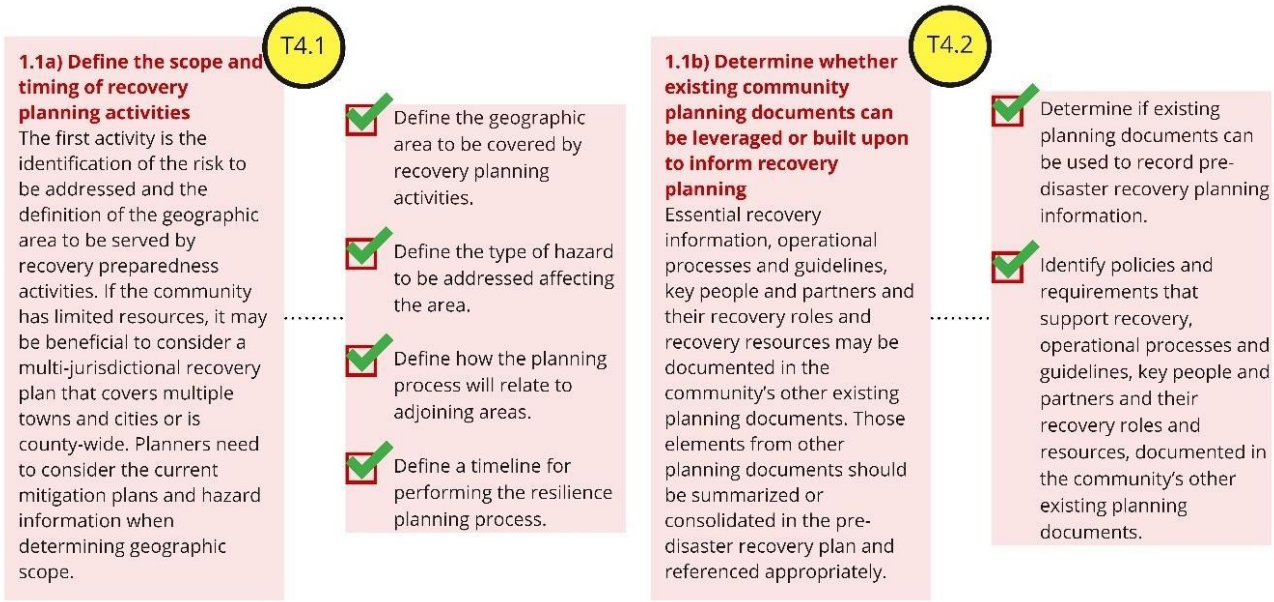

Figure 56. Key-activity 1.1 for Seferihisar OL

Activity 1.2 - Create a collaborative Planning Resilience Team (Figure 57)

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

The Municipality of Seferihisar, as guided by the local branches and central directives of AFAD, the Disaster And Emergency Management Presidency, can be considered as the starting point to form the team which leads the recovery planning process. According to the Organigraph, developed in Task 6.3, there are other political and technical entities that offer their contribution to the process:

- Izmir Metropolitan Municipality
- Izmir Disaster Coordination Centre
- Disaster Search and Rescue Team

Funds for these planning activites are retrieved from the local government's budget, programmes of the national government and programmes of international/national agencies.

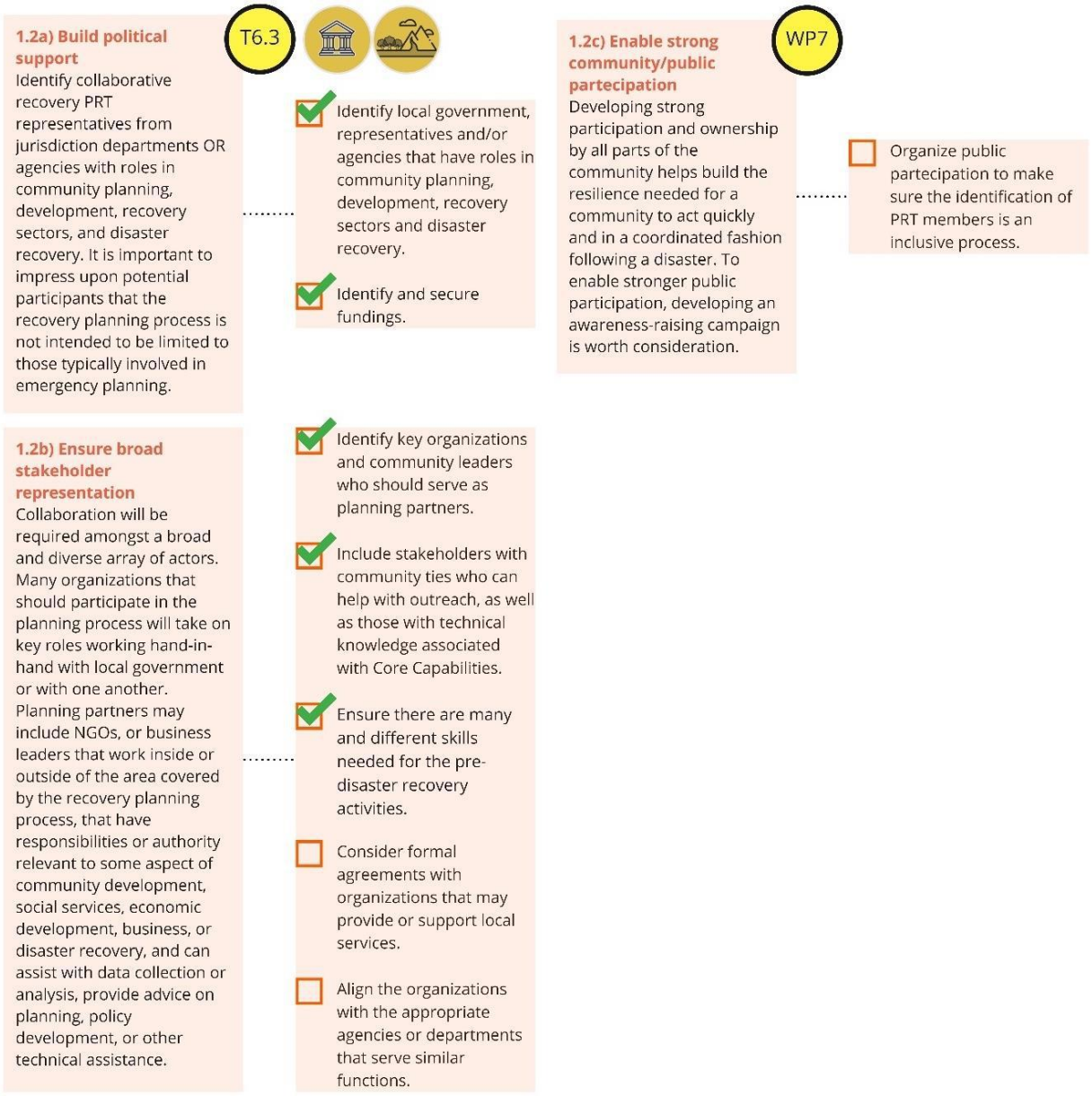

Figure 57. Key-activity 1.2 for Seferihisar OL

Activity 1.3 – Develop and implement the partner engagement strategy (Figure 58)

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 15).

LEVEL	SP TOOL
Provincial level	Izmir Environmental Regulation Provincial Plan at 1/25000 scale
	Izmir Disaster Risk Reduction Plan
	Izmir Green City Action Plan

Table 15. Relevant SP tools for Seferihisar OL for Activity 1.3

The development and implementation of these planning tools foresaw collaborative processes with relevant stakeholders and local communities.

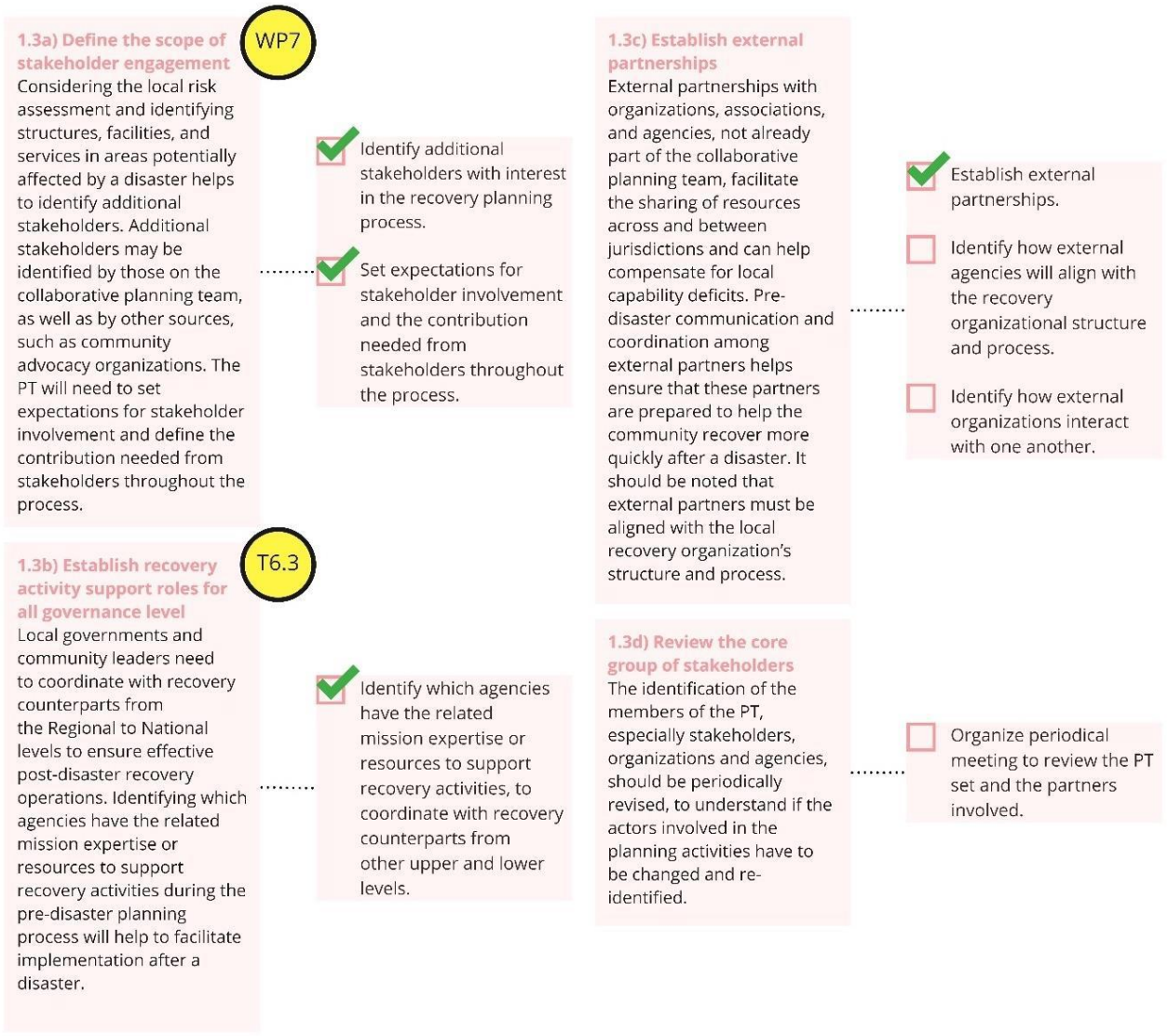

Figure 58. Key-activity 1.3 for Seferihisar OL

Activity 1.4 – Educate the Planning Resilience Team (Figure 59)

The education of the stakeholders involved in the recovery planning activities, within Seferihisar OL, are provided by the DRM agency at national level, AFAD, through trainings. It has the role of coordinator of governmental bodies, NGOs, private business and local communities to plan the post-disaster response.

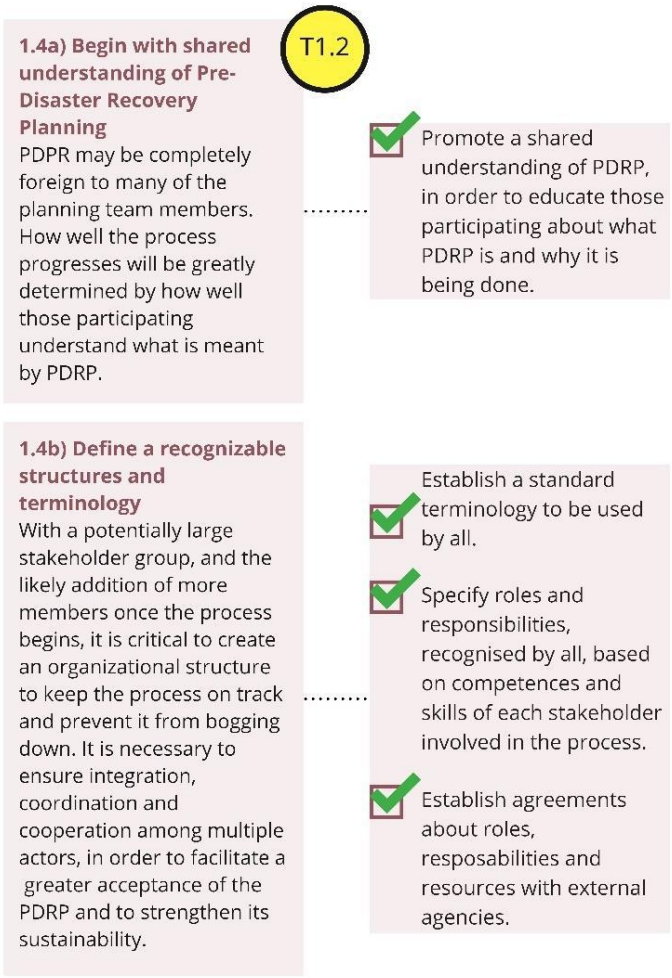

Figure 59. Key-activity 1.4 for Seferihisar OL

Regarding the first phase, it is possible to say that Seferihisar OL has a well-defined team, in terms of planning resilience, involving many different and educated stakeholders.

5.3.2 PHASE 2 – COLLECTING NECESSARY DATA: Understand the situation

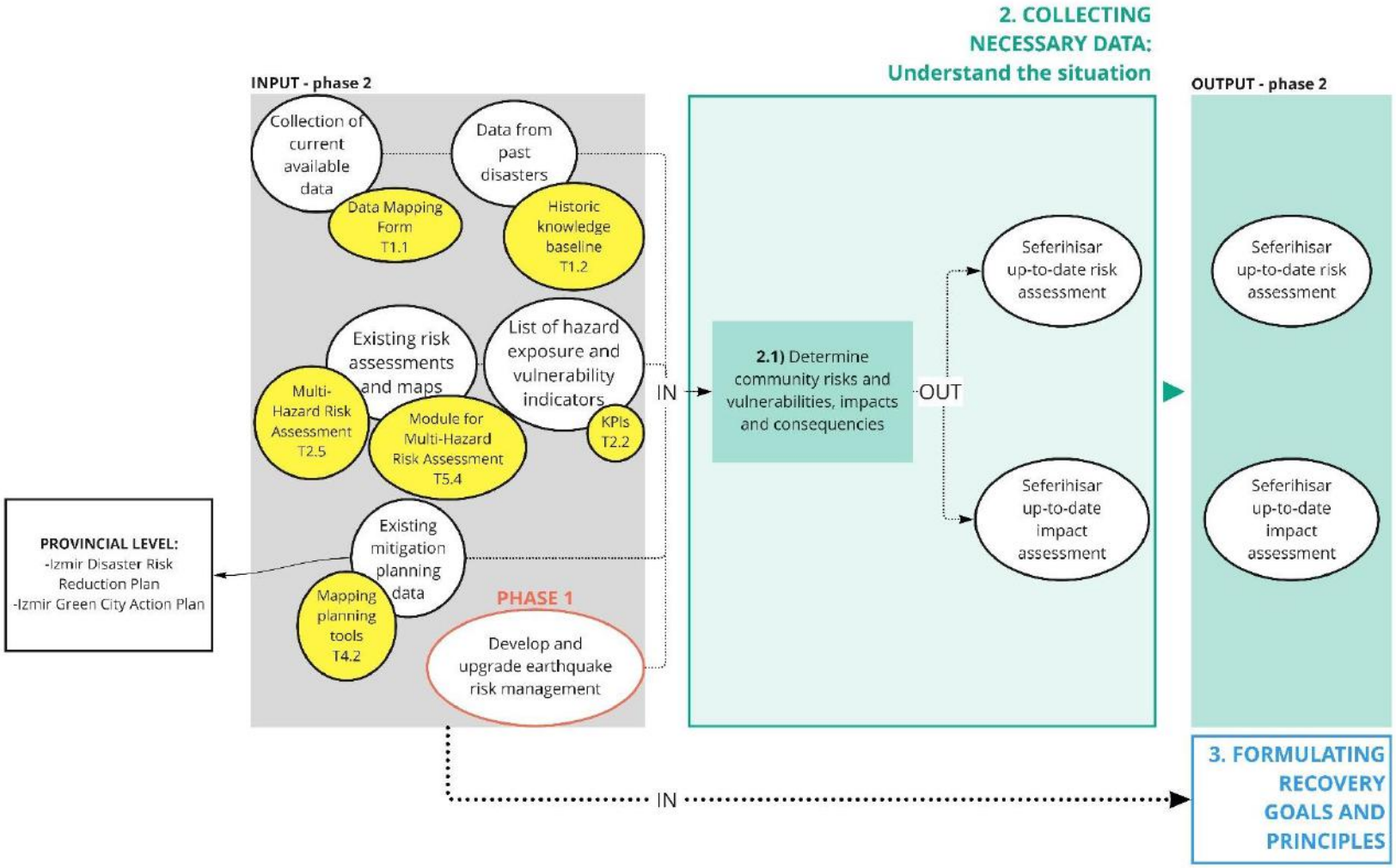

Figure 60. Phase 2 for Seferihisar OL

Activity 2.1 - Determine community risks and vulnerabilities, impacts and consequences (Figure 61)

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

From SHELTER, the available inputs are:

- Data Mapping Form, which collects all current 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 some planning tools, that provide also specific disaster risk information, at provincial level (Table 16).

LEVEL	SP TOOL
Provincial level	Izmir Disaster Risk Reduction Plan
	Izmir Green City Action Plan

Table 16. Relevant SP tools for Seferihisar OL for Activity 2.1

The first is the *Izmir Disaster Risk Reduction Plan*, which analyses risks and hazards in Izmir, considering also the impacts of disasters. This plan takes into account the consequences of a natural event, such as an earthquake, on heritage places and conservation areas, to define policies and measures to improve the resilience in Izmir.

The second is the *Izmir Green City Action Plan.* It contains assessments of the existing situation in terms of threats and risks, especially those linked to negative impacts of CC on CNH. The plan assesses also the difficulties and challenges of Izmir Metropolitan Municipality.

Regarding the second phase, it is possible to say that Seferihisar OL has useful data, to gather information about hazards, risks and vulnerabilities to address in its territory. However, it is necessary to specify that fluctuating population, in the touristic summer town, and the lack of an agency about population is a vulnerability factor, that means community measures are difficult to implement. Due to a lack of data, a comprehensive planning is not always possible.

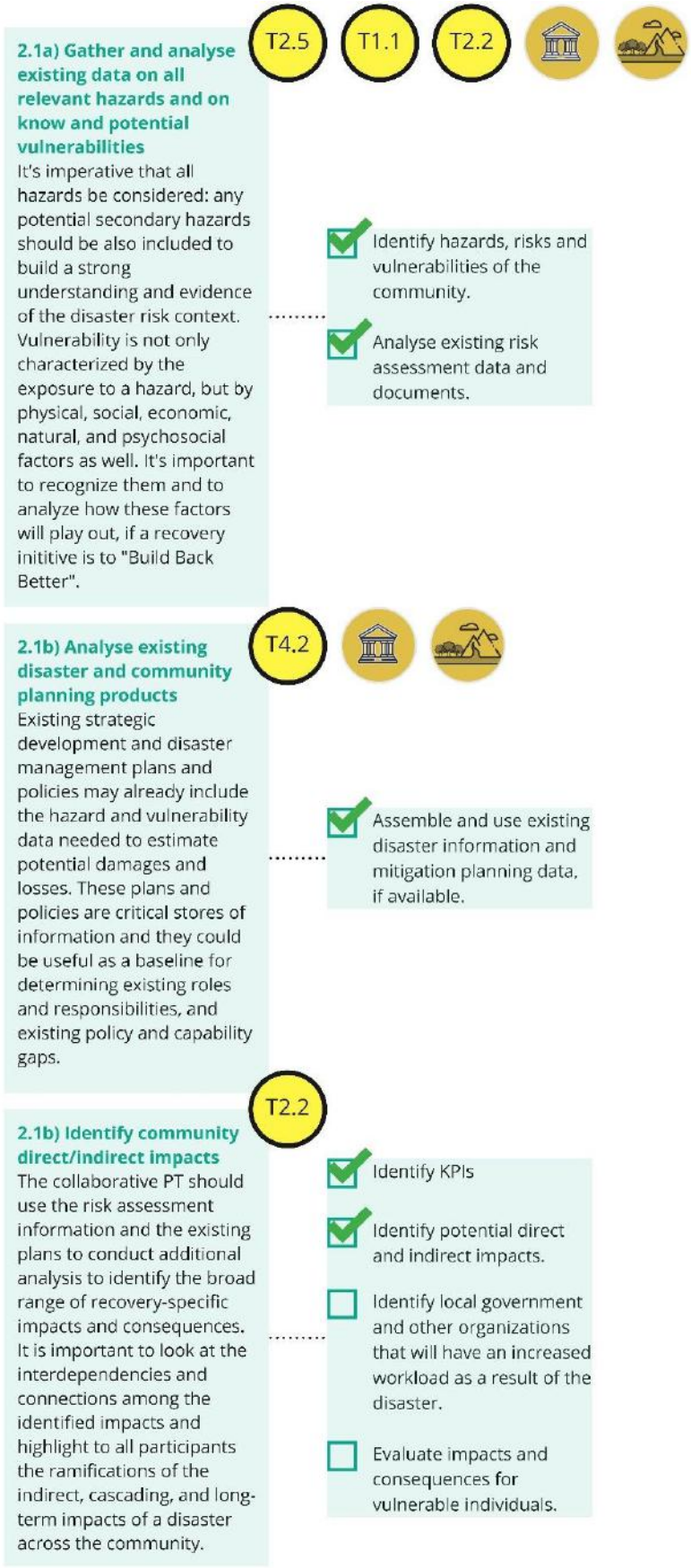

Figure 61. Key-activity 2.1 for Seferihisar OL

5.3.3 PHASE 3 – FORMULATING RECOVERY GOALS AND PRINCIPLES

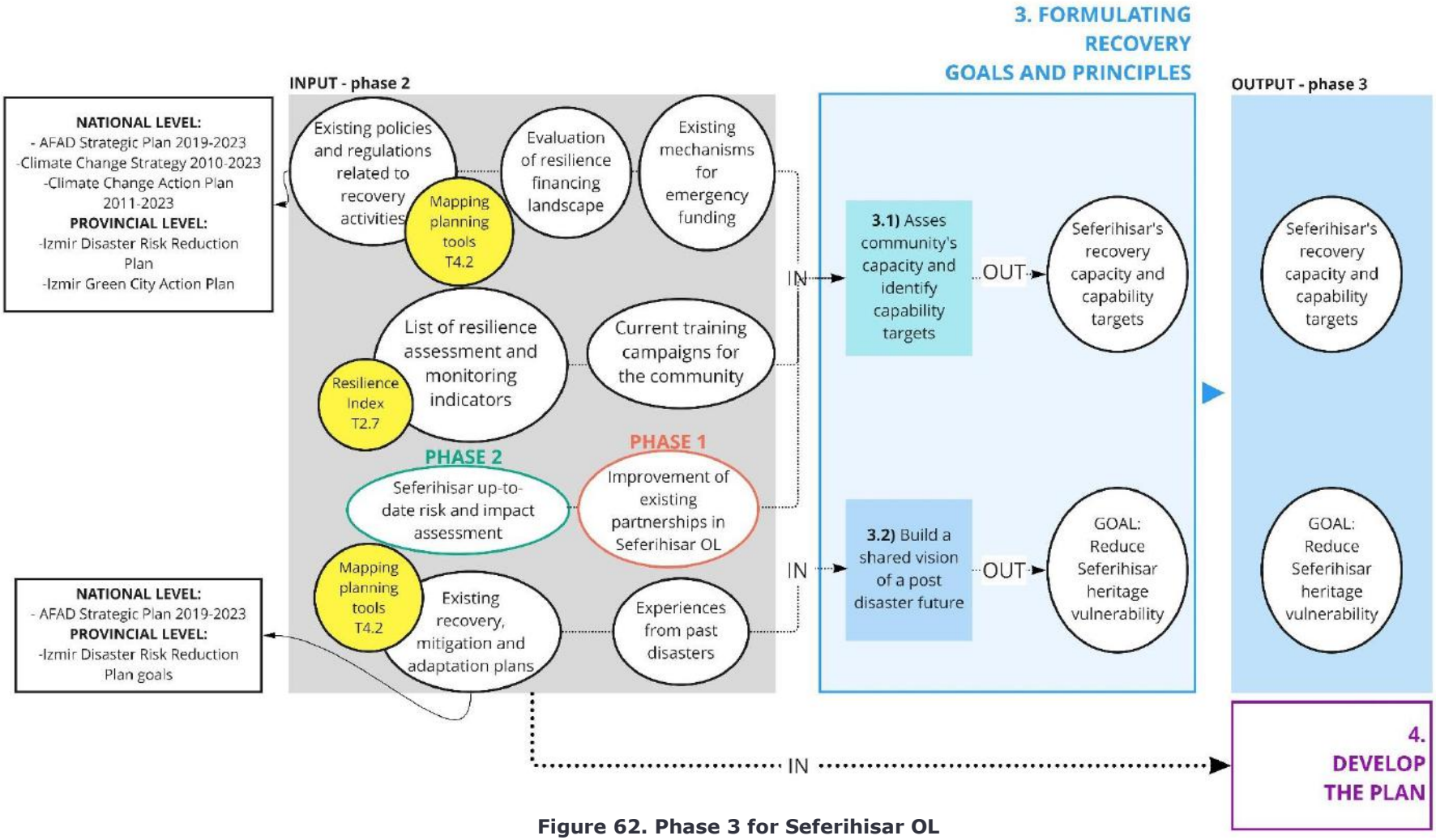

Figure 62. Phase 3 for Seferihisar OL

Activity 3.1 – Assess community's capacity and identify capability targets (Figure 63)

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 tools are the followings (Table 17).

LEVEL	SP TOOL
National level	AFAD Strategic Plan 2019-2023
	Climate Change Strategy 2010-2023
	Climate Change Action Plan 2011-2023
Provincial level	Izmir Disaster Risk Reduction Plan
	Izmir Green City Action Plan

Table 17. Relevant SP tools for Seferihisar OL for Activity 3.1

From SHELTER, the available input is:

- Resilience Index, that 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.

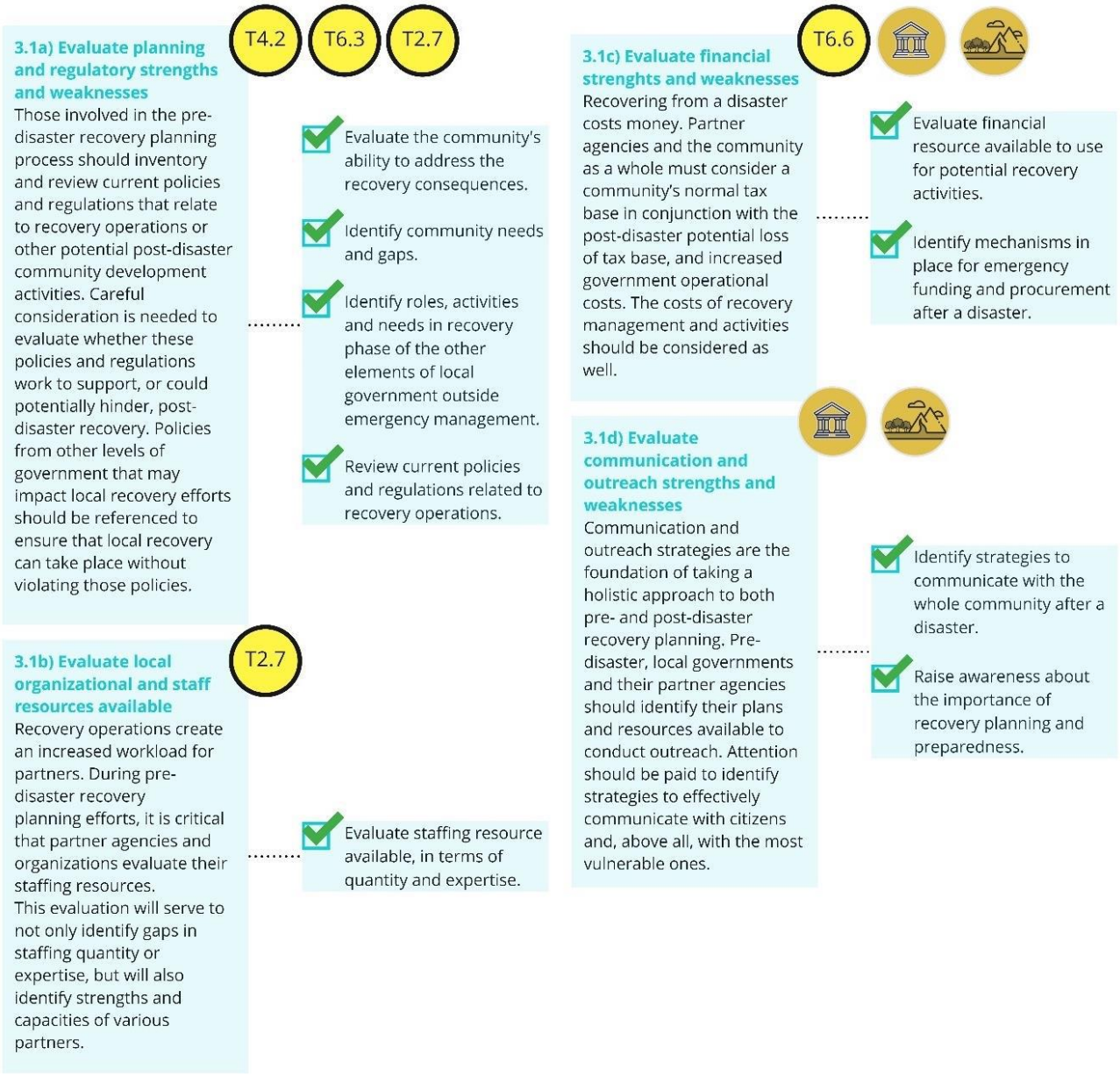

Figure 63. Key-activity 3.1 for Seferihisar OL

Activity 3.2 – Build a shared vision of a post-disaster future (Figure 64)

The main potential recovery goal for Seferihisar OL could be to reduce Seferihisar cultural heritage vulnerability. This goal coincides with the overall aims and the objectives of the following planning tools (Table 18).

LEVEL	SP TOOL
National level	AFAD Strategic Plan 2019-2023
Provincial level	Izmir Disaster Risk Reduction Plan

Table 18. Relevant SP tools for Seferihisar OL for Activity 3.2

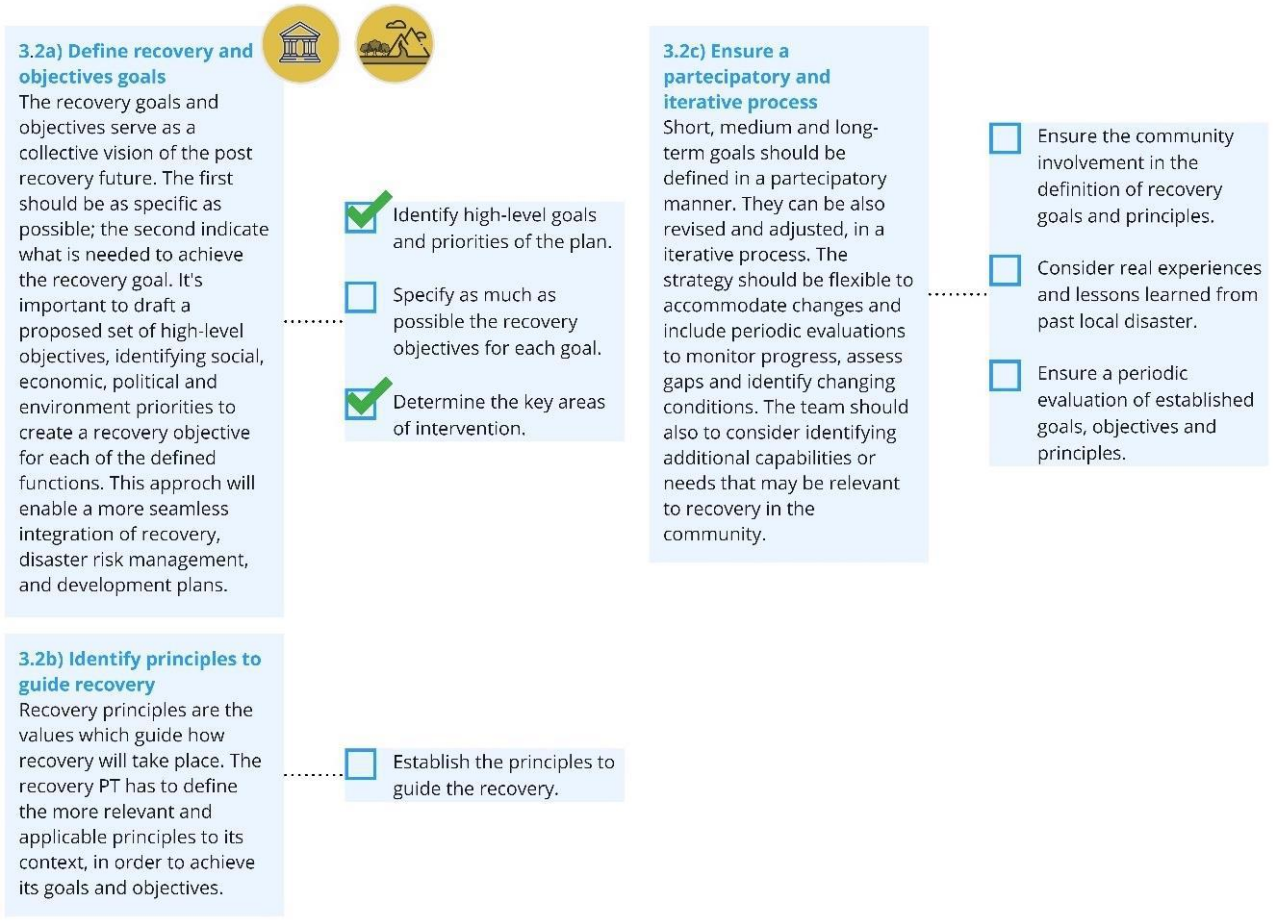

Figure 64. Key-activity 3.2 for Seferihisar OL

Regarding the third phase, in Seferhisar OL it is possible to identify some gaps and potential needs.

First of all, there are gaps in the legislation, since many plans are on paper, but not translated into action, due to the planning process is often led by the national government, but the execution is left to local governments.

In addition, there are difficulties in communication both among partners and institutions: for example, the priorities of the funders are often not in line with HA managers. The stakeholders involved in the OL highlight that some mistakes are repeated and lessons learned are not translated into action.

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

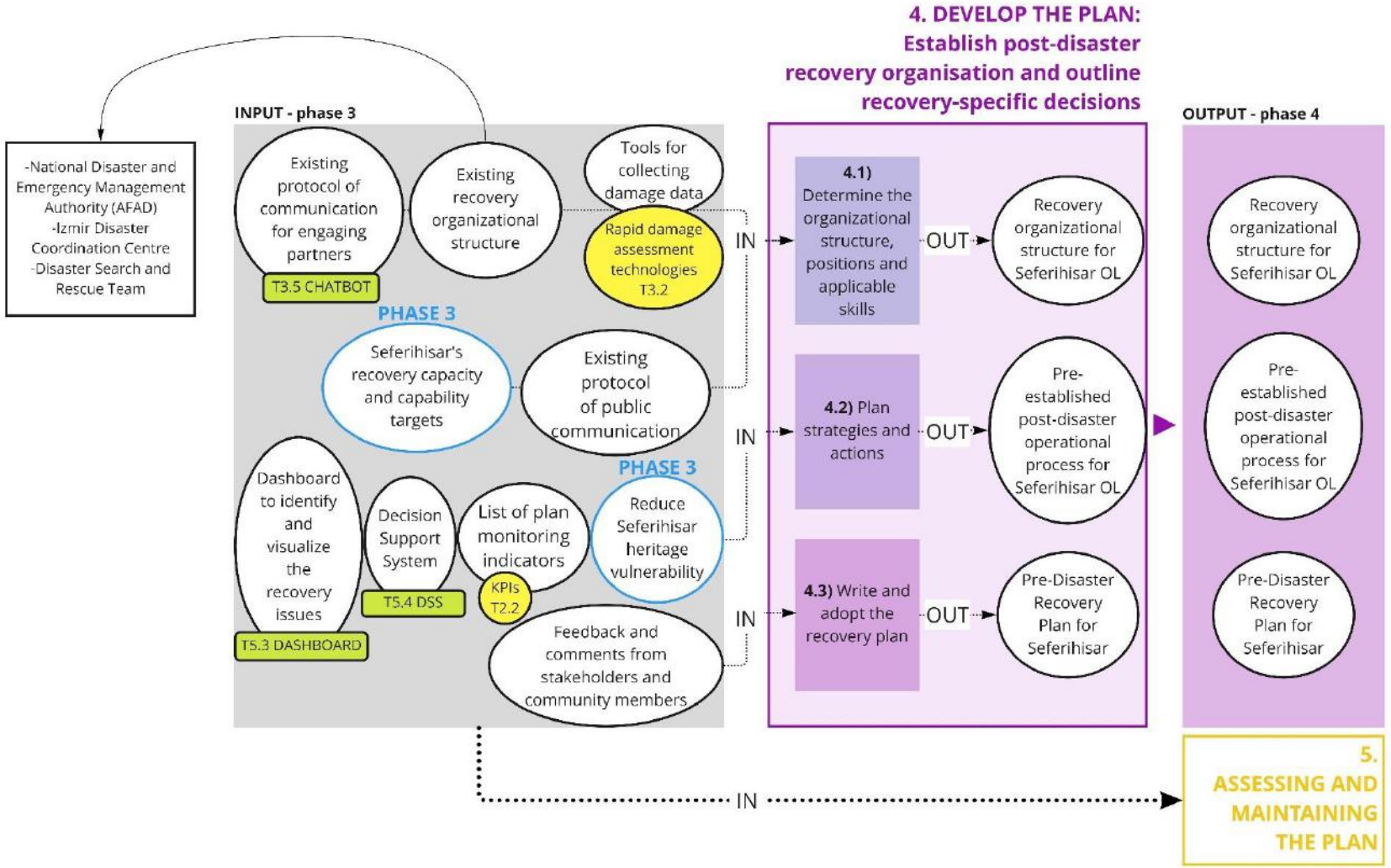

Figure 65. Phase 4 for Seferihisar OL

Activity 4.1 – Determine the organizational structure, positions and applicable skills (Figure 66)

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

In Turkey, AFAD, the Disaster and Emergency Management Presidency, is the institution working to prevent disaster and minimize disaster-related damages. As said above, AFAD has to coordinate all emergency and recovery actors. Under its control, there are search and rescue units, like the Izmir Disaster Coordination Centre and the Disaster Search and Rescue Team, , that also coordinate NGO's that volunteer for rescue efforts.

All the procedures of communication among partners and with local communities are established at a central level. The national government is also responsible for developing tools for collecting damage data. However, thank to the collaboration of NGOs, mapathones are also held.

From SHELTER, the available input is:

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

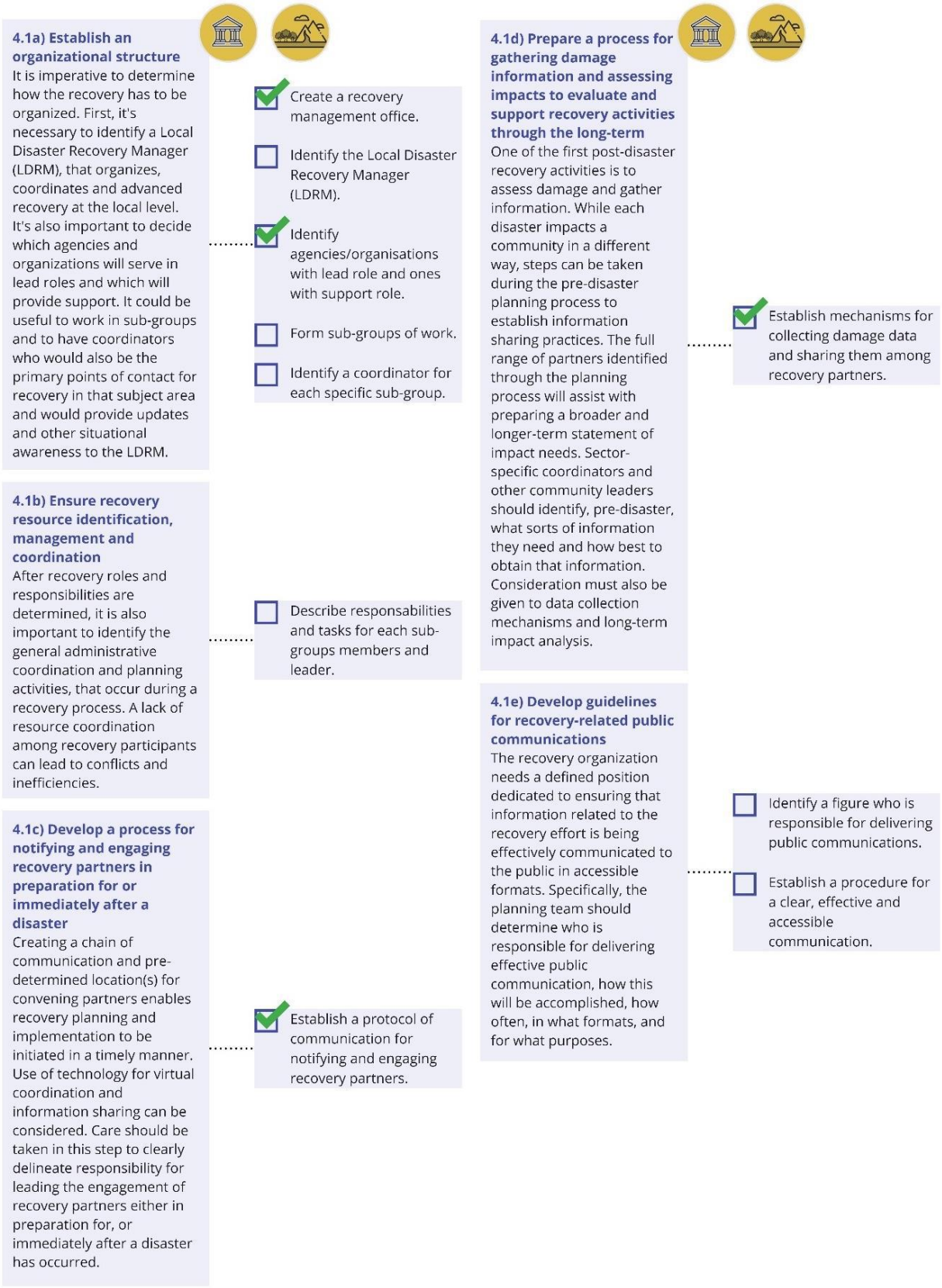

Figure 66. Key-activity 4.1 for Seferihisar OL

Activity 4.2 – Plan strategies and actions (Figure 67)

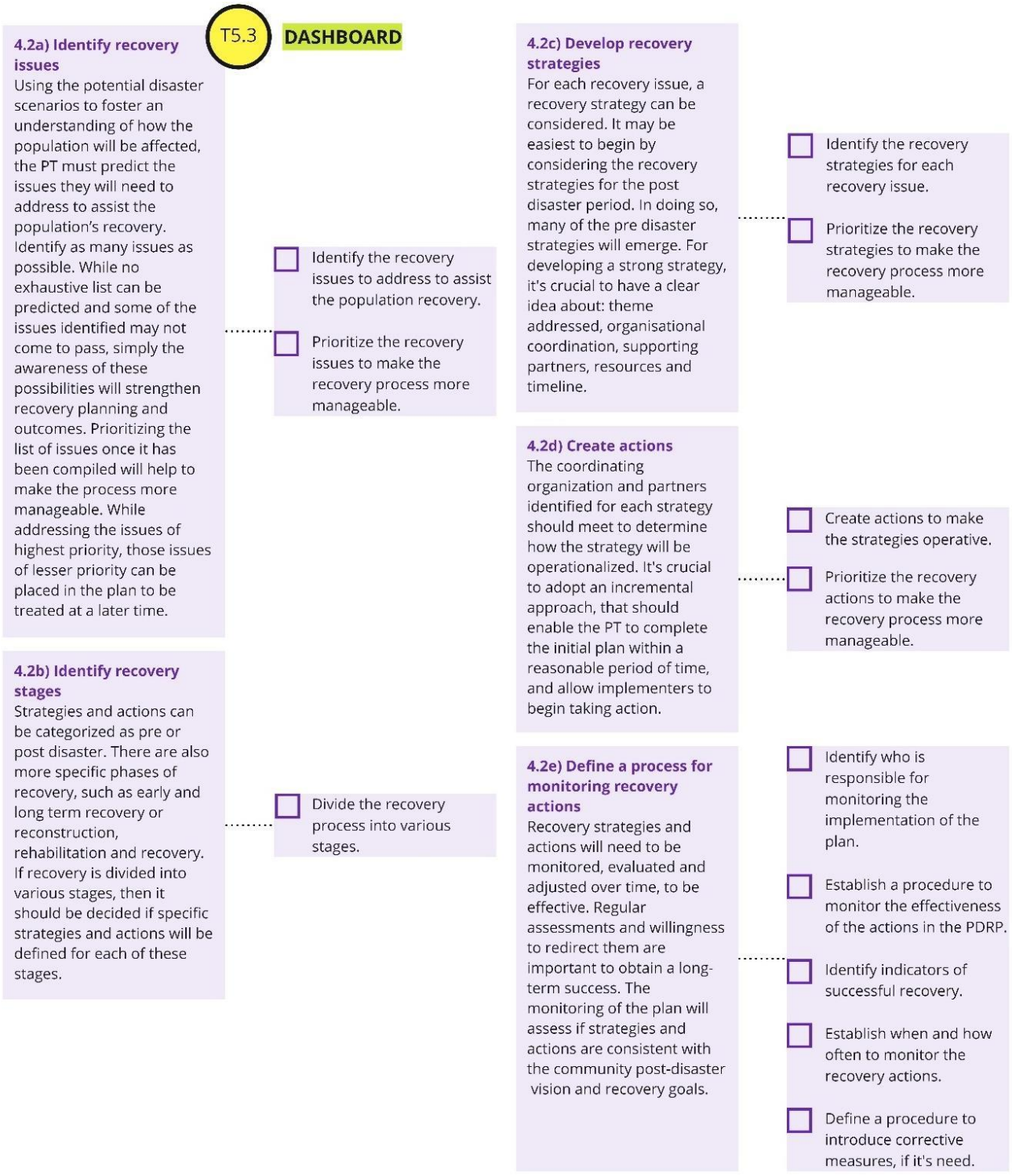

Figure 67. Key-activity 4.2 for Seferihisar OL

Activity 4.3 – Write and adopt the recovery plan (Figure 68)

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 consequently release.

As mentioned above, the public participatory of documents is mandatory, even if the community does not participate in co-design processes.

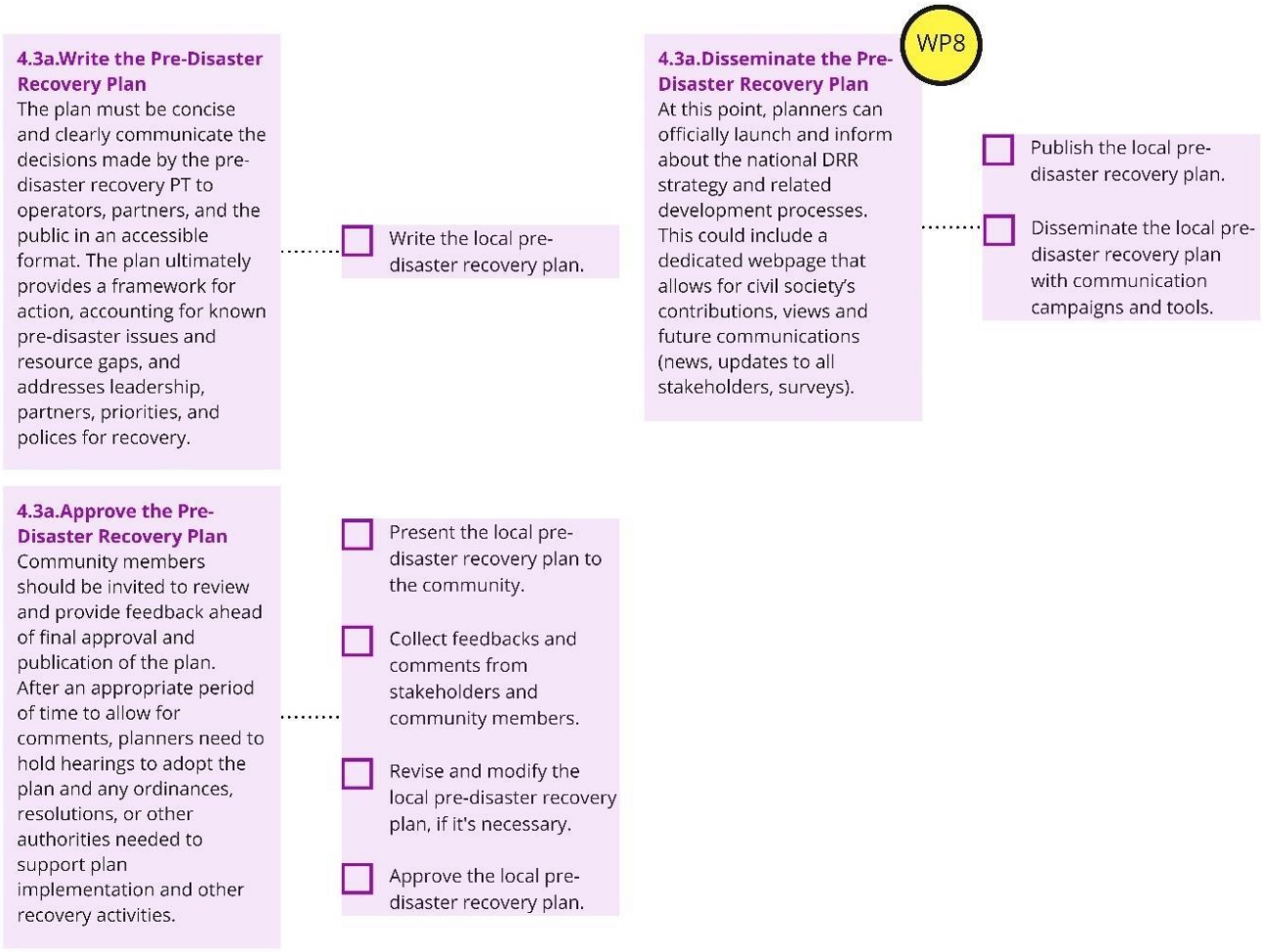

Figure 68. Key-activity 4.3 for Seferihisar OL

Regarding the fourth phase, in Seferihisar OL is not possible to recognize an effective post-disaster operational process, already developed. The OL needs to plan its recovery strategies and actions, to write and approve a PDRP.

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

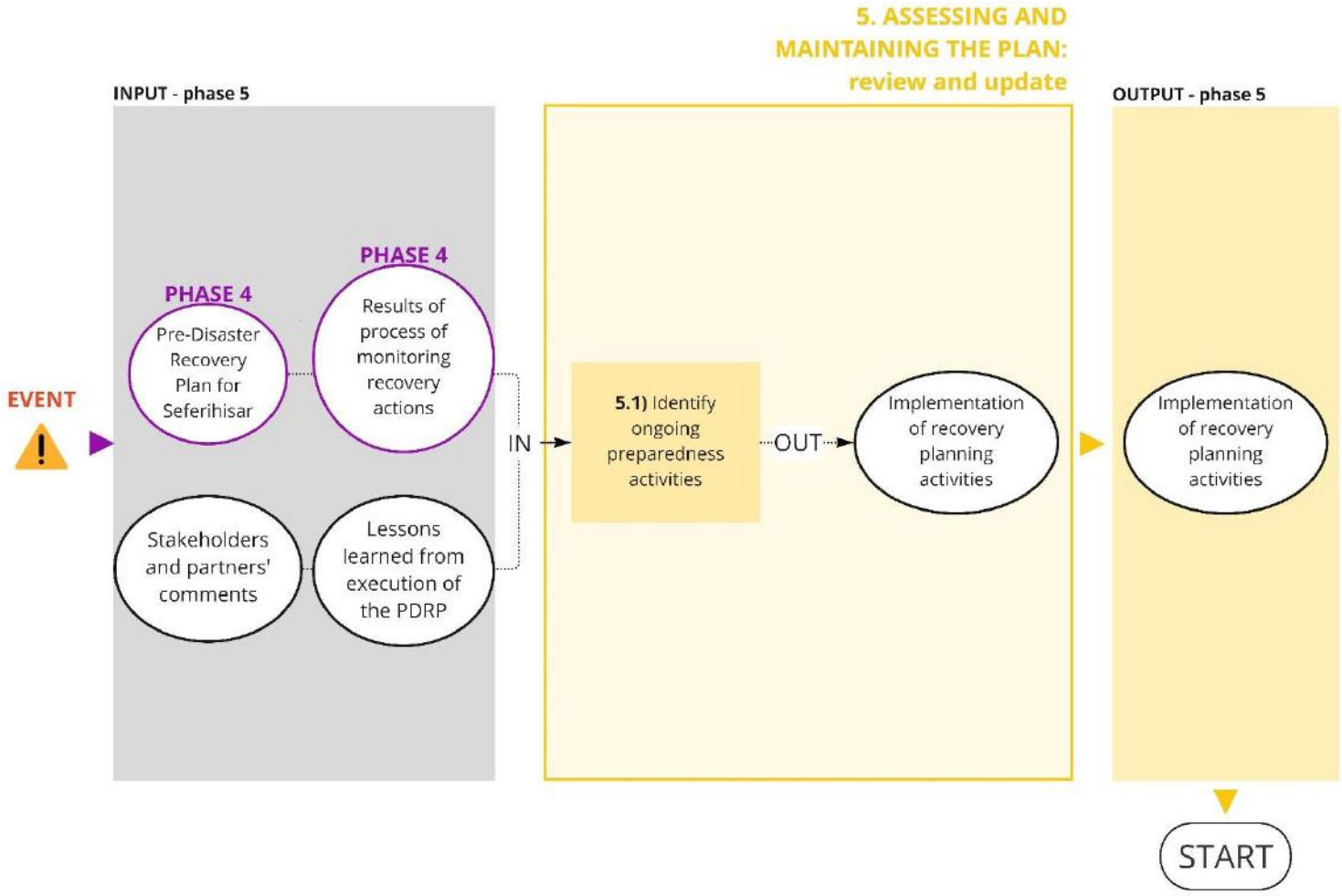

Figure 69. Phase 5 for Seferihisar OL

Activity 5.1 – Identify ongoing preparedness activities (Figure 70)

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 wildfires, 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 70. Key-activity 5.1 for Seferihisar OL

Another important ongoing preparedness activity is the regular evaluation and review of the PDRP, policy documents and ordinances, because 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 governments regulations and laws. Furthermore, lessons learned from execution of the plan in a post-disaster phase should be documented to guide future revisions of the plan.

5.3.6 Summary of the Early Recovery Roadmap for Seferihisar OL

Figure 71 shows the progress of Seferihisar OL for each phase of the PDRR, through a qualitative indicator in the form of a loading bar.

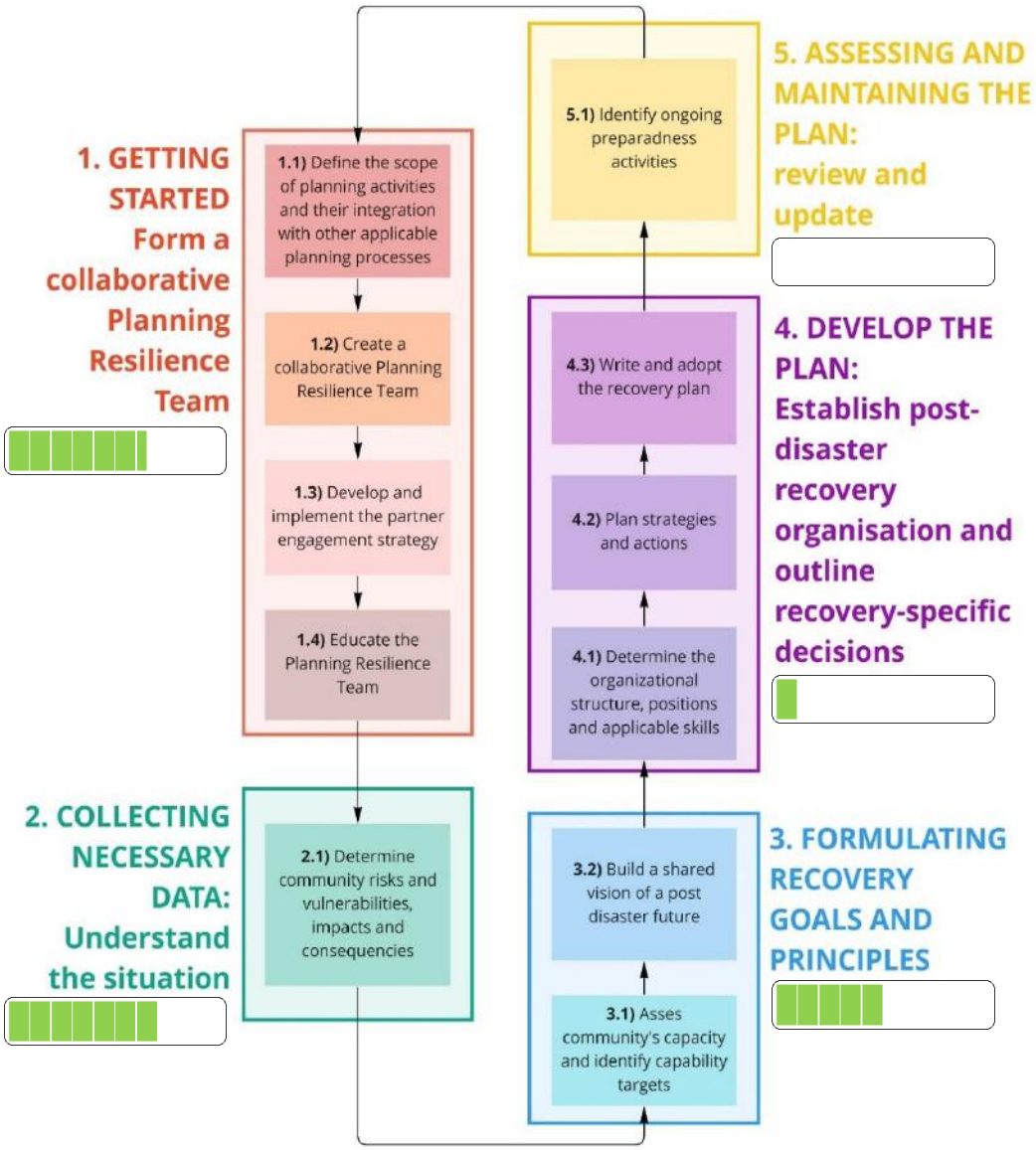

Figure 71. Progress in the PDRR for Seferihisar OL

In addition, the following summary list (Table 19) 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 Seferihisar 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 1.3a) 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	Consider formal agreements with organizations that may provide or support local services in sub-activity 1.2b Align the organizations with appropriate agencies or departments that serve similar functions in sub-activity 1.2b 1.2c) Enable strong community/public participation Identify how external agencies will align with the recovery organizational structure and process in sub-activity 1.3c Identify how external organizations interact with one another in sub-activity 1.3c 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 2.1c) Identify community direct/indirect impacts
pending sub-activity	Identify local government and other organizations that will have an increased workload as a result of the disaster in sub-activity 2.1c Evaluate impacts and consequences for vulnerable individuals in sub-activity 2.1c
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 strenghts and weaknesses 3.1d) Evaluate communication and outreach strengths and weaknesses 3.2a) Define recovery and objectives goals
pending sub-activity	Specifiy as much as possible the recovery objectives for each goal in sub-activity 3.2a 3.2b) Identify principles to guide recovery 3.2c) Ensure a partecipatory and iterative process
PHASE 4	
complete sub-activities	4.1a) Establish an organizational structure 4.1c) Develop a process for notifying and engaging recovery partners in preparation for or immediately after a disaster
pending sub-activity	Idenitfy the LDRM in sub-activity 4.1a Form sub-groups of work in sub-activity 4.1a Identify a coordinator for each specific sub-group in sub-activity 4.1a 4.1b) Ensure recovery resource identification, management and coordination 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 4.2e) Define a process for monitoring recovery 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
PHASE 5	
complete sub-activities	-
pending sub-activity	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

Table 19. Completed/pending activities for Seferihisar OL

To summarise, the application of the early recovery Roadmap to the Seferihisar OL has detected that no phases can be considered as totally achieved, and only a limited number of activities and sub-activities have been completed through the provisions included in existing planning and policy instruments. Therefore, Seferihisar OL can start developing the PDRP by applying the methodology described in this report.

5.4 Galicia Open Lab

The Galicia OL is a cross-border OL, located in the Natural Park of Baixa Lima-Serra Do Xurés in Spain. This territory is subject to significant pressure due to the incidence of forest fires that take place. SHELTER particularly focuses on providing tools to increase the resilience of both its natural and historic built environment.

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

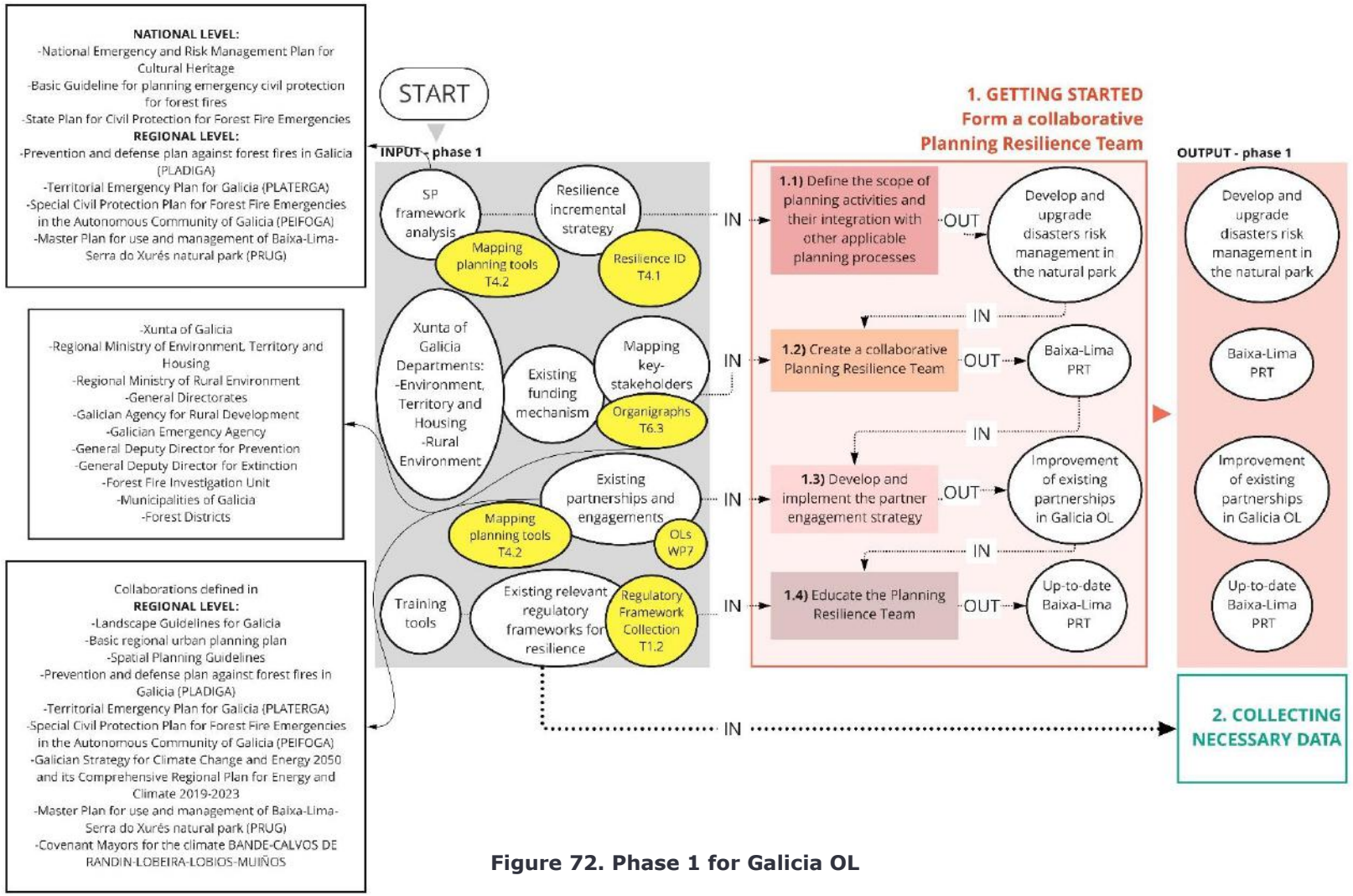

Figure 72. Phase 1 for Galicia OL

Activity 1.1 - Define the scope of planning activities and their integration with other applicable planning processes (Figure 73)

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 20).

LEVEL	SP TOOL
National level	National Emergency and Risk Management Plan for Cultural Heritage
	Basic Guideline for planning emergency civil protection for forest fires
	State Plan for Civil Protection for Forest Fire Emergencies
Regional level	Prevention and defense plan against forest fires in Galicia (PLADIGA)
	Territorial Emergency Plan for Galicia (PLATERGA)
	Special Civil Protection Plan for Forest Fire Emergencies in the Autonomous Community of Galicia (PEIFOGA)
	Master Plan for use and management of Baixa-Lima- Serra do Xurés natural park (PRUG)

Table 20. Relevant SP tools for Galicia OL for Activity 1.1

From the analysis of the SP framework, it can be defined that the scope of the PDR planning for Galicia OL is to develop and upgrade the DRM in the Natural Park of Baixa Lima-Serra Do Xurés, especially against wildfires.

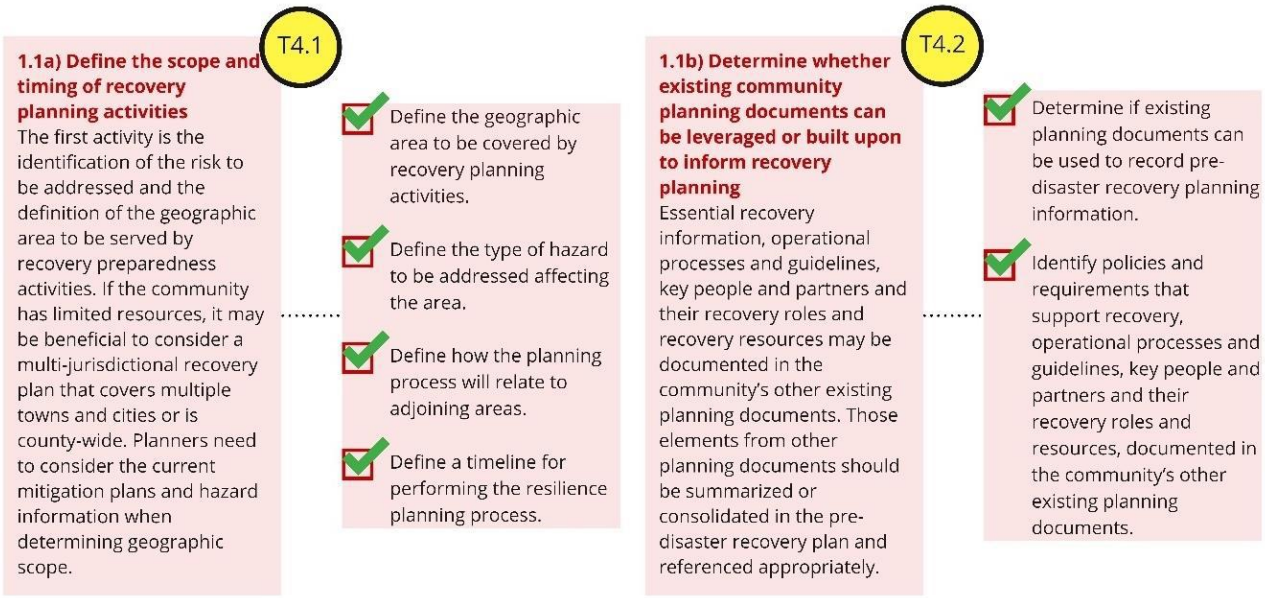

Figure 73. Key-activity 1.1 for Galicia OL

Activity 1.2 - Create a collaborative Planning Resilience Team (Figure 74)

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

The Xunta of Galicia, and its Departments of Environment, Territory and Housing and Rural Environment can be considered as the starting point to form the team which leads the recovery planning process. According to the Organigraph, developed in Task 6.3, there are several political and technical entities that offer their contribution to the process:

- Regional Ministry of Environment, Territory and Housing
- Regional Ministry of Rural Environment
- General Directorates
- Galician Agency for Rural Development
- Galician Emergency Agency
- General Deputy Director for Prevention
- General Deputy Director for Extinction
- Forest Fire Investigation Unit
- Municipalities of Galicia
- Forest Districts

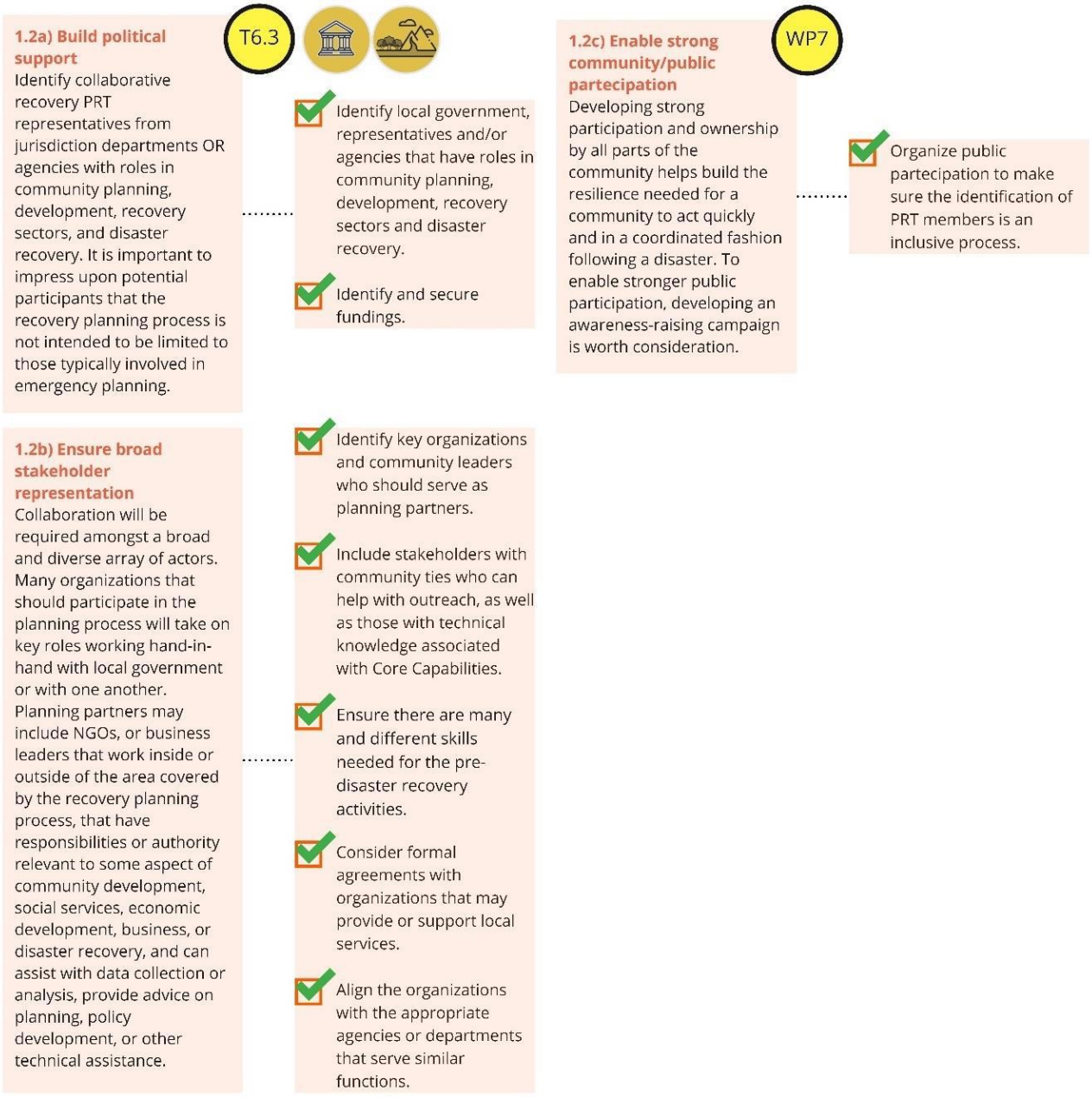

Figure 74. Key-activity 1.2 for Galicia OL

Activity 1.3 – Develop and implement the partner engagement strategy (Figure 75)

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 21).

LEVEL	SP TOOL
Regional level	Landscape Guidelines for Galicia
	Basic regional urban planning plan
	SP Guidelines
	Prevention and defense plan against forest fires in Galicia (PLADIGA)

	Territorial Emergency Plan for Galicia (PLATERGA)
	Special Civil Protection Plan for Forest Fire Emergencies in the Autonomous Community of Galicia (PEIFOGA)
	Galician Strategy for Climate Change and Energy 2050 2050 and its Comprehensive Regional Plan for Energy and Climate 2019-2023
	Master Plan for use and management of Baixa-Lima- Serra do Xurés natural park (PRUG)
	Covenant Mayors for the climate BANDE-CALVOS DE RANDIN-LOBEIRA-LOBIOS-MUIÑOS

Table 21. Relevant SP tools for Galicia OL for Activity 1.3

The development and implementation of these planning tools foresaw collaborative processes among Regional governmental administrations, several Departments of Xunta, including emergency ones, and local and provincial administrations. Local communities do not participate in co-creation and co-management of planning tools, assuming that the public and participatory information process is mandatory.

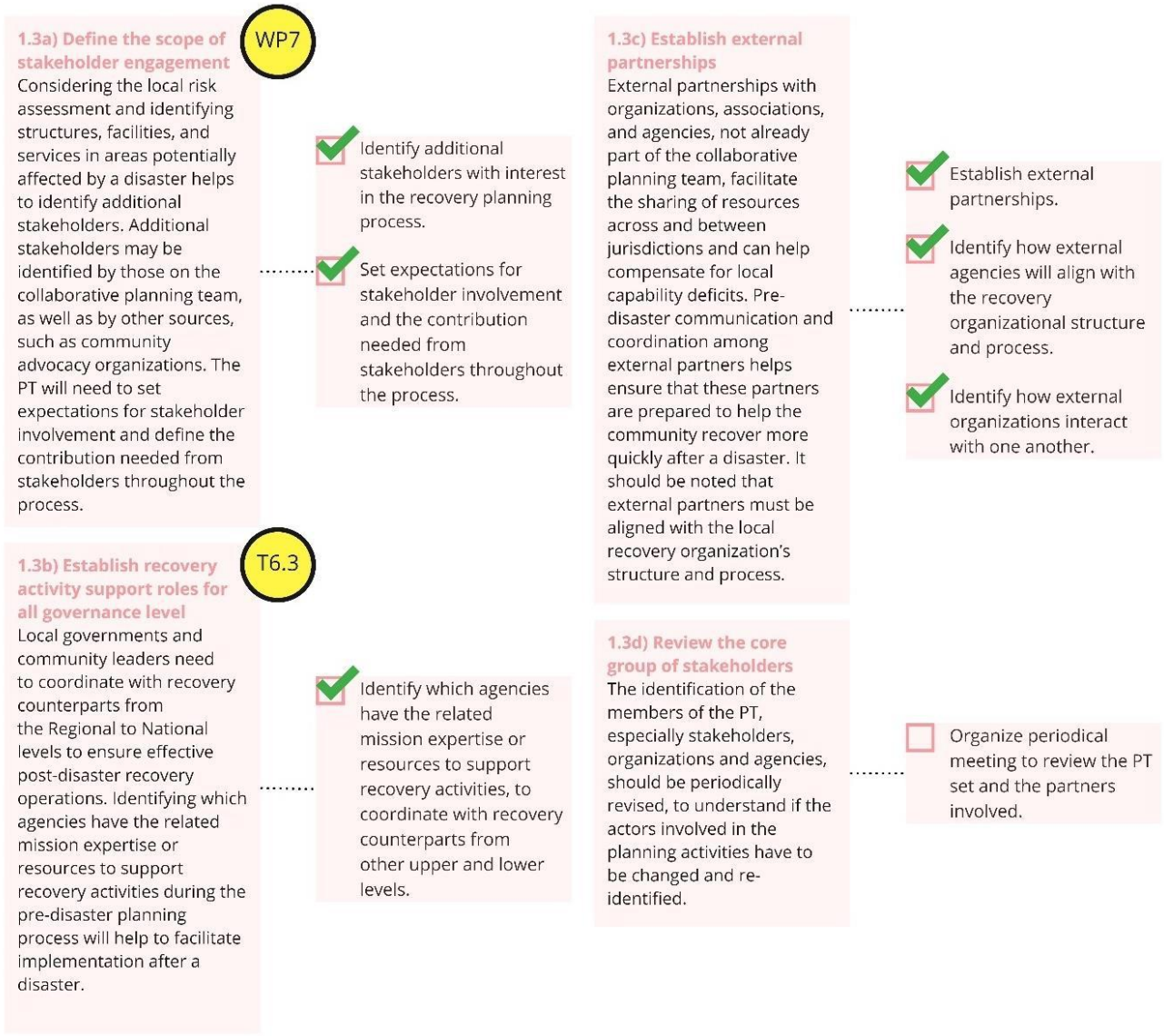

Figure 75. Key-activity 1.3 for Galicia OL

Activity 1.4 – Educate the Planning Resilience Team (Figure 76)

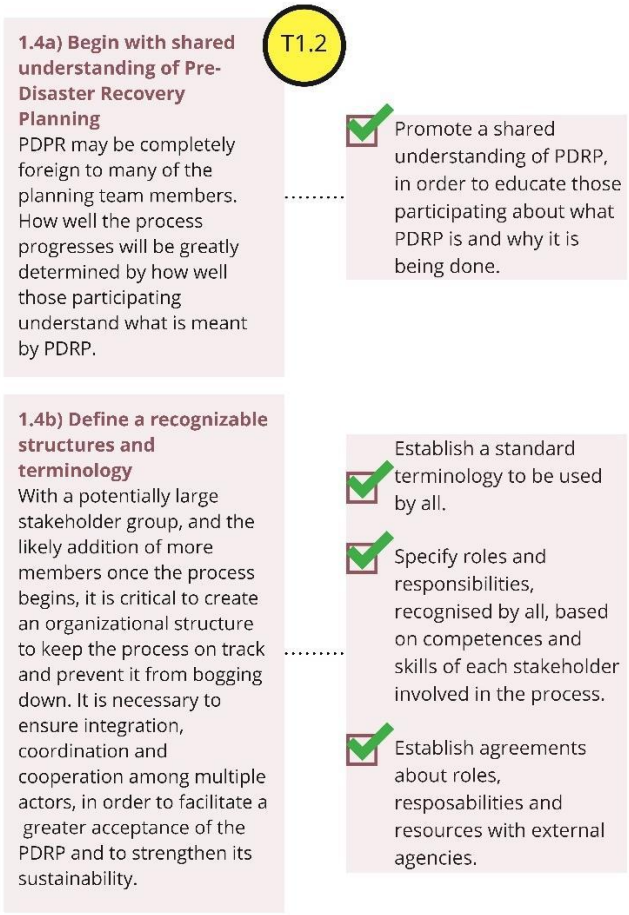

Figure 76. Key-activity 1.4 for Galicia OL

Regarding the first phase, it is possible to say that Galicia 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 administrations of each Galician municipality; however, their engagement is realized not in a formal way.

5.4.2 PHASE 2 – COLLECTING NECESSARY DATA: Understand the situation

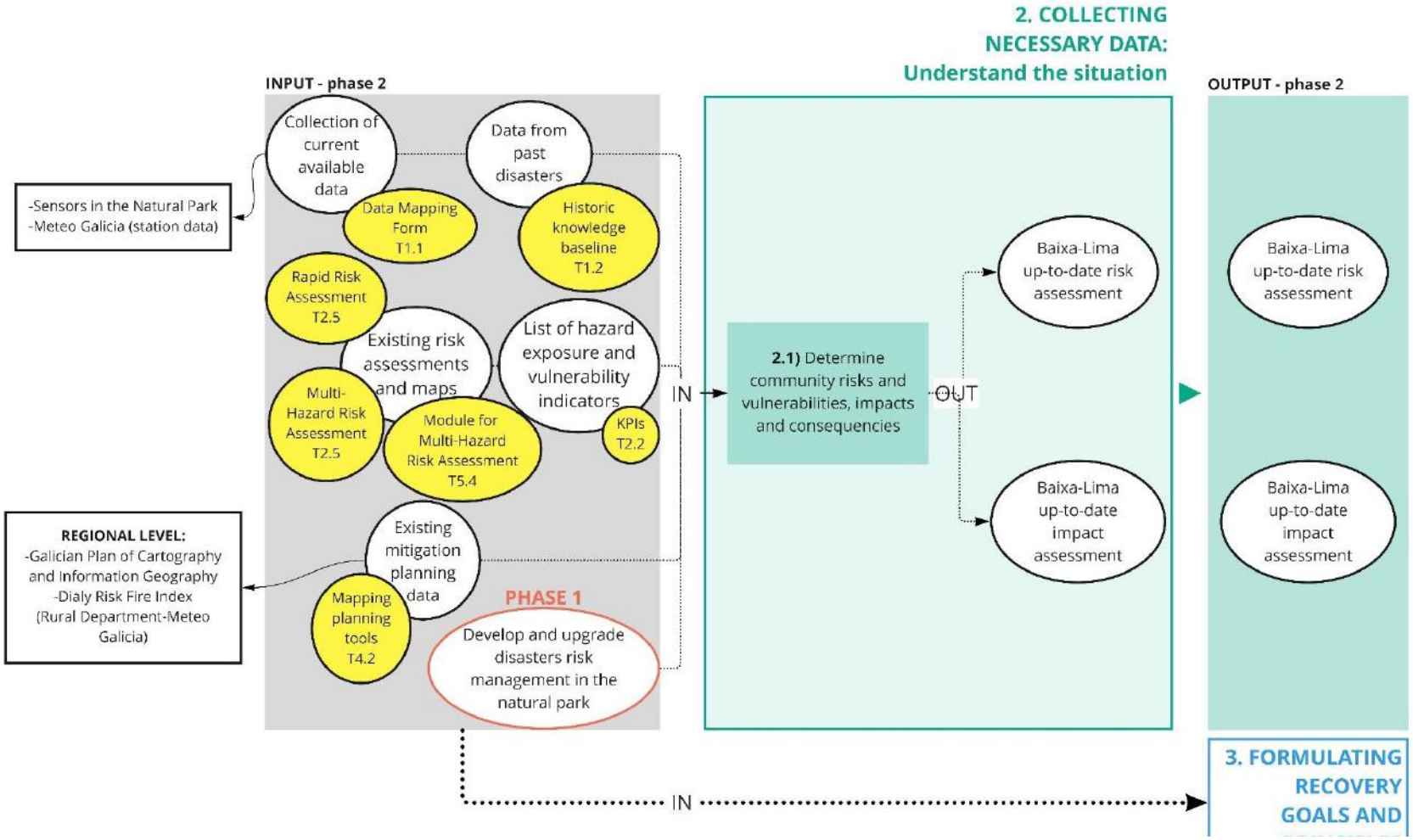

Figure 77. Phase 2 for Galicia OL

Activity 2.1 - Determine community risks and vulnerabilities, impacts and consequences (Figure 78)

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

From SHELTER, the available inputs are:

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

The PRT can also gather data from sensors installed in the Natural Park and meteo station data, present in all the territory.

Furthermore, there are two useful tools, that provide specific disaster risk information.

The first is the *Galician Plan of Cartography and Information Geography.* It ensures consistency, continuity and interoperability of geographical information on the Galician territory, organizing and integrating them in a homogeneous data model. It contains also specific maps for wildfire risk and also other natural risk.

The second is the *Dialy risk Fire Index,* developed by the Rural Department of the Xunta of Galicia. This Index predicts the zones with low, medium, high and extreme risk of fires, four days in advance, for each of the 360 cells of 10 km x 10 km that cover the total Galicia surface. For the prediction of the fire risk, the system uses the meteorological data taken directly from the automatic meteorological stations. The Index is visualized by means of a GIS, on a Galicia map, where the cells appear in the color corresponding to the risk level (green, yellow, brown and red).

Regarding the second phase, it is possible to say that Galicia OL has many available data, to gather information about hazards, risks and vulnerabilities to address in its territory. The PRT can also use the inventory of NH in terms of area, species and climate change variability.

The potential needs, identified by the OL, are the sharing of these data among partners, considering that some of them are not totally public; the combination of different types of data; the creation of a final index to summarize all risks and vulnerabilities affected the area, as an implemented tool to lead the process of making decisions around recovery.

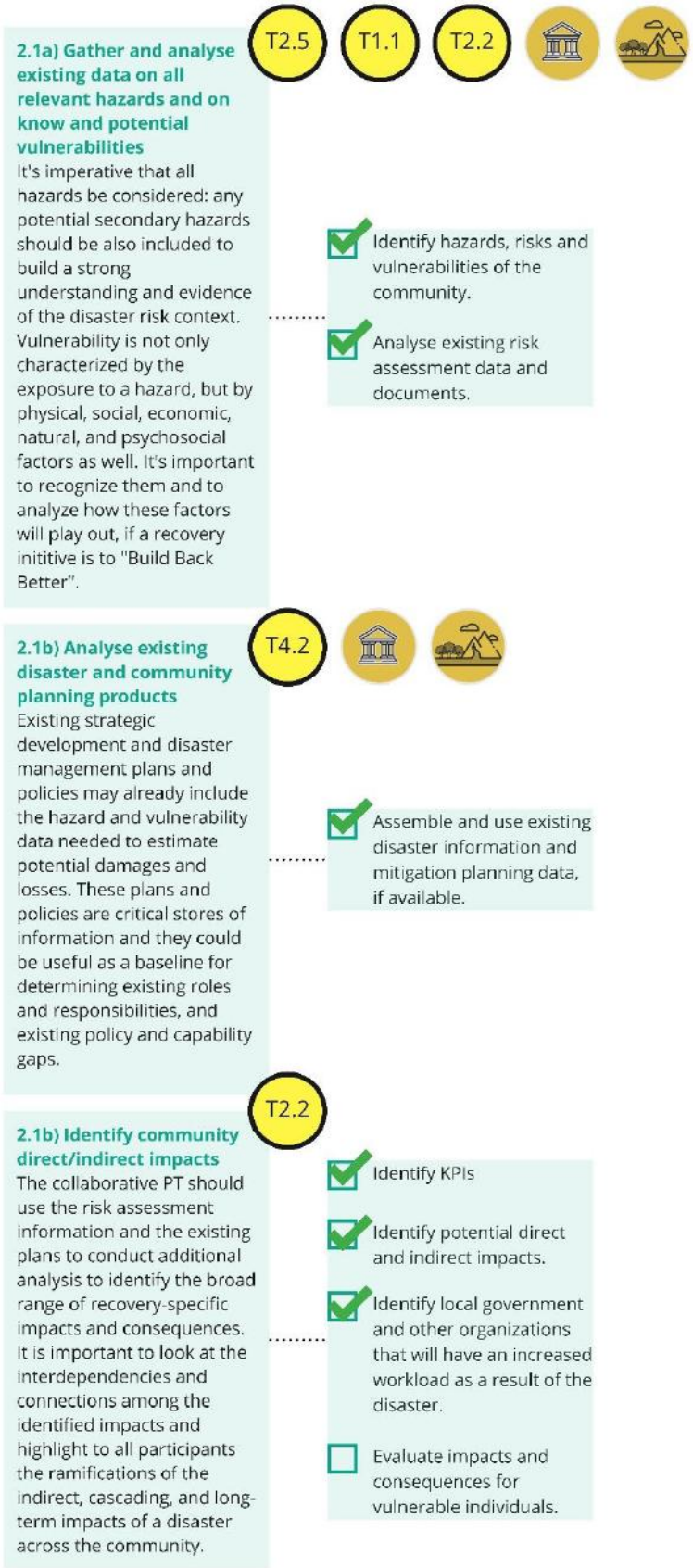

Figure 78. Key-activity 2.1 for Galicia OL

5.4.3 PHASE 3 – FORMULATING RECOVERY GOALS AND PRINCIPLES

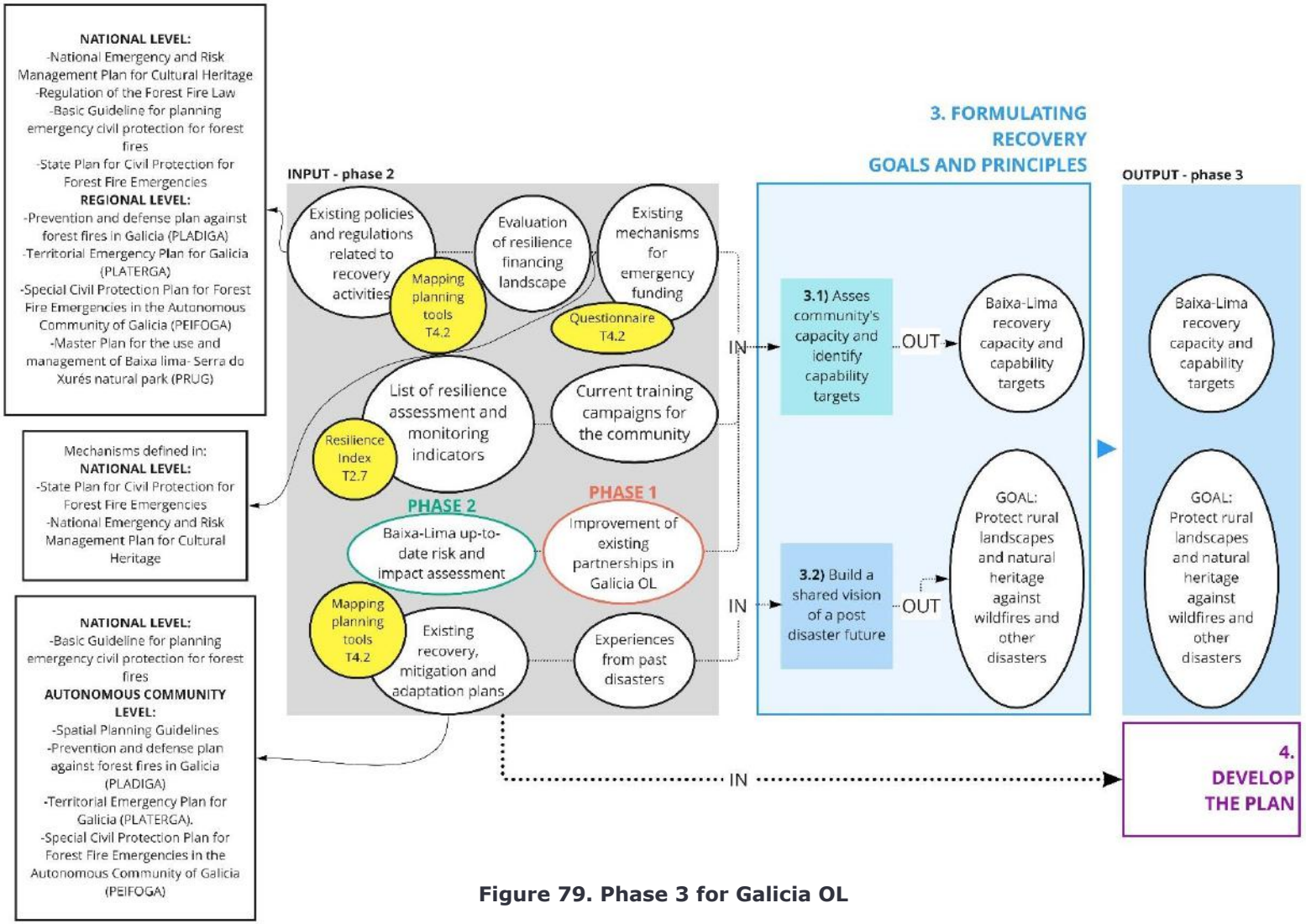

Figure 79. Phase 3 for Galicia OL

Activity 3.1 – Assess community's capacity and identify capability targets (Figure 80)

Based on the risk assessment of the previous phase, this activity is to evaluate strengths and weakness 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 tools are the followings (Table 22).

LEVEL	SP TOOL
National level	National Emergency and Risk Management Plan for Cultural Heritage
	Regulation of the Forest Fire Law
	Basic Guideline for planning emergency civil protection for forest fires
	State Plan for Civil Protection for Forest Fire Emergencies
Regional level	Prevention and defense plan against forest fires in Galicia (PLADIGA)
	Territorial Emergency Plan for Galicia (PLATERGA)
	Special Civil Protection Plan for Forest Fire Emergencies in the Autonomous Community of Galicia (PEIFOGA)
	Master Plan for the use and management of Baixa lima- Serra do Xurés natural park (PRUG)

Table 22. Relevant SP tools for Galicia OL for Activity 3.1

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 resource, in terms of quantity and expertise, and the financial resources available, identifying potential community needs and gaps.

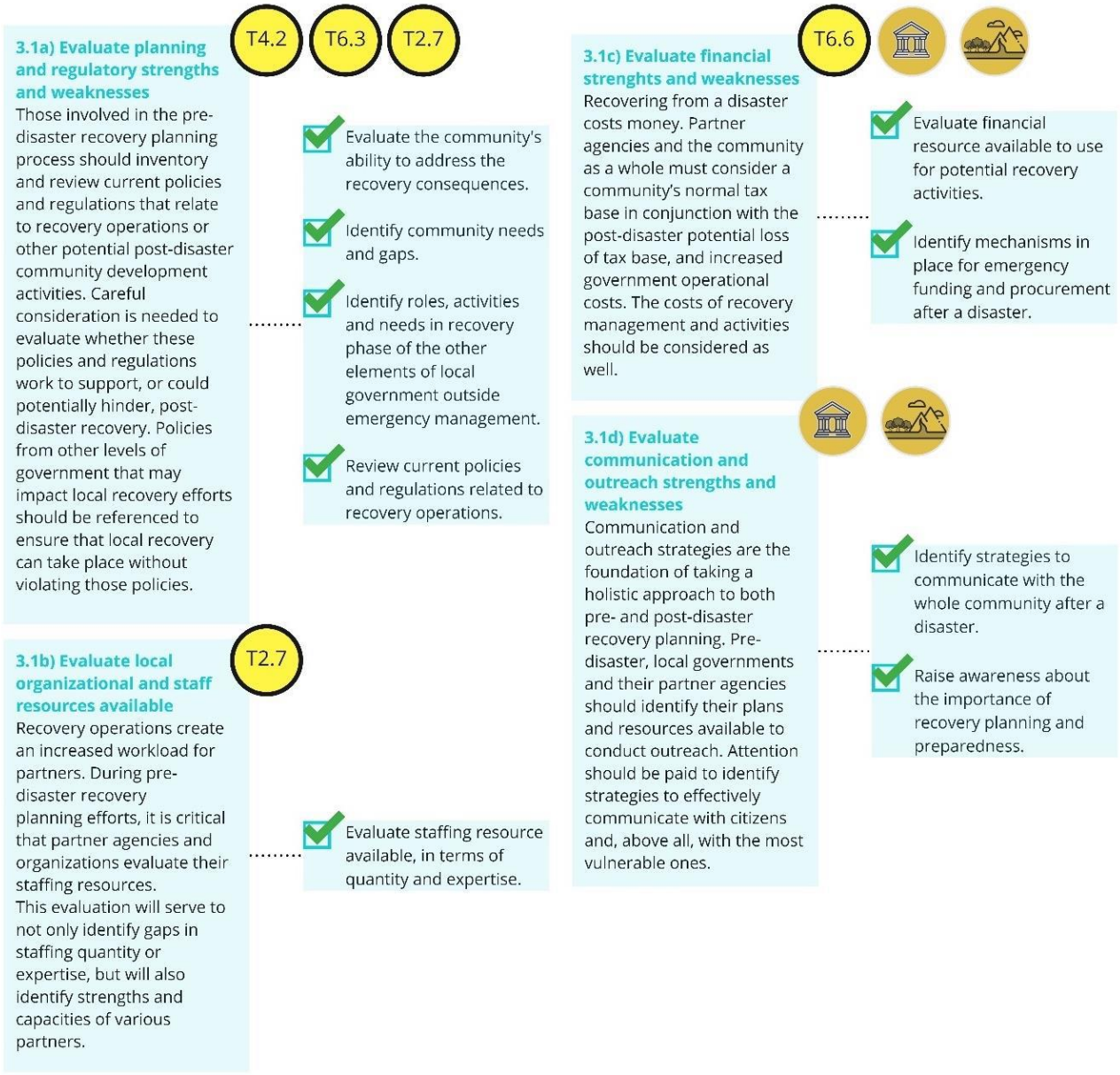

Figure 80. Key-activity 3.1 for Galicia OL

Activity 3.2 – Build a shared vision of a post disaster future (Figure 81)

The main potential recovery goal for Galicia OL could be to protect rural landscapes and NH against wildfires and other disasters. This goal coincides with the overall aims and the objectives of the following planning tools (Table 23).

LEVEL	SP TOOL
National level	Basic Guideline for planning emergency civil protection for forest fires
Regional level	SP Guidelines
	Prevention and defense plan against forest fires in Galicia (PLADIGA)
	Territorial Emergency Plan for Galicia (PLATERGA)

	Special Civil Protection Plan for Forest Fire Emergencies in the Autonomous Community of Galicia (PEIFOGA)
	Master Plan for the use and management of Baixa lima- Serra do Xurés natural park (PRUG)

Table 23. Relevant SP tools for Galicia OL for Activity 3.2

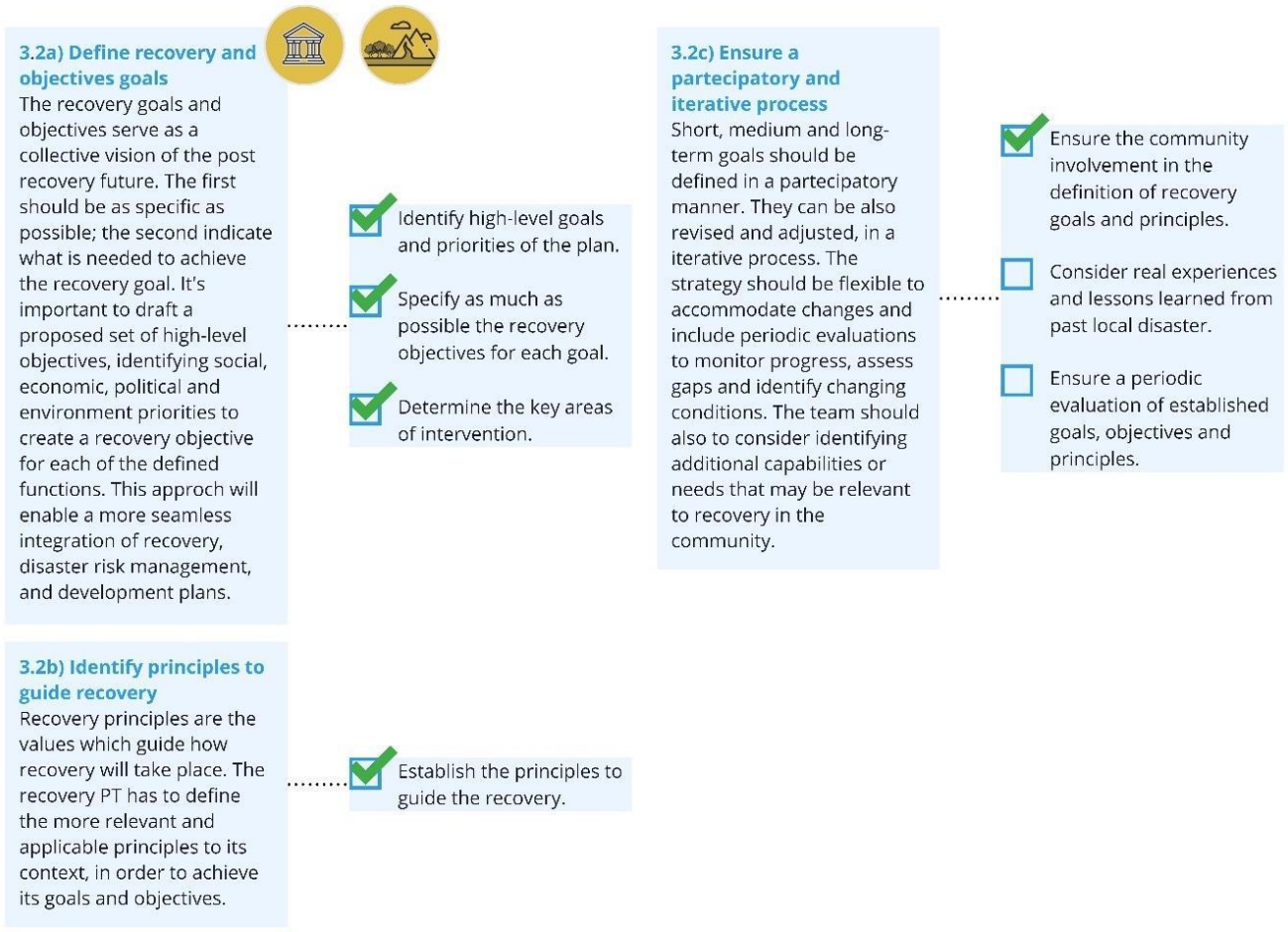

Figure 81. Key-activity 3.2 for Galicia OL

Regarding the third phase, it is possible to say that in Galicia OL the identification of community needs and gaps is very well-covered. At the same time, the recovery goals and objectives are well defined, but it is relevant to notice that they are established in a very high and strategic level in the recovery, mitigation and adaptation plans at upper level than the local one. The establishment of goals and objectives is determined by the specific plans focused on the local areas where the recovery would take place.

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

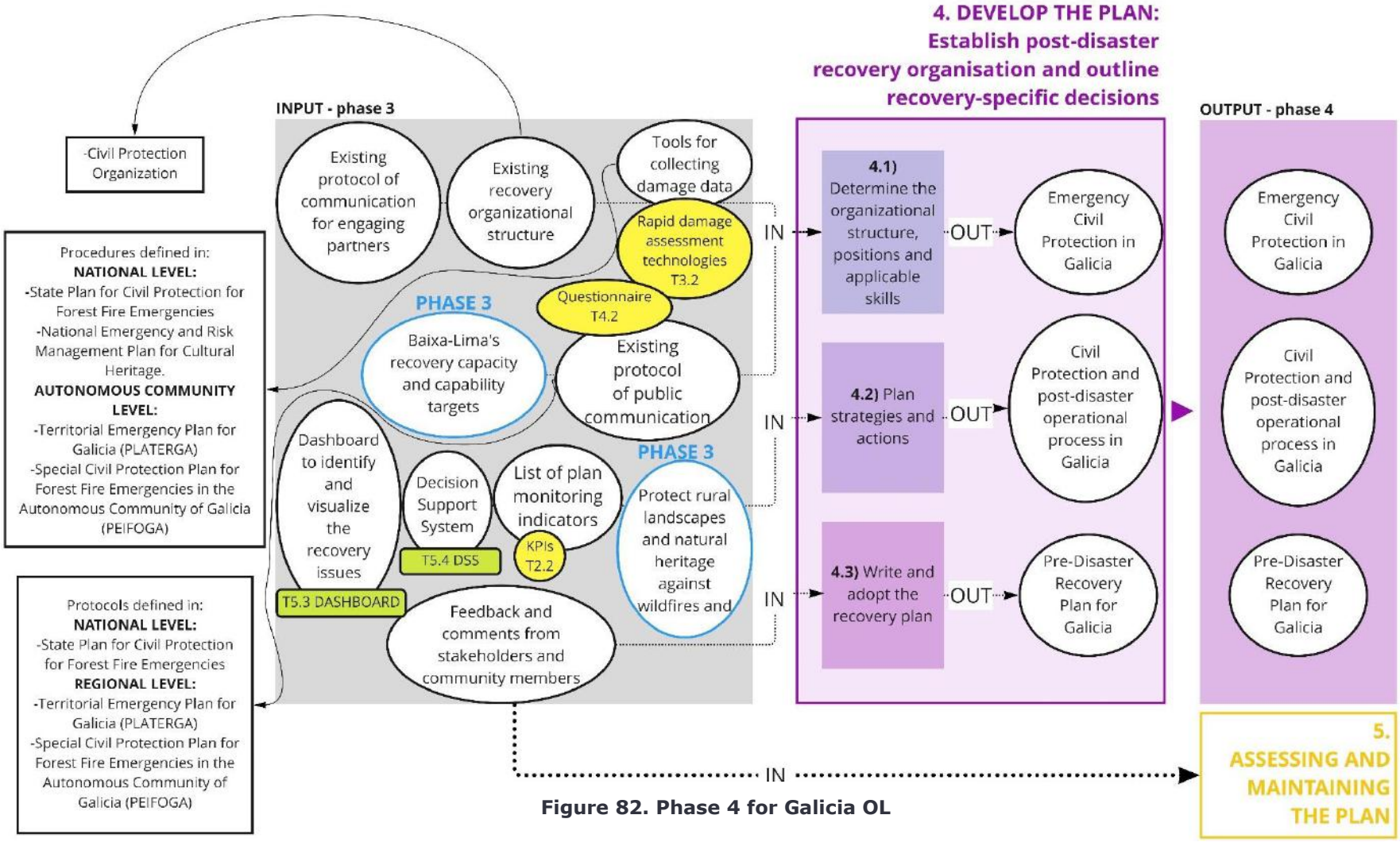

Figure 82. Phase 4 for Galicia OL

Activity 4.1 – Determine the organizational structure, positions and applicable skills (Figure 83)

Those involved in the planning process should start by evaluating the existing recovery organization. The National Civil Protection System is structured through three levels, national, regional and local. The activation of each system depends on the territorial influence of the event. Usually, since the event has location at the regional level, the action will be led by the autonomous comunity of Galicia.

The *State Plan for Civil Protection for Forest Fire Emergency* provides the organizational structure that allows the direction and coordination of the set of Public Administrations in emergency situations due to fires forestry, in which the national interest is present. It is also the main reference for mechanisms and procedures to coordinate the contribution of means and resources, for intervention in emergencies, for cases in which those provided in the corresponding plans of the autonomous communities are manifestly insufficient. It establishes and keeps updated information on capacities available in wildfire emergencies, in support of the Autonomous community plans, and defines the information system and procedure, related to the monitoring of forest fires with potential consequences for Civil Protection.

It may be relevant also to consider the *National Emergency and Risk Management Plan for Cultural Heritage.* It establishes resources and protocols for urgent action for the safeguarding and rescue of cultural property in the event of an emergency, coordination mechanisms between the different administrations, procedures to exchange knowledge and experiences between the different institutions that intervene in an emergency.

At the autonomous community level, the two most relevant planning tools are the *Territorial Emergency Plan for Galicia (PLATERGA)* and the *Special Civil Protection Plan for Forest Fire Emergencies in the Autonomous Community of Galicia (PEIFOGA).*

The first, that aims to obtain maximum protection for people, the environment and the goods affected in any emergency situation, provides information regarding the appropriate coordination of all public and private services called to intervene, and the procedures to inform the population, also using social communication media, about the evolution of events. The second, constitutes the organizational structure and procedures for emergency intervention by forest fires, within the territory of the Autonomous Community of Galicia. The *PEIFOGA* establishes also mechanisms and procedures for coordination with the organizations of the local administrations, organizational systems for coaching volunteer staff and procedures for informing the population.

It is important to highlight that in Galicia, the system of Civil Protection is involved mainly during the emergency; instead, in the recovery stage all the stakeholders are involved and they are part of a very well-defined organizational structure, headed by a Commission with representatives of all the different administrations in the territory, that could be considered a Disaster Recovery Manager.

Regarding inputs provided by SHELTER in this phase, it must be pointed out that the Chatbot is not applicable, since in the area there is not a wide internet connection.

Figure 83. Key-activity 4.1 for Galicia OL

Activity 4.2 – Plan strategies and actions (Figure 84)

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

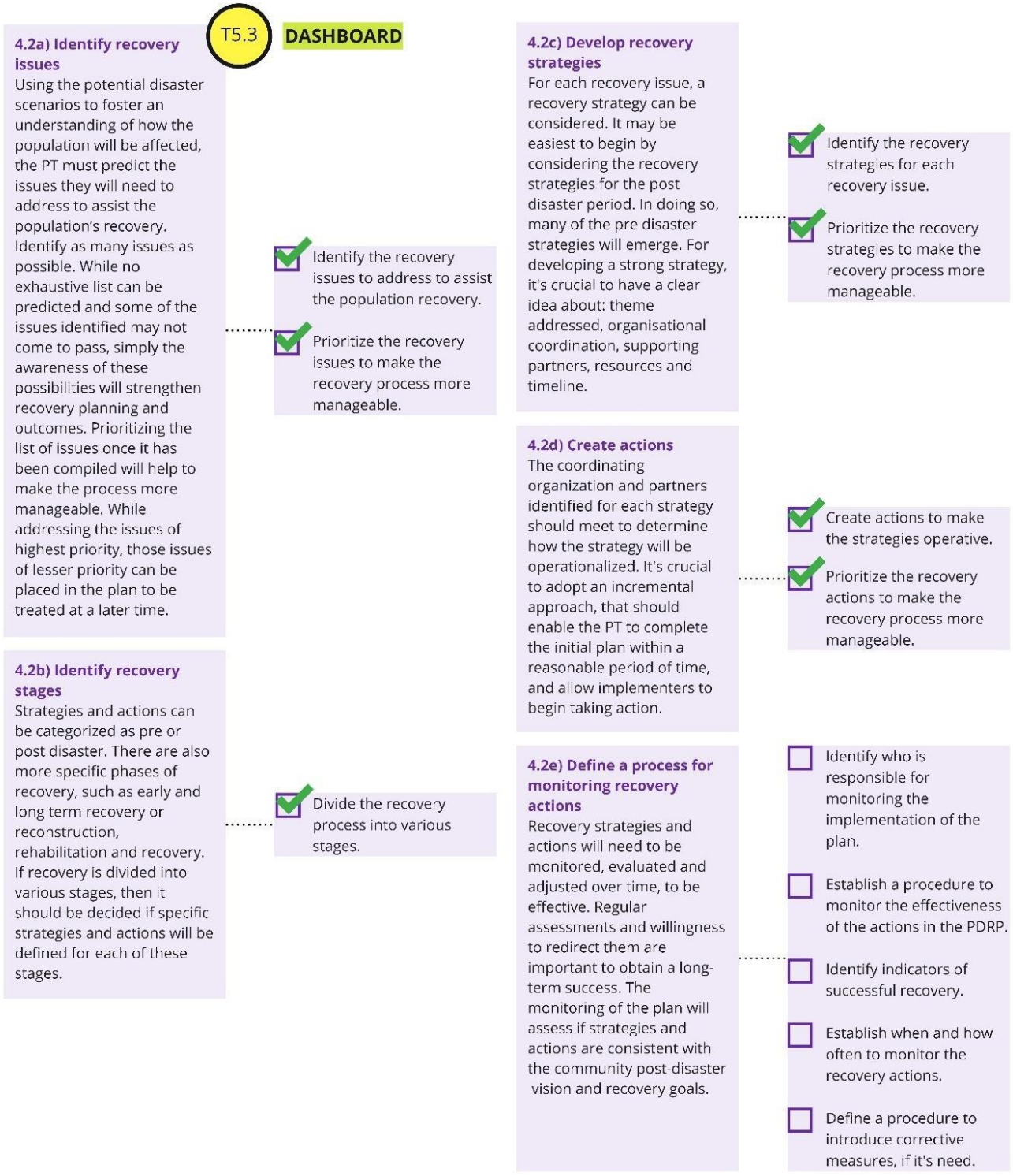

Figure 84. Key-activity 4.2 for Galicia OL

In Pre-Disaster stage, there is a general strategy for the actions to be taken after a wildfire. After some events happed, the Recovery Plans are defined with more operative and customized actions.

Activity 4.3 – Write and adopt the recovery plan (Figure 85)

If the community needs to develop a new PDRP, all information, documentations 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 consequently release.

As mentioned above, the public participatory of documents is mandatory, even if the community does not participate in co-design processes.

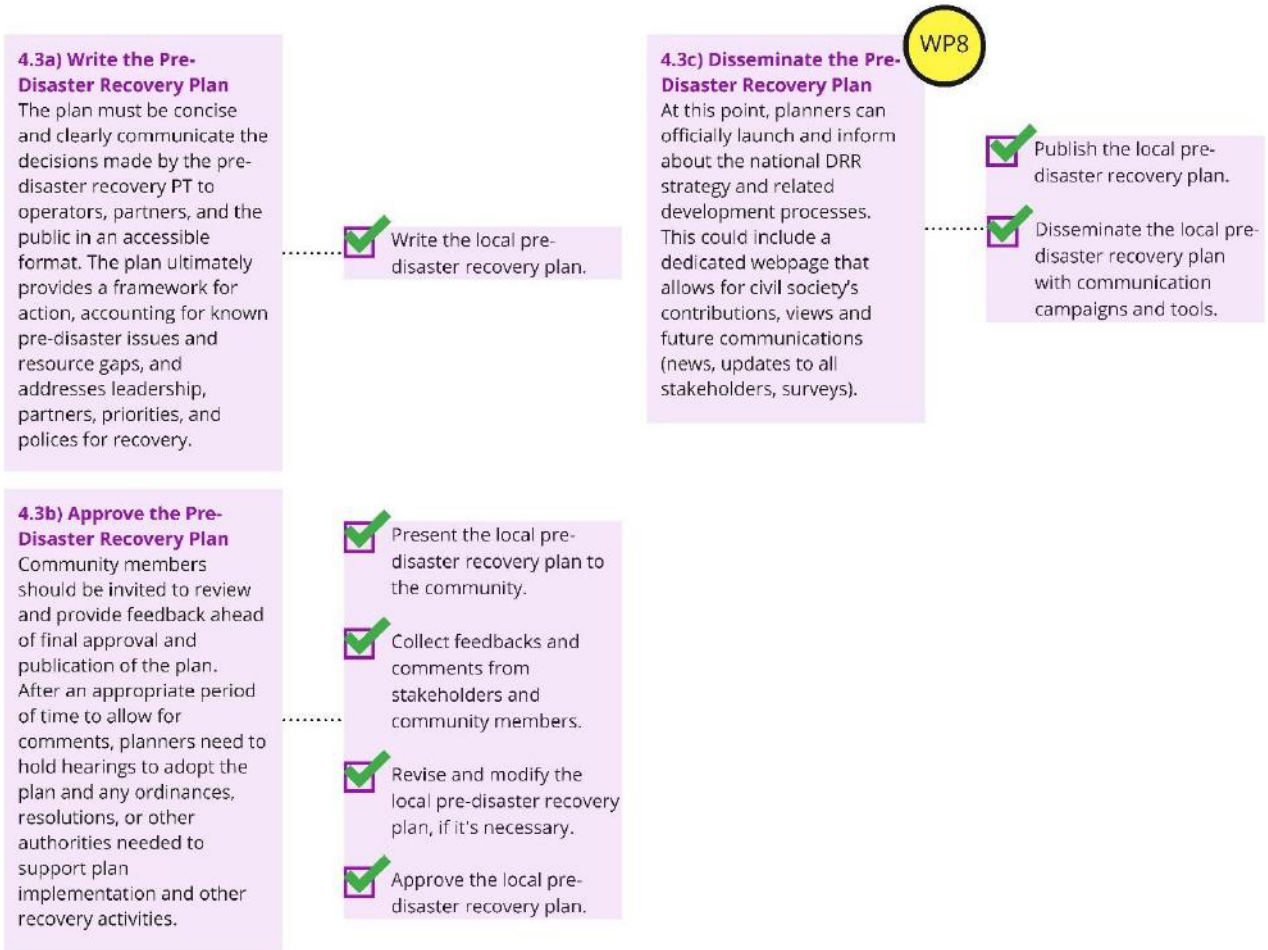

Figure 85. Key-activity 4.3 for Galicia OL

Regarding the fourth phase, it is possible to say that in Galicia OL the existing *Prevention and defense plan against forest fires in Galicia (PLADIGA)* can be recognized as a PDRP,

which means that Galicia OL is already provided with an effective post-disaster operational process. The OL does not have the need to write and approve a new planning tool.

However, a potential way of implementing this tool is the customization of recovery strategies and actions for a specific event, immediately related to the characteristic of the disaster and the community that has to address it. Furthermore, the OL has identified as a gap that a well-defined monitoring part is missing, in terms of operative ways and procedures.

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

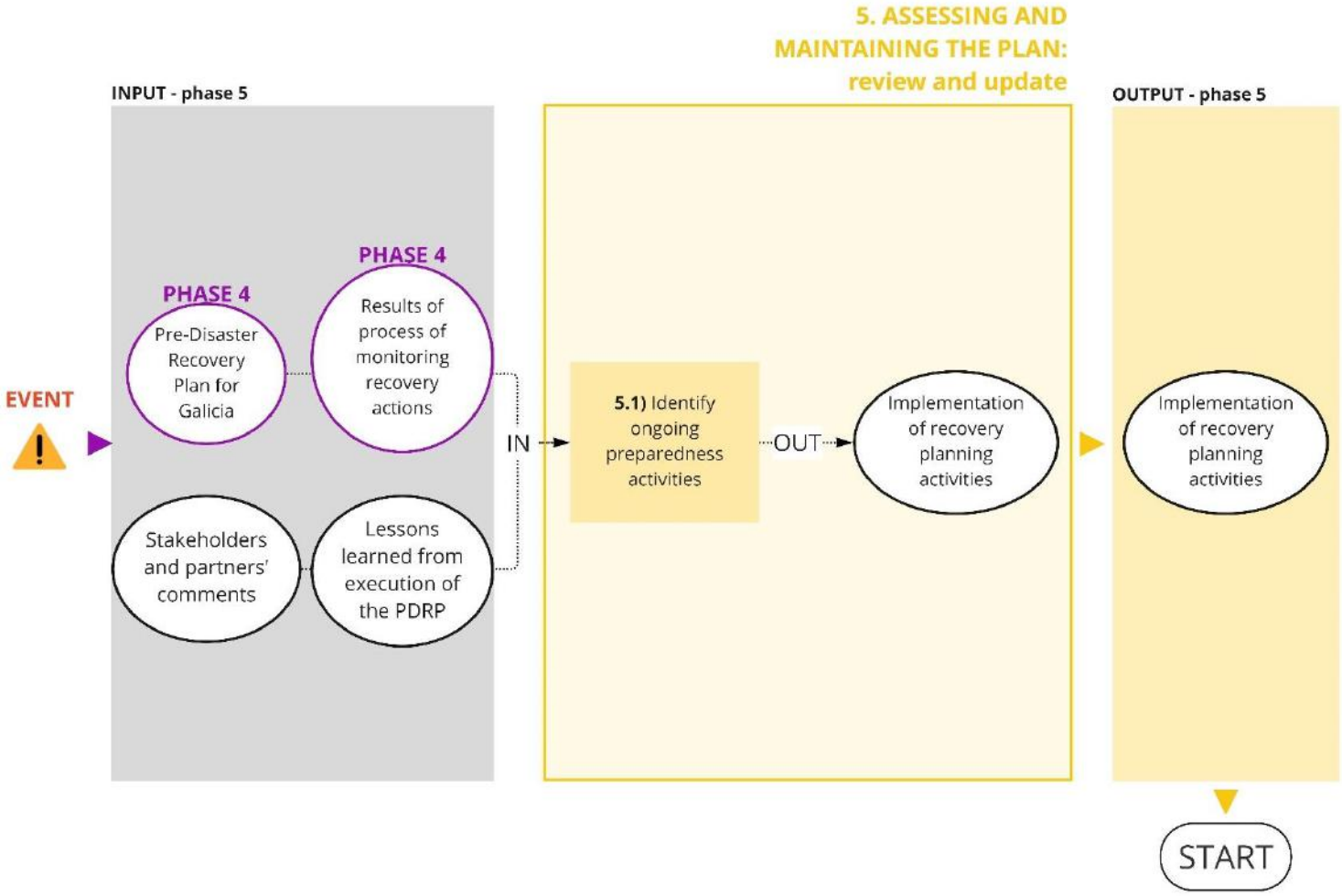

Figure 86. Phase 5 for Galicia OL

Activity 5.1 – Identify ongoing preparedness activities

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 wildfires, 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 87. Key-activity 5.1 for Galicia OL

Another important ongoing preparedness activity is the regular evaluation and review of the PDRP, policy documents and ordinances, because 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 governments regulations and laws. Furthermore, lessons learned from execution of the plan in a post-disaster phase should be documented to guide future revisions of the plan.

In Galicia OL, it would be useful to follow these steps in the specific area in which a disaster has happened. In fact, the recovery plans, that consider all these elements, are done in an operative way, but nor for each wildfire.

5.4.6 Summary of the Early Recovery Roadmap for Galicia OL

Figure 88 shows the progress of Galicia OL for each phase of the PDRR, through a qualitative indicator in the form of a loading bar.

In addition, the list in Table 24 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 Galicia OL.

To summarise, the application of the early recovery Roadmap to the Galicia OL has shown that the majority of steps, activities and sub-activities have been already taken into account by national, regional, local policy and planning instruments, although the PDRP as such, as conceived by this methodology, has not been developed yet. Nevertheless, Galicia OL is provided with an effective post-disaster operational process described in the existing *Prevention and defense plan against forest fires in Galicia (PLADIGA)*. The OL does not need to write and approve a new planning tool, 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. In particular, the monitoring part is missing in terms of operative ways and procedures, and the revision of the existing plan in light of the main findings from this methodology might start from there.

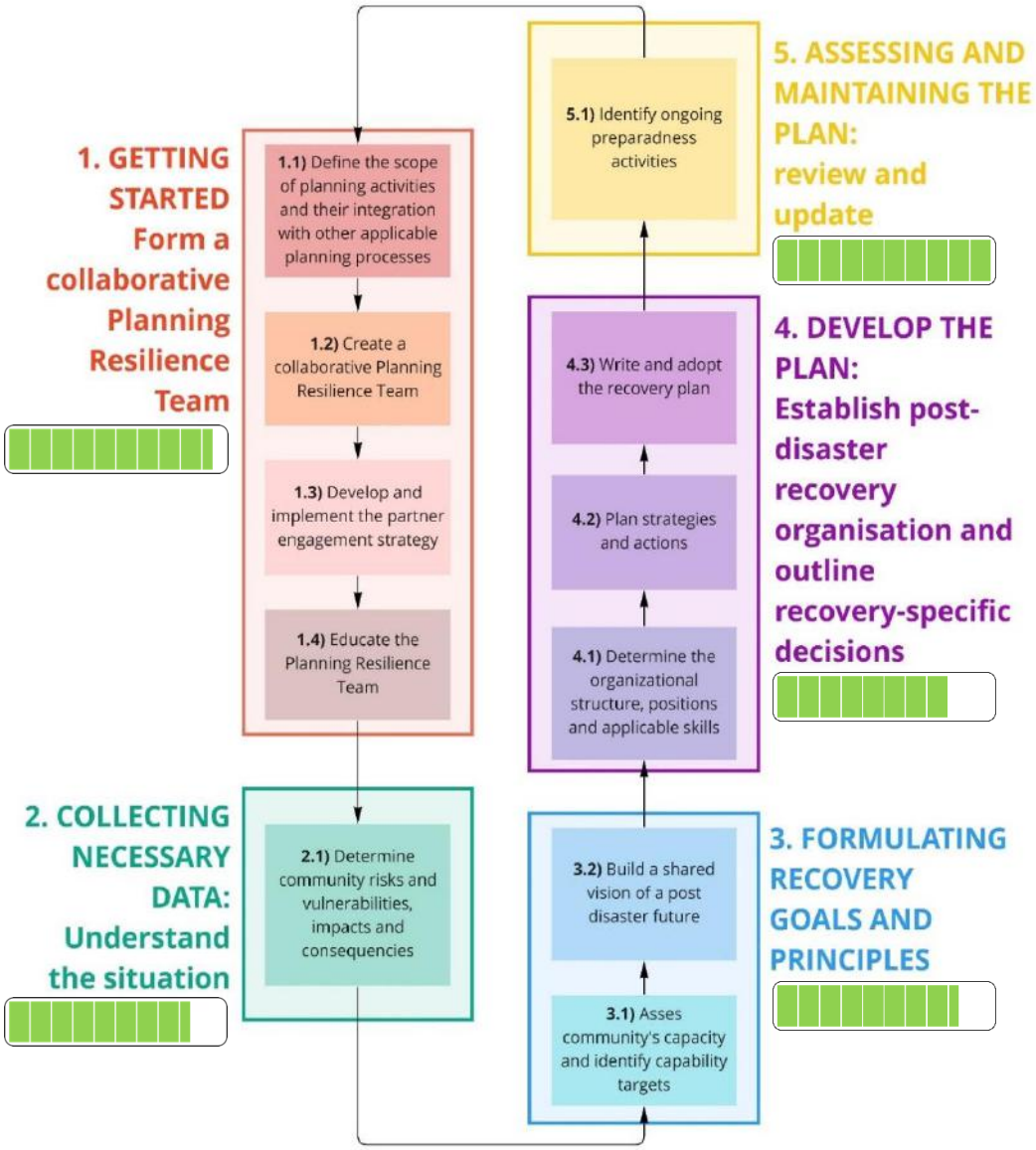

Figure 88. Progress in the PDRR for Galicia OL

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 2.1c) Identify community direct/indirect impacts
pending sub-activity	Evaluate impacts and consequences for vulnerable individuals in sub-activity 2.1c
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 strenghts 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 partecipatory and iterative process
pending sub-activity	Consider real experiences and lessons learned from past local disaster in sub-activity 3.2c 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	Identify the LDRM in sub-activity 4.1a 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 24. Completed/pending activities for Galicia OL

5.5 Sava River Basin Open Lab

The Sava River Basin OL is a cross-border OL, that involves several countries in the South-Eastern Europe: the Republic of Albania, Bosnia and Herzegovina, the Republic of Croatia, Montenegro, the Republic of Serbia and the Republic of Slovenia. For this territory, flooding has been identified as the main hazard, and climate change has been considered as an amplifying phenomenon.

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

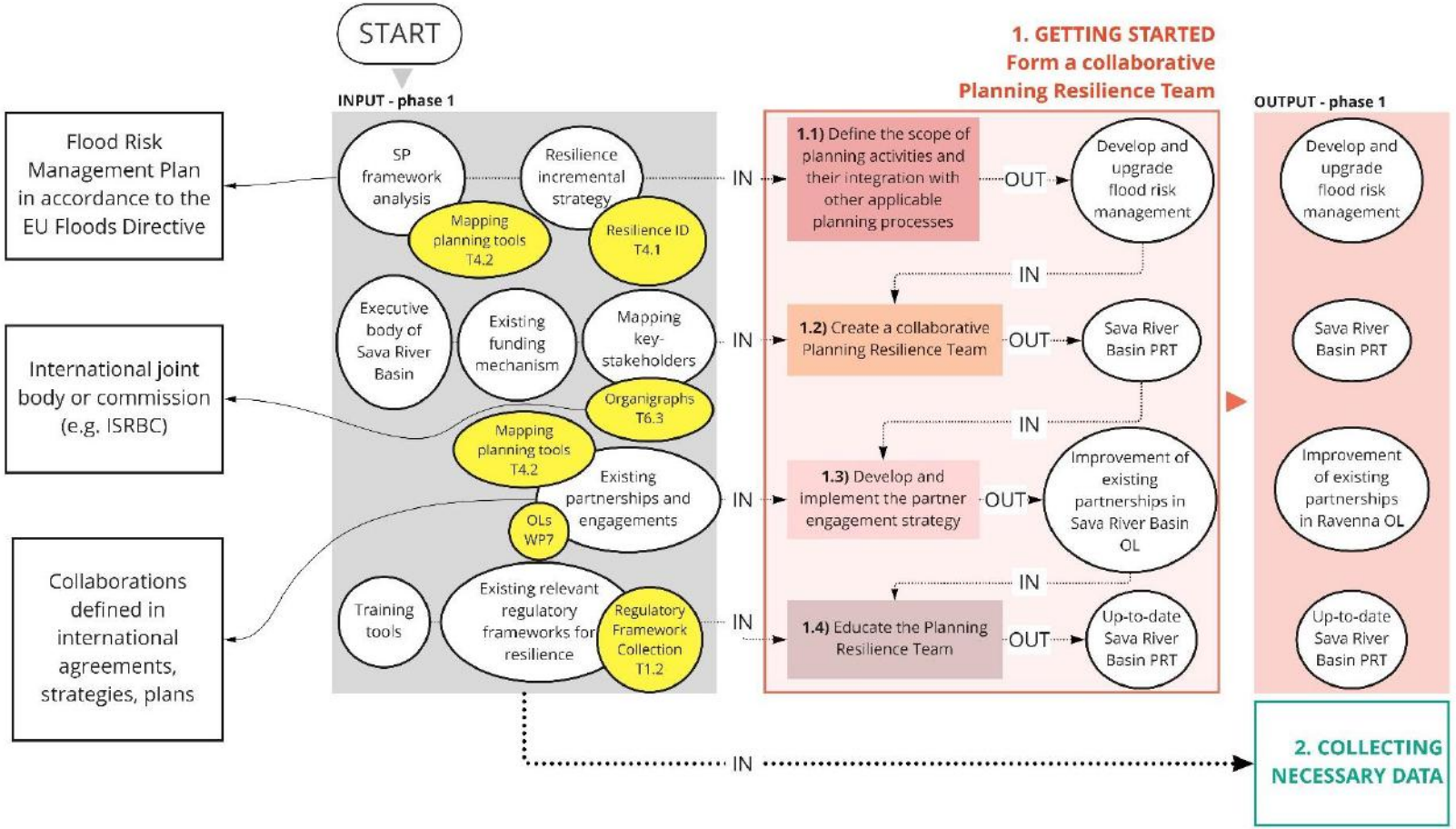

Figure 89. Phase 1 for Sava River Basin OL

Activity 1.1 - Define the scope of planning activities and their integration with other applicable planning processes (Figure 90)

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 most relevant reference among planning tools, already collected in Task 4.2 *Definition of protocols, plans and guidelines for CCA/DRM and integration within planning policies,* is the *Flood Risk Management Plan in the Sava River Basin.* It establishes joint objectives of flood risk management in compliance with principles of long-term sustainability, identifies non-structural and structural measures in areas of mutual interest, and enables a consistent and coordinated approach to managing these risks at the level of the entire Sava River Basin in accordance to the EU Floods Directive.

It can be defined that the scope of the PDRP for Sava River Basin OL is to develop and upgrade flood risk management.

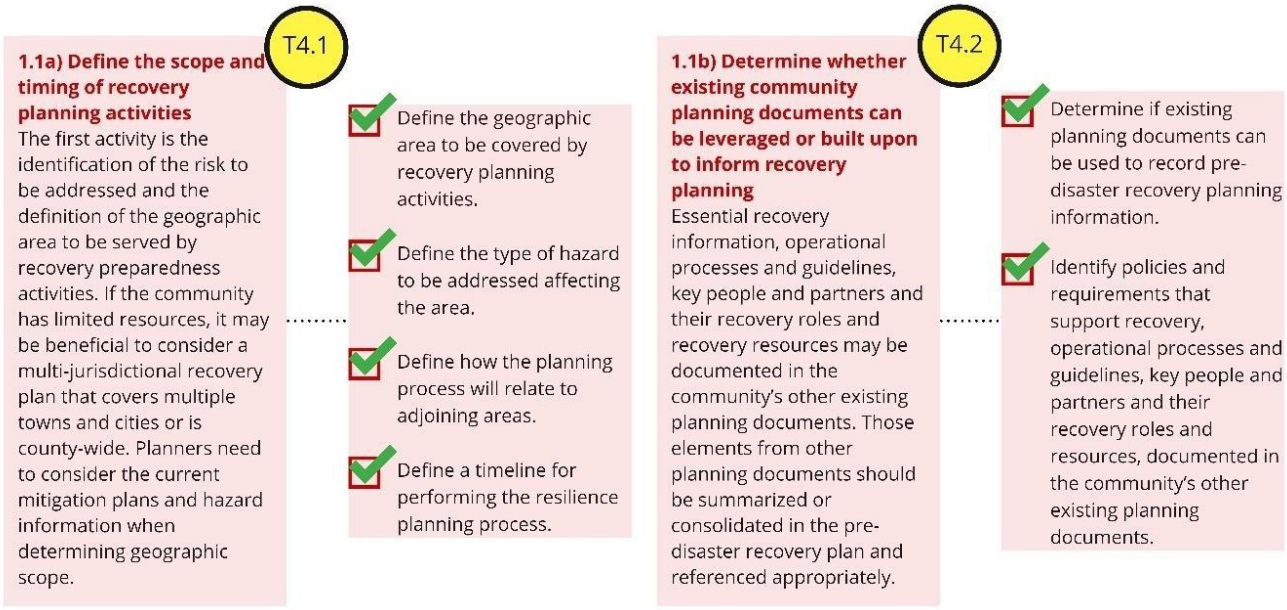

Figure 90. Key-activity 1.1 for Sava River Basin OL

Activity 1.2 - Create a collaborative Planning Resilience Team (Figure 91)

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

The executive body of the International Sava River Basin Commission can be considered as the starting point to form the team which leads the recovery planning process. In this activity, the Organigraph developed in Task 6.3 is the most helpful tool to explore potential partners, collaboration, and governance mechanisms that operate the international spatial scale, especially those which deal with the risk of flooding.

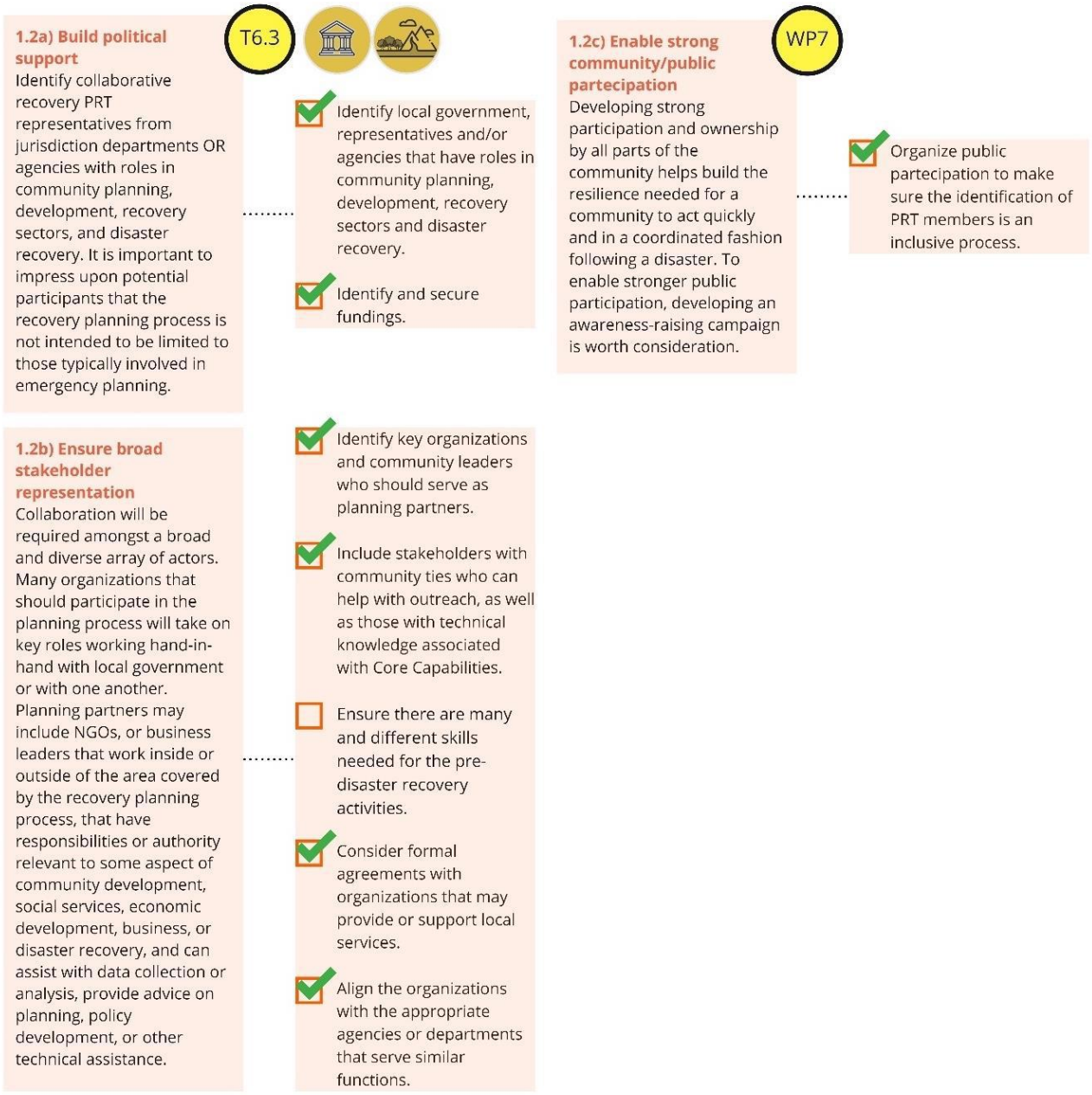

Figure 91. Key-activity 1.2 for Sava River Basin OL

Activity 1.3 – Develop and implement the partner engagement strategy (Figure 92)

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 international agreements, strategies, and plans.

The development and implementation of these planning tools foresaw collaborative processes, including experts from all countries of the Framework Agreement in the Sava River Basin.

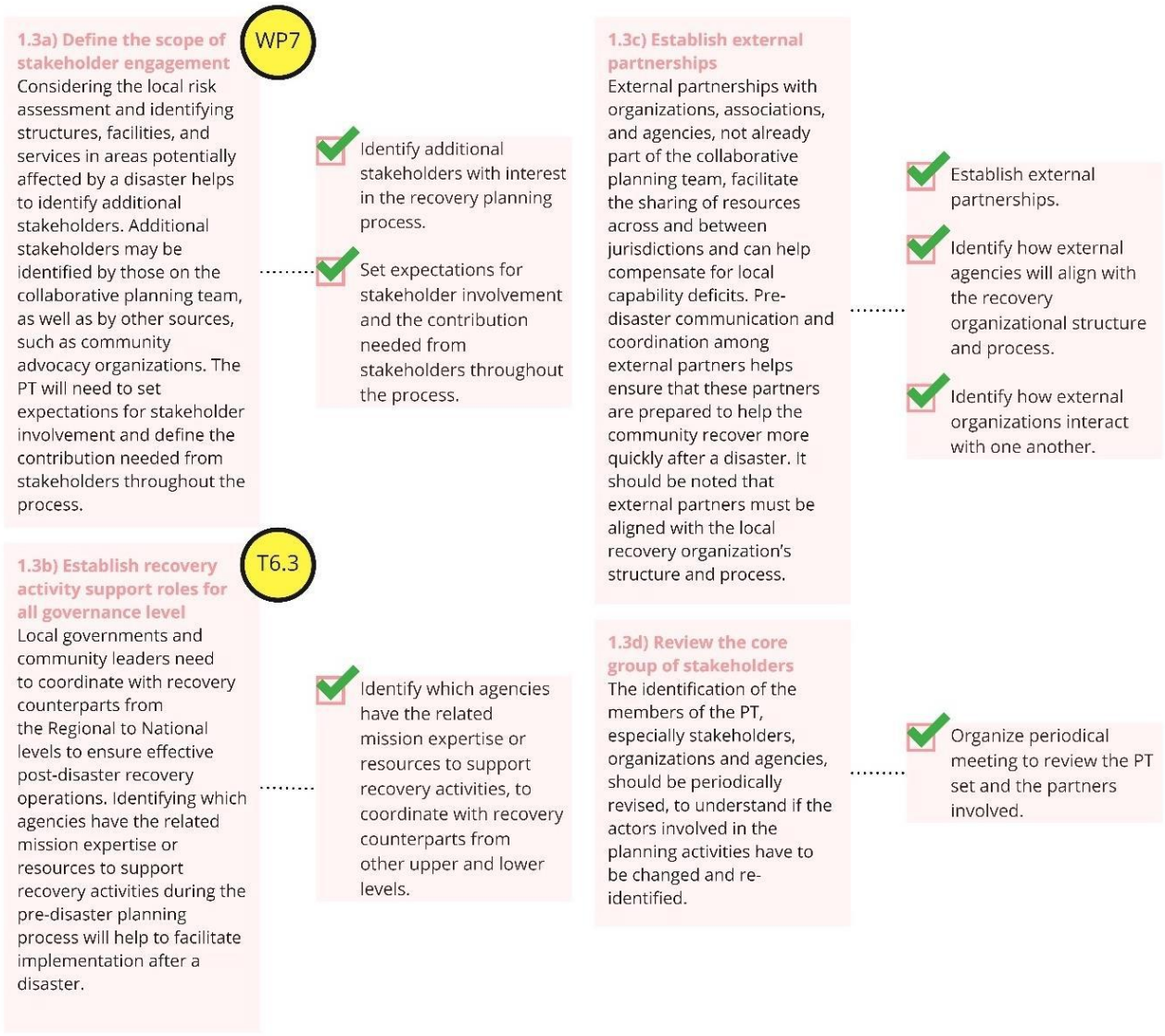

Figure 92. Key-activity 1.3 for Sava River Basin OL

Activity 1.4 – Educate the Planning Resilience Team (Figure 93)

Regarding the first phase, the Sava River Basin OL has a well-defined team, in terms of planning resilience: there is a solid network of the interested stakeholders and citizens, and it has also established a Task expert Group for the SHELTER project implementation which if formed of the core experts of the Open Lab stakeholders group (cultural heritage authorities, flood management authorities and emergency responders/civil protection authorities) and officially nominated by the representatives in the Sava Commission and the responsible ministry from Montenegro, as well as the officials of the Sava Commission Secretariat. The representatives of the Member countries in the International Sava River Basin Commission regularly evaluate the work of the Task Group.

However, the most relevant challenge is to involve more agencies with cultural heritage expertise, to take more into account this key topic. In fact, those experts involved in this

planning process recognize as a gap that the team does not involve partners and authorities or experts in cultural protection and management sectors.

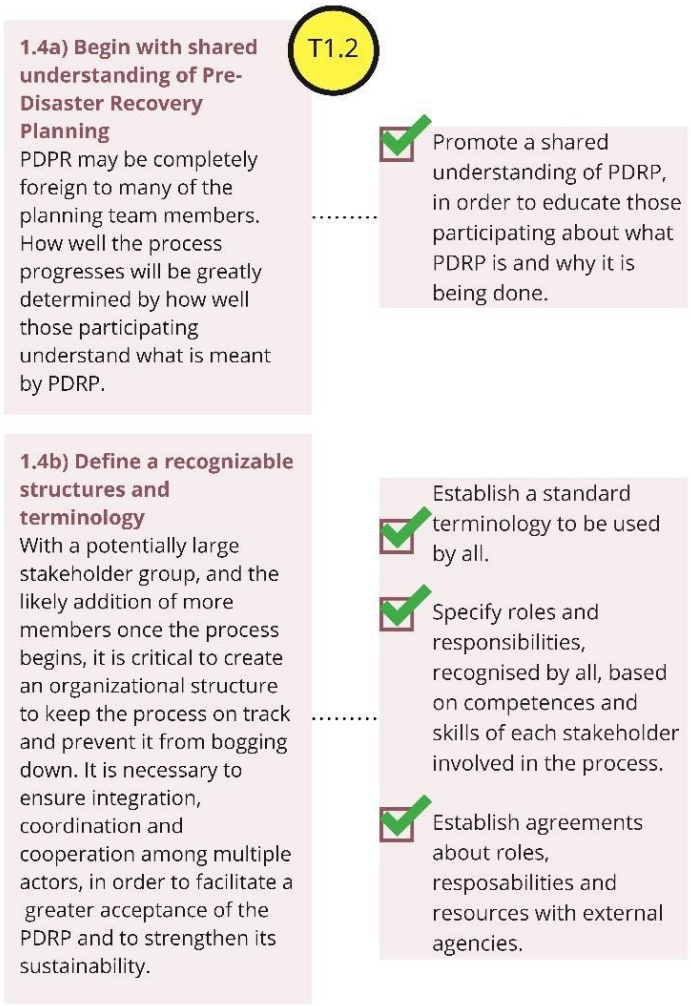

Figure 93. Key-activity 1.4 for Sava River Basin OL

5.5.2 PHASE 2 – COLLECTING NECESSARY DATA: Understand the situation

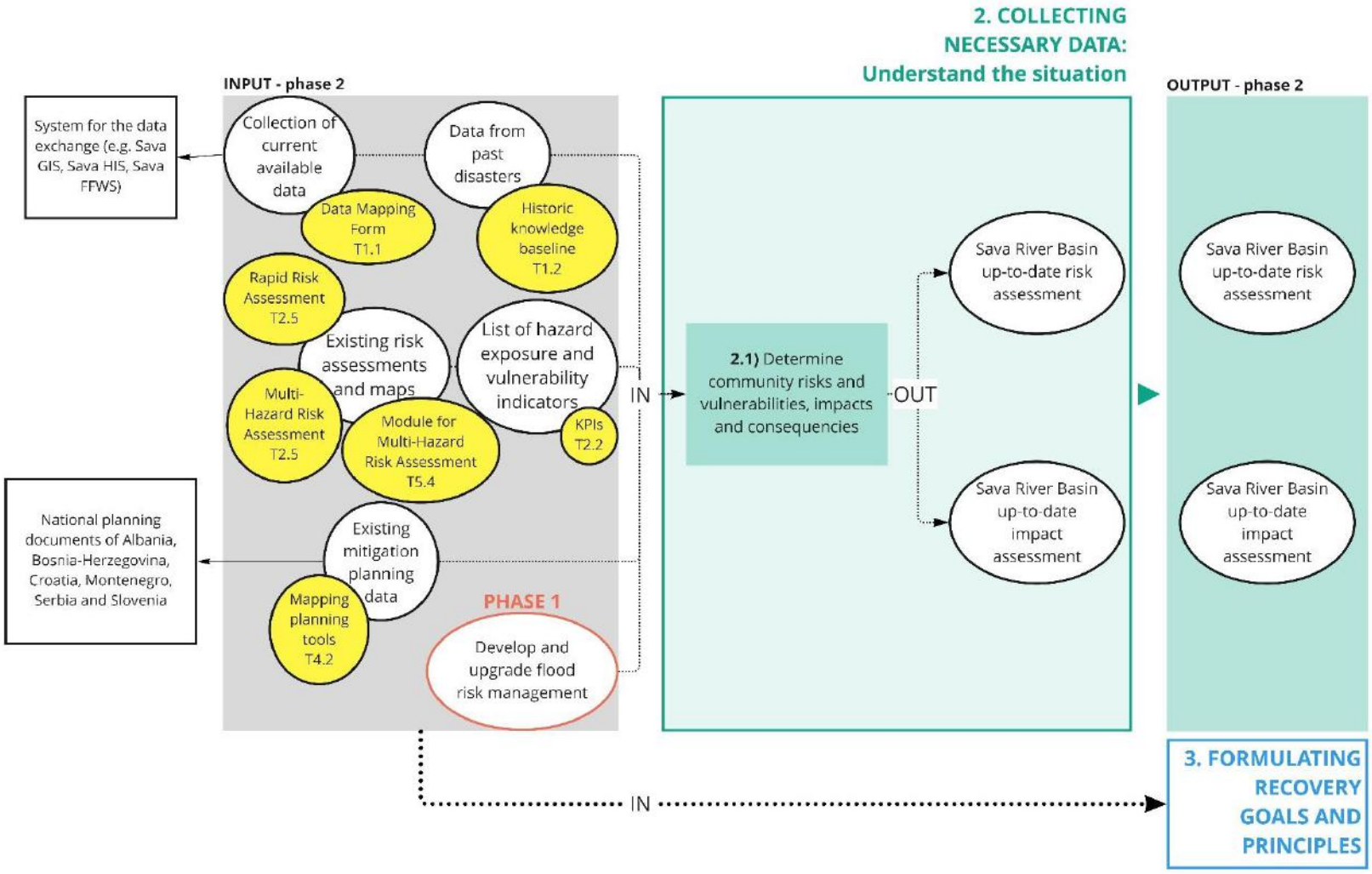

Figure 94. Phase 2 for Sava River Basin OL

Activity 2.1 - Determine community risks and vulnerabilities, impacts and consequences (Figure 95)

Many different instruments to obtain specific disaster risk information are available for the Sava River Basin OL.

From SHELTER, the available inputs are:

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

The PRT can also use such systems for data exchange as Hydrological Information System of the International Sava River Basin Commission (Sava HIS), Sava Flood Forecasting and Warning System (Sava FFWS) and Sava GIS Geoportal.

Furthermore, it is possible to refer to national planning documents from the countries involved in the Sava River Basin, which provide risk assessments, data on threats and hazards, overviews of vulnerabilities of communities and impacts and consequences they have to address.

Examples of existing documents to review and consider in this phase include:

- Emergency plans
- Mitigation and adaptation plans
- Protection and rescue plans
- Guidances for making vulnerability and risk assessments

Regarding the second phase, the Sava River Basin OL has many available data, to gather information about hazards, risks and vulnerabilities to address in its territory. However, while hazard is identified, the assessment of risk is a very challenging task still ongoing within the SHELTER project.

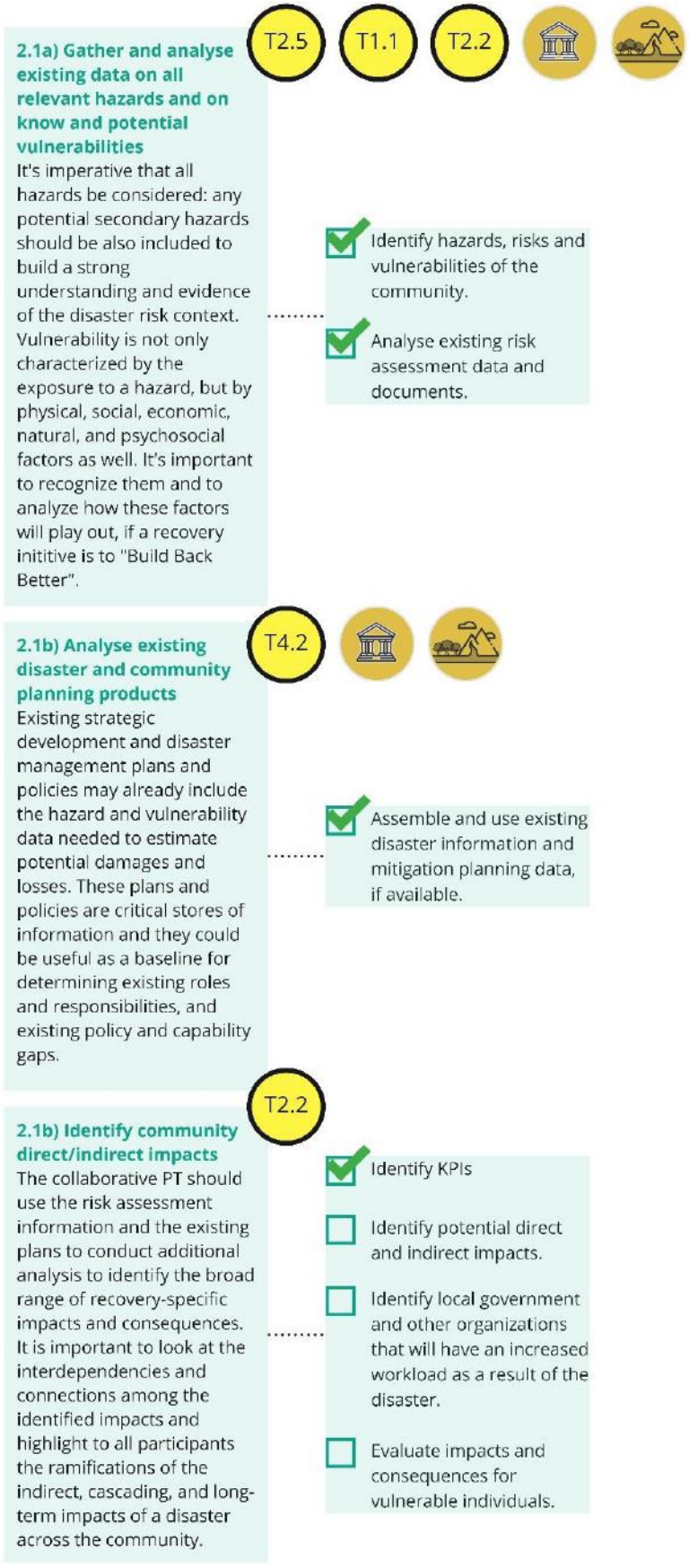

Figure 95. Key-activity 2.1 for Sava River Basin OL

5.5.3 PHASE 3 – FORMULATING RECOVERY GOALS AND PRINCIPLES

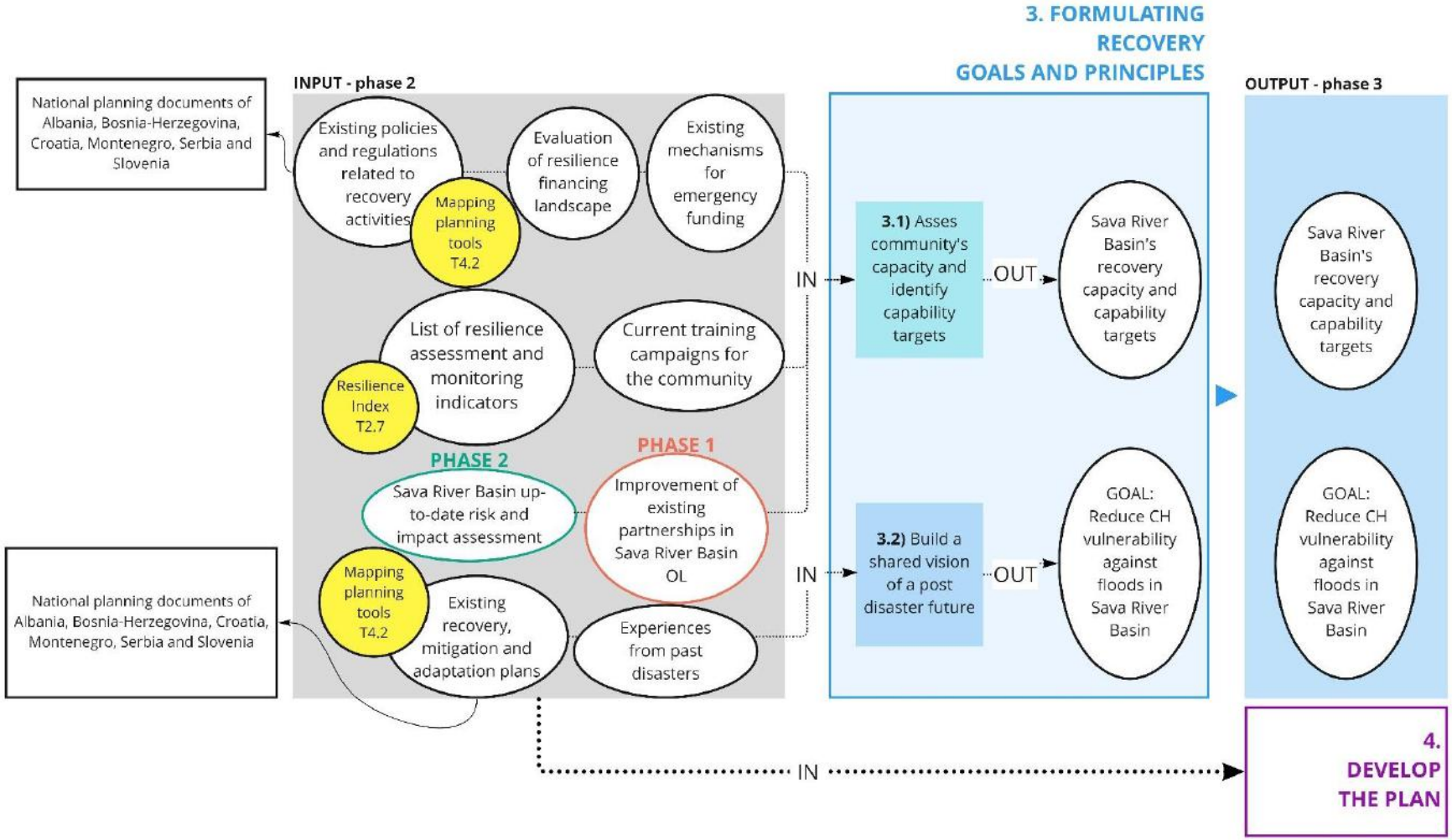

Figure 96. Phase 3 for Sava River Basin OL

Activity 3.1 – Assess community's capacity and identify capability targets (Figure 97)

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. In Sava River Basin OL, the main references are all the national planning tools, such as:

- Emergency plans
- Flood risk management plans
- Flood defense plans
- Strategies on CCA

From SHELTER, the available input is:

- Resilience Index, that 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 resource, in terms of quantity and expertise, and the financial resources available, identifying potential community needs and gaps.

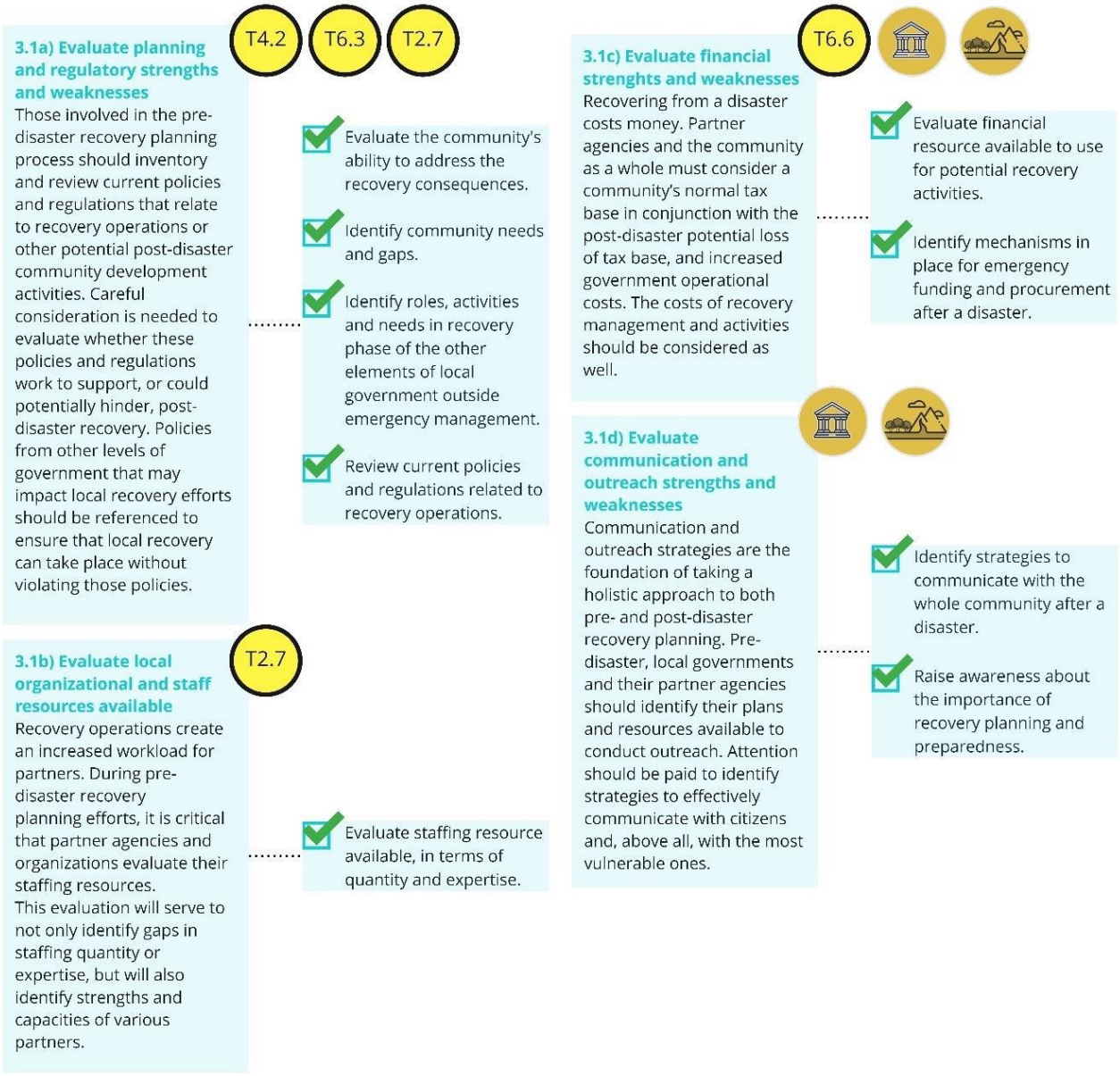

Figure 97. Key-activity 3.1 for Sava River Basin OL

Activity 3.2 – Build a shared vision of a post disaster future (Figure 98)

The main potential recovery goal for Sava River Basin OL could be:

- Reduce CH vulnerability against floods in the Sava River Basin

This goal coincides with the overall aims and the objectives of many planning tools of countries involved in the OL, regarding DRM, CCA, protection and rescue in emergency situations.

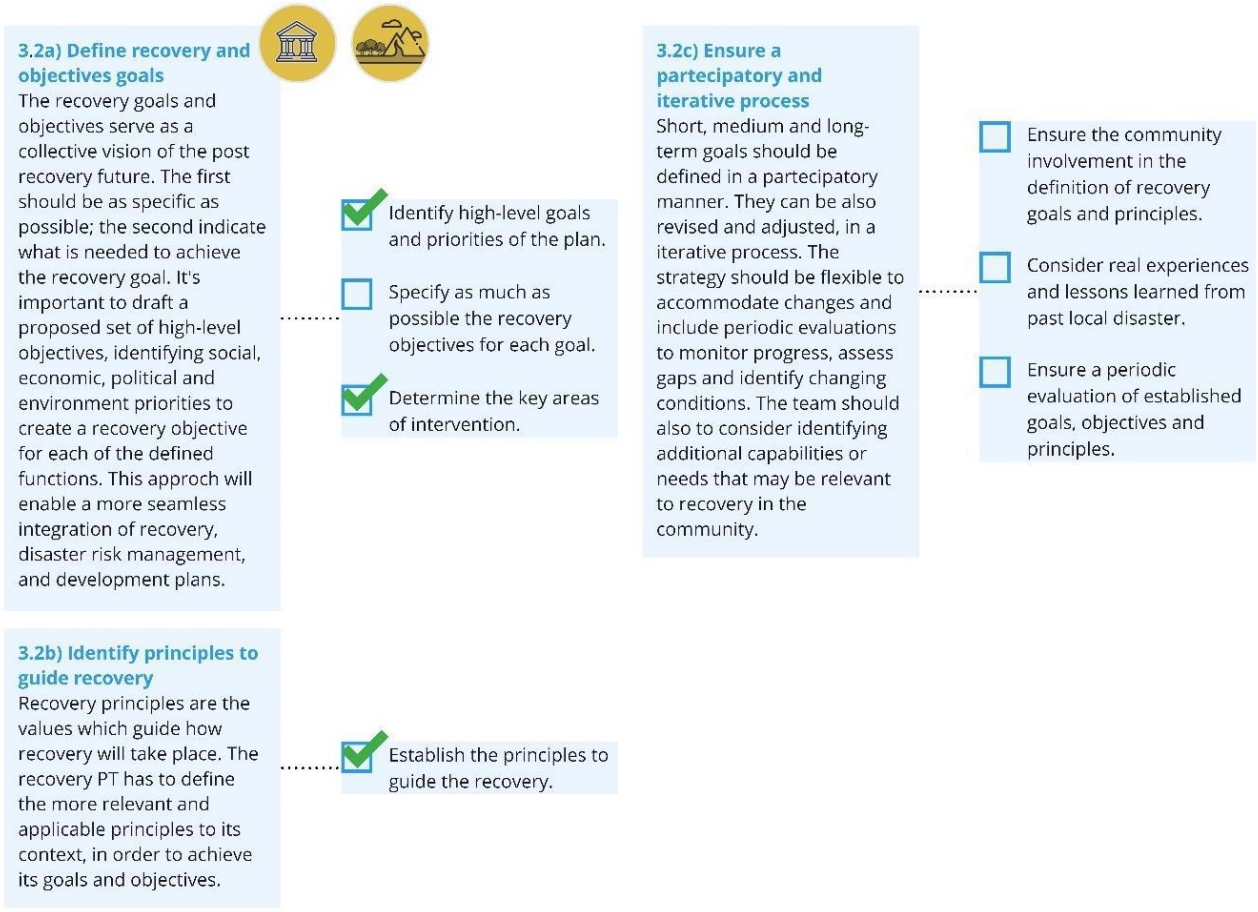

Figure 98. Key-activity 3.2 for Sava River Basin OL

Regarding the third phase, in the Sava River Basin OL the identification of community needs and gaps are very well-covered, by virtue of national tools.

The recovery goals and objectives are well defined, but it is relevant to notice that they are established at a very high and strategic level in the recovery, mitigation and adaptation plans at the national level, for each country involved in the Sava River Basin.

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

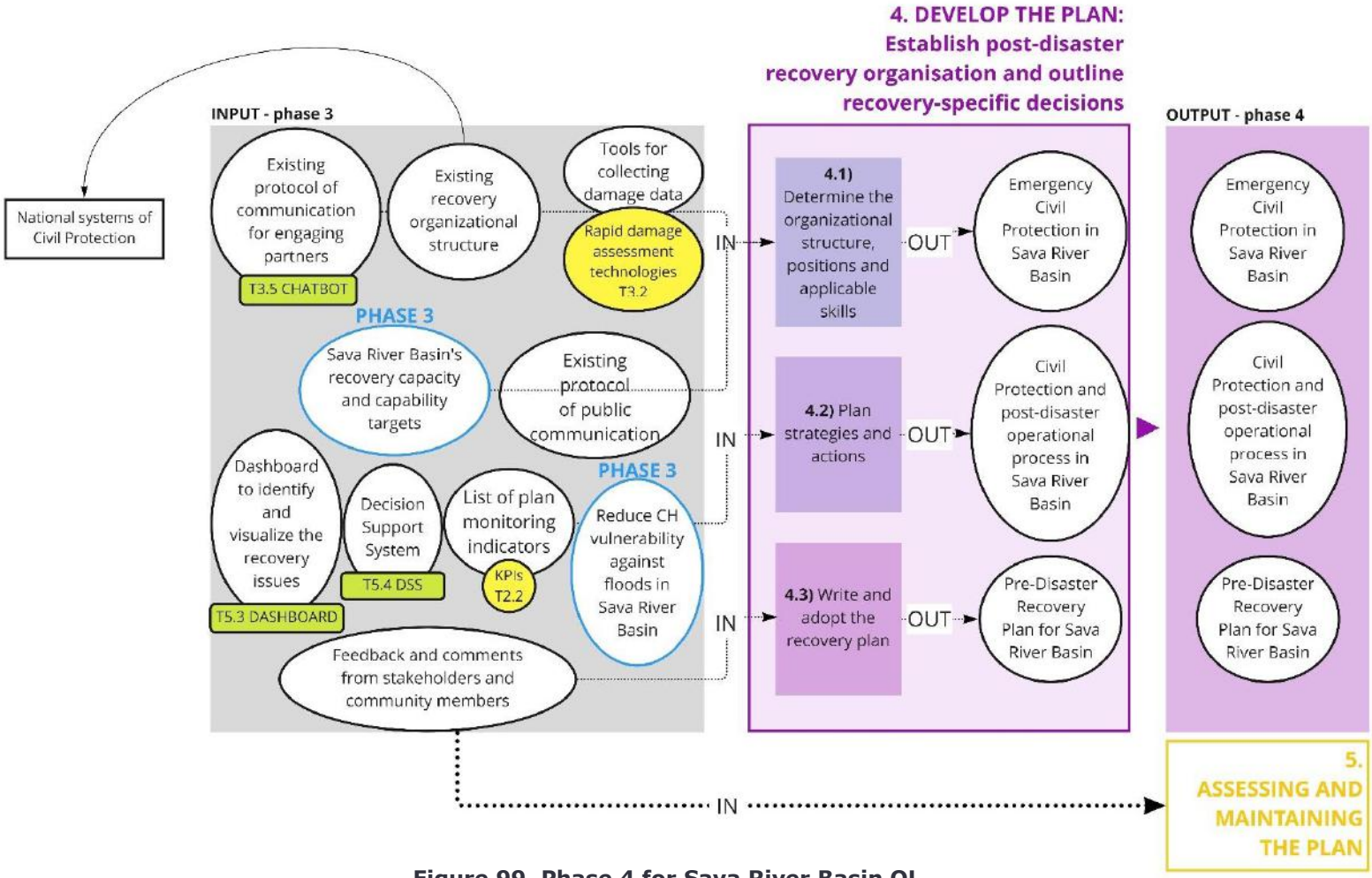

Figure 99. Phase 4 for Sava River Basin OL

Activity 4.1 – Determine the organizational structure, positions and applicable skills (Figure 100)

Stakeholders and experts involved in the planning process should start by evaluating the existing recovery organization. Each country of the Sava River Basin has its national Civil Protection Organization, with a clear and well-defined structure.

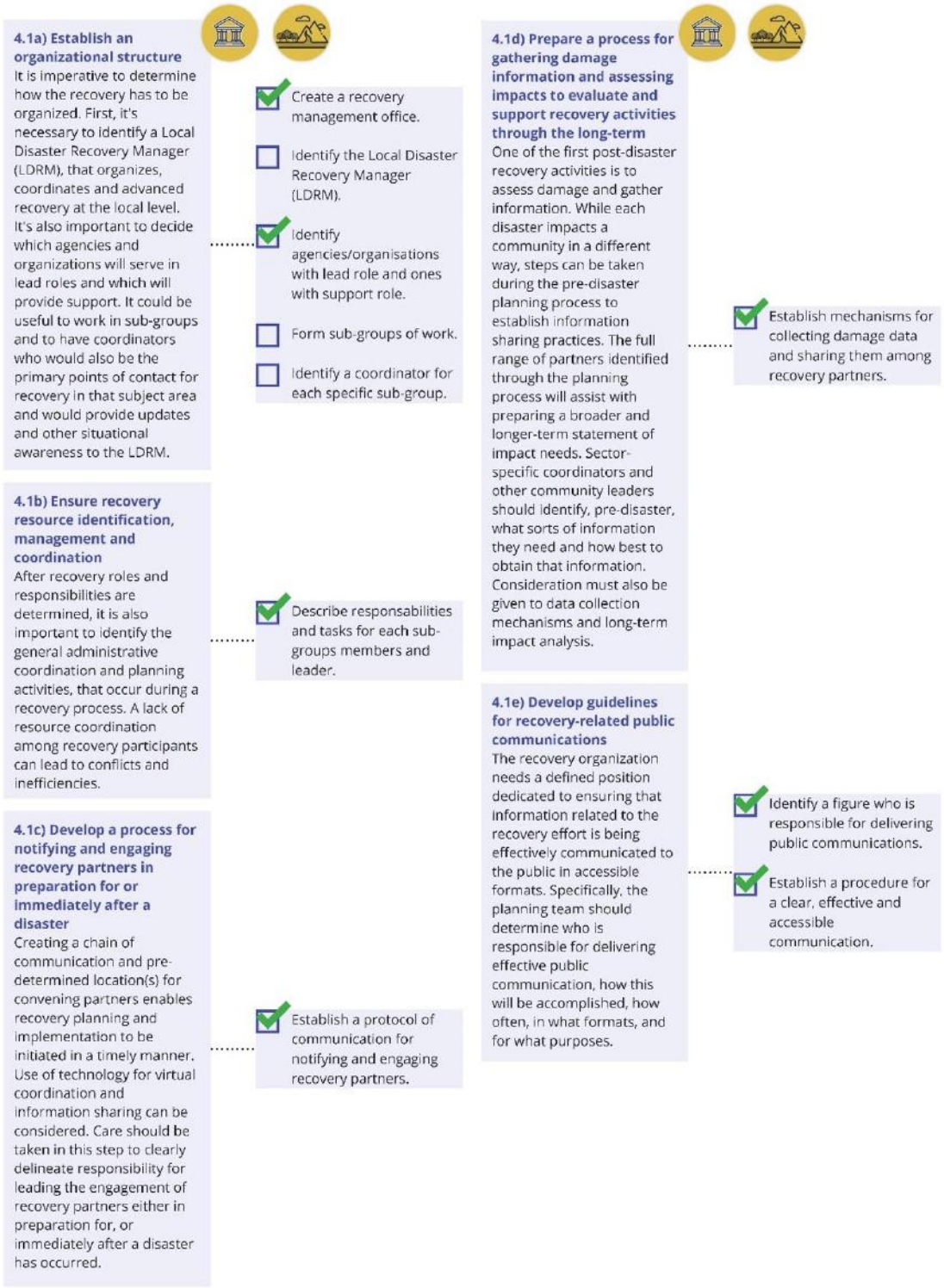

Figure 100. Key-activity 4.1 for Sava River Basin OL

Activity 4.2 – Plan strategies and actions (Figure 101)

Considering the content of the existing recovery, mitigation and adaptation plans in countries of the Sava River Basin, it is possible to assert that in this OL strategies and actions to address recovery issues, both before and after a disaster, are already defined.

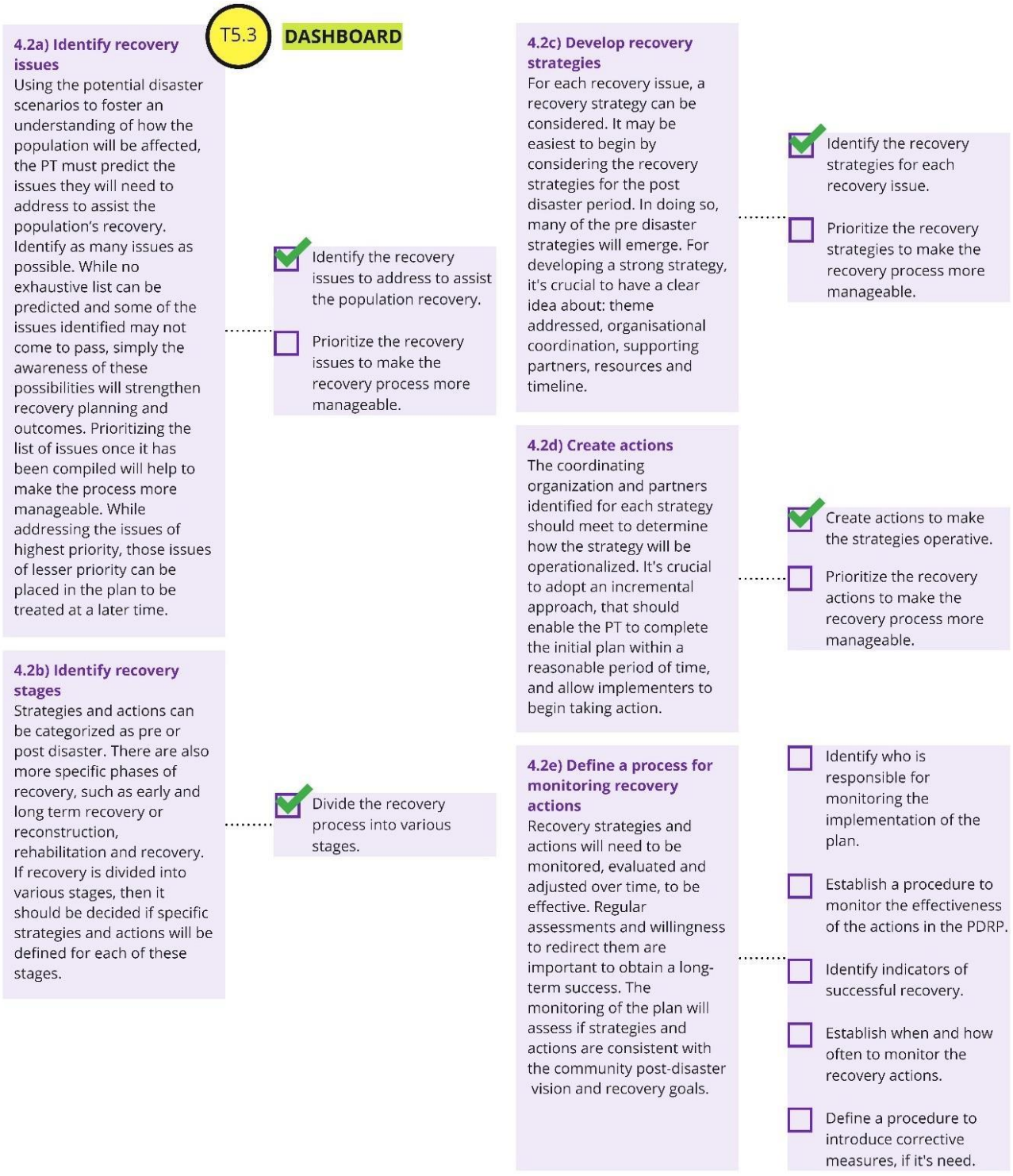

Figure 101. Key-activity 4.2 for Sava River Basin OL

Activity 4.3 – Write and adopt the recovery plan (Figure 102)

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

When the plan is adopted, the 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 consequently release.

As mentioned above, the public participatory of documents is mandatory, even if the community does not participate in co-design processes.

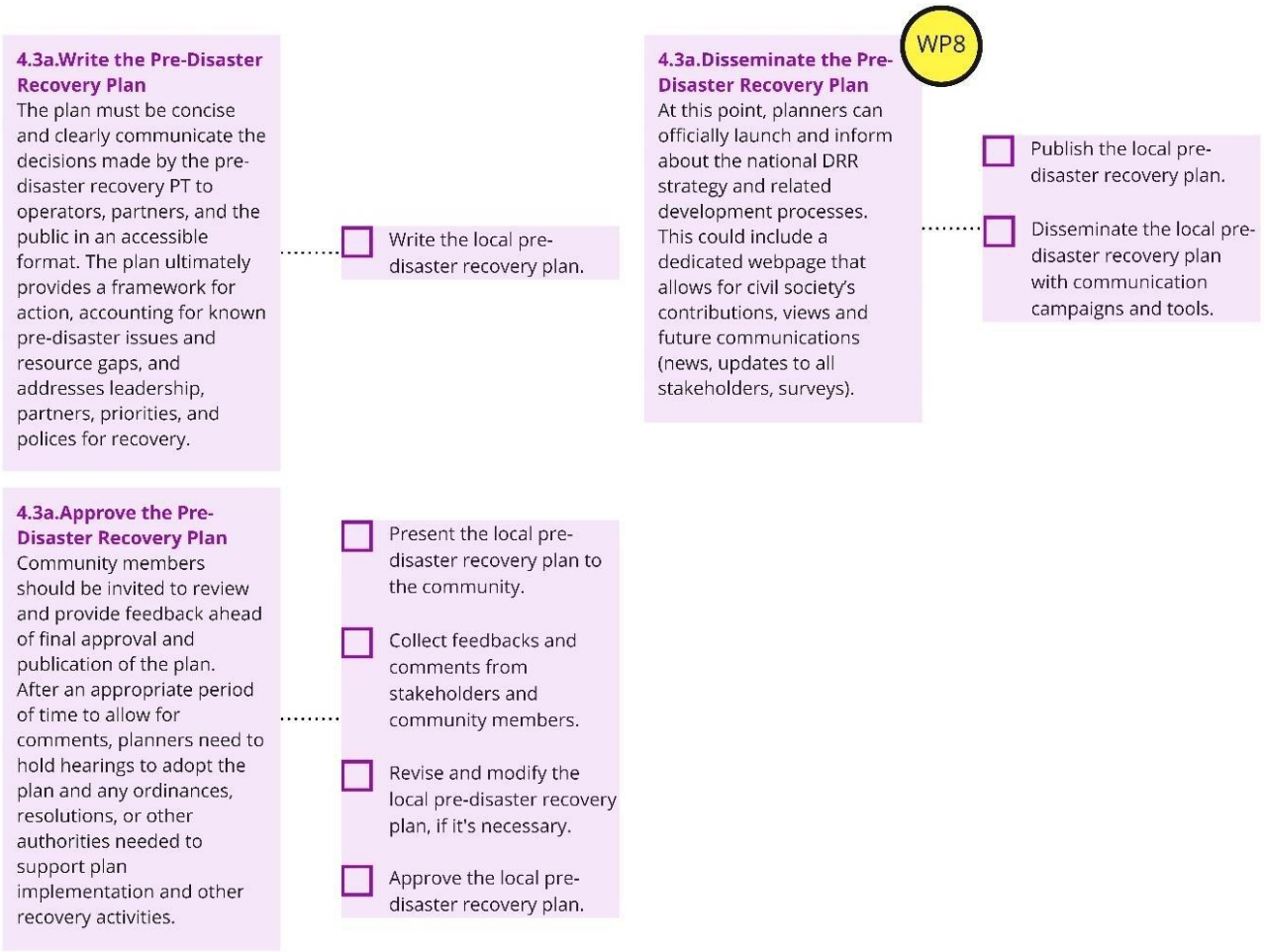

Figure 102. Key-activity 4.3 for Sava River Basin OL

Regarding the fourth phase, in the Sava River Basin OL, all countries have already established their emergency and recovery management: many steps in the prevention phase of DRM are already done, thanks to national procedures.

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

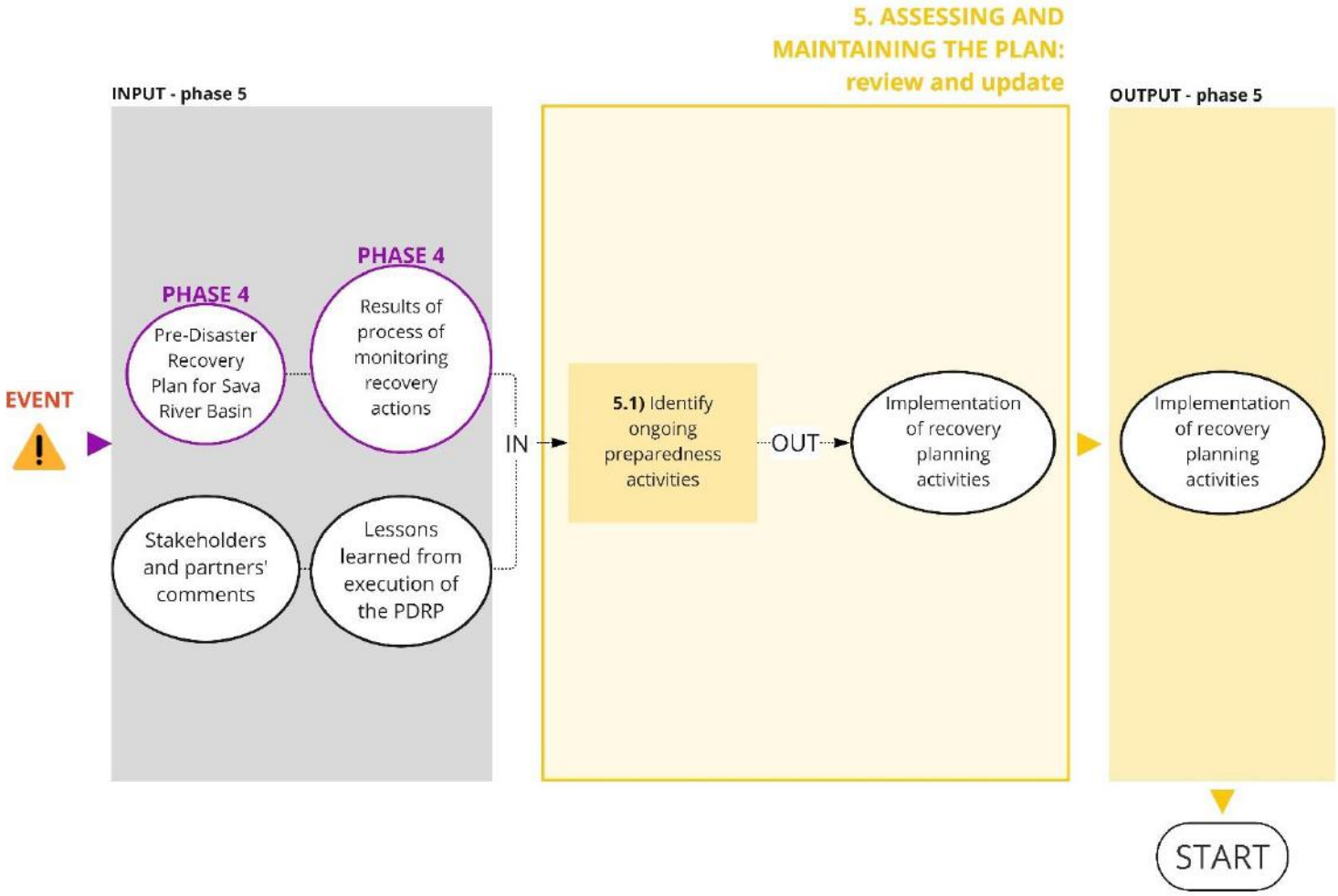

Figure 103. Phase 5 for Sava River Basin OL

Activity 5.1 – Identify ongoing preparedness activities (Figure 104)

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 wildfires, 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).

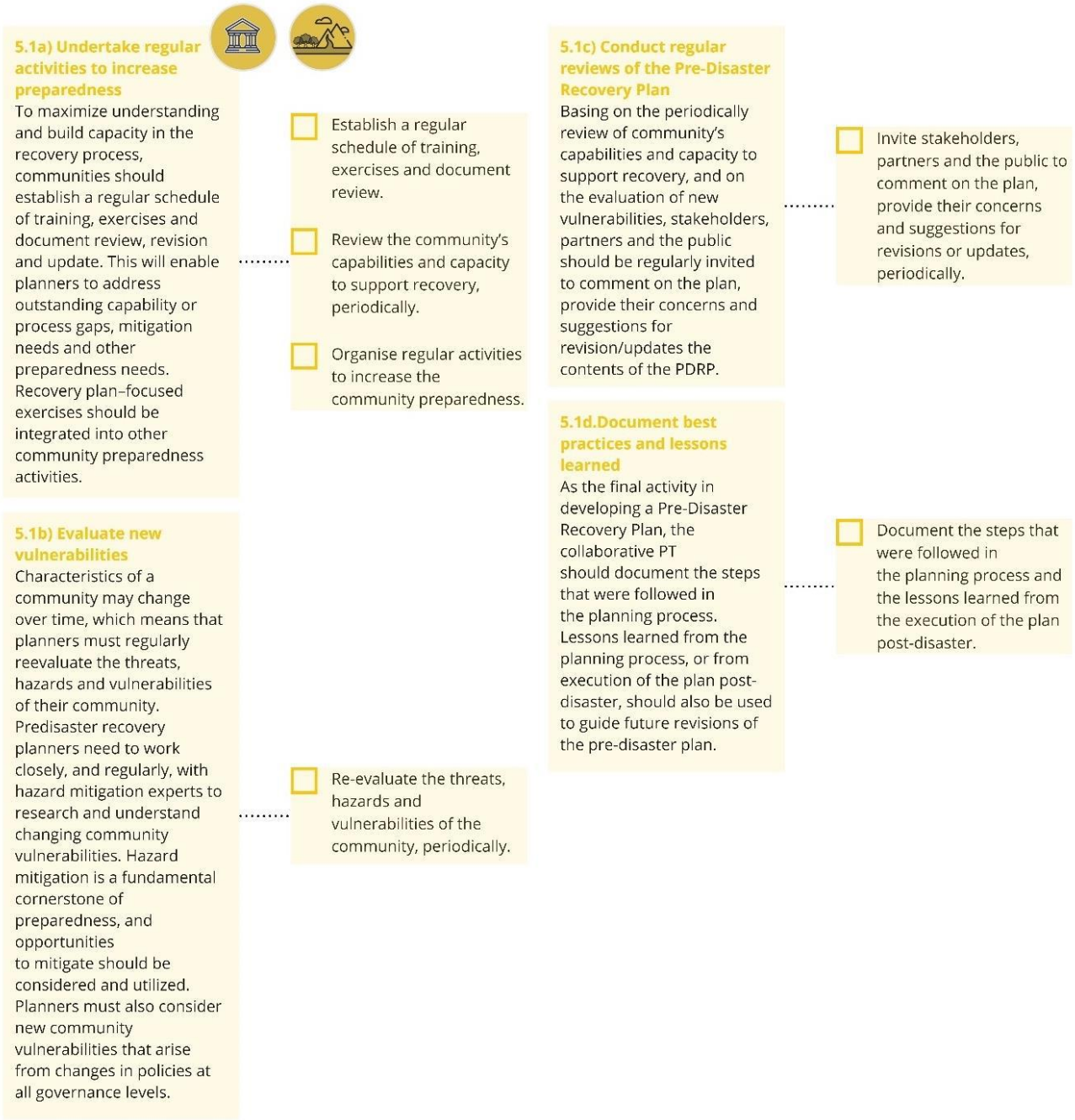

Figure 104. Key-activity 5.1 for Sava River Basin OL

Another important ongoing preparedness activity is the regular evaluation and review of the PDRP, policy documents and ordinances, because 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 governments´ regulations and laws. Furthermore, lessons learned from execution of the plan in a post-disaster phase should be documented to guide future revisions of the plan.

5.5.6 Summary of the Early Recovery Roadmap for Sava River Basin OL

Figure 105 shows the progress of Sava River Basin OL for each phase of the PDRR, through a qualitative indicator in the form of a loading bar.

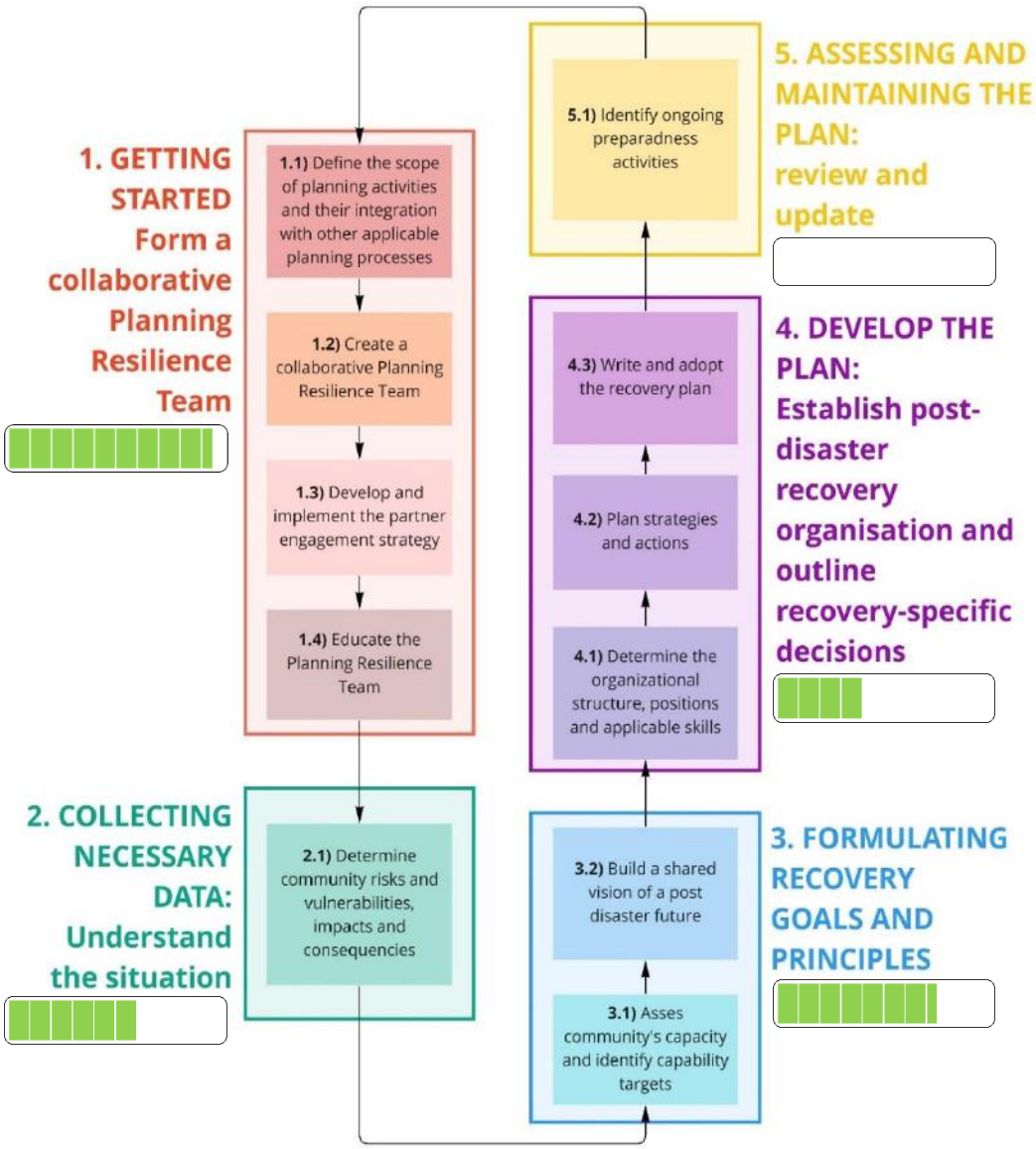

Figure 105. Progress in the PDRR for Sava River Basin OL

In addition, the following summary list (Table 25) 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 Sava River Basin 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 1.3d) Review the core group of stakeholders 1.4a) Begin with shared understanding of Pre-Disaster Recovery Planning 1.4b) Define a recognizable structures and terminology
pending sub-activity	Ensure there are many and different skills needed for the pre-disaster recovery activities in sub-activity 1.2b
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 2.1c) Identify community direct/indirect impacts
pending sub-activity	Identify potential direct and indirect impacts in sub-activty 2.1c Idenitfy local government and other organizations that will have an incresead workload as a result of the disaster in sub-activty 2.1c Evaluate impacts and consequences for vulnerable individuals in sub-activty 2.1c
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 strenghts 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
pending sub-activity	Specify as much as possible the recovery objectives for each goal in sub-activty 3.2a 3.2c) Ensure a partecipatory and iterative process
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
pending sub-activity	Identify the LDRM in sub-activty 4.1a Form sub-groups of work in sub-activty 4.1a Identify a coordinator for each specific sub-group in sub-activty 4.1a

	Prioritize the recovery issues to make the recovery process more managebale in sub-activty 4.2a Prioritize the recovery strategies to make the recovery process more managebale in sub-activty 4.2c Prioritize the recovery actions to make the recovery process more managebale in sub-activty 4.2d 4.2e) Define a process for monitoring recovery 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
PHASE 5	
complete sub-activities	-
pending sub-activity	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

Table 25. Completed/pending activities for Sava River Basin OL

As already explained, Sava River Basin OL is a cross-border case study involving several countries in the Balkan area. Therefore, the completion of steps, activities and sub-activities have been taken into account from the cross-border perspective whenever applicable. To summarise, the application of the early recovery Roadmap to the Sava River Basin OL has shown that 2 out of 5 phases (i.e. phase 1 and 3) have been already almost finalized, while the others show different degrees of completion. Although Sava River Basin OL has not already in place a cross-border PDRP, all countries part of the OL have already established their emergency and recovery management plan: many steps in the prevention phase of DRM are already done, thanks to national procedures.

6 Conclusions

The strategy for Early Recovery Roadmap described in this report has been conceived as a simple tool to guide policy-makers to take into account all the relevant activities and stakeholders to increase the resilience of historic areas.

The starting point has been the investigation of strategies and guidelines already available at international level. Clearly, in the last ten years several documents have been published to facilitate the implementation of the Disaster Risk Reduction, and the Sendai Framework principles. They are presented in the form of guidelines or manuals with detailed step-by-step instructions to be followed and application examples. However, they also present some limitations that have so far prevented local and national governments from largely and easily applying them.

To overcome such limitations, the SHELTER project has developed a simple set of guidelines for identifying effective pre-planned strategies to be quickly mobilized, allowing greater attention to event-specific, post-disaster recovery actions that must be performed according to prevailing conditions and newly-generated data.

The Pre-Disaster Recovery Roadmap is a process that provides guidelines to prepare for and respond to unplanned events and to recover after a disaster occurrence. In particular, the Roadmap is divided into five phases, designed to be applied by decision-makers to develop the Pre-Disaster Recovery Plan, a planning tool that defines the disaster risk management organization pre- and post- events.

Thanks to its well-structured and flexible form, the flowchart is capable of guiding the decision-makers in the planning, defining the operations to be implemented first and the necessary inputs to complete the activities. Also, at the beginning of each phase, simple input-output diagrams summarize in a schematic way the inputs needed to perform the activity, and the expected outputs.

The Strategy for Early Recovery Roadmap has proved to be a useful tool for understanding which actions should be performed and in which order to design a Pre-Disaster Recovery Plan to follow to improve the resilience of historic areas. Key findings of this process are summarised below:

- To form a collaborative team to work on the Pre-Disaster Recovery Plan is essential. Interactions among stakeholders contribute to a common operational understanding;
- Planning decisions impact not only infrastructures and environment but primarily society. Involving the community in the process helps in building awareness of disaster risk, validating the activities of the plan and establishing a relationship for response and recovery;
- Understanding the current situation means identifying the hazards, performing the disaster risk assessment and identify the community’s priorities. Previous disaster

events, their impacts and all the existing planning tools should be investigated at first to define the known and potential vulnerabilities

- Completing the evaluation of community's capacities and comparing identified needs to established roles and existing community resources allows the community to identify gaps. This will serve as the basis for resource and partnership decisions throughout the recovery planning process.
- Short, medium and long-term goals should be defined in a participatory, inclusive and negotiated manner. Involving the public in defining how the recovery goals and objectives are to be achieved will enable greater public trust and collaboration in government-led recovery efforts.
- After assessing the community's capacity, detecting resources, organizational processes, preventive actions for effective resilience, roles and responsibilities is at the basis of the Pre-Disaster Recovery Plan. A Local Disaster Recovery Manager that organizes, coordinates and advances recovery at the local level should be appointed.
- After the manager has been selected, it will be important to decide which agencies and organizations will serve in leadership roles and which will provide support during the post-disaster recovery process.
- Coordinated messaging is a challenge in any disaster. The Planning Resilience Team should determine who is responsible for delivering effective public communication, how this will be accomplished, how often, in what formats, and for what purposes.
- The coordinating organization and partners identified for each recovery strategy should meet to determine how the strategy will be operationalized. The team prevent the plan remains simply a document, assigning responsibility for each action to one or more entities, creating deadlines for completion of pre-disaster actions, and specifying the resources required and the means to obtain them. The type of actions to be taken will depend on the strategy.
- Recovery strategies and actions will need to be monitored, evaluated and adjusted over time, to be effective. Regular assessments and willingness to redirect them are important to obtain a long-term success. The monitoring of the plan will assess if strategies and actions are consistent with the community post-disaster vision and recovery goals.

Following the flowchart and the input-output diagram's directions, the Pre-Disaster Recovery Roadmap has been applied to the 5 SHELTER OLs. OL coordinators and OL technical partners have been involved through interviews during bilateral remote meetings, to get their overall impression of the applicability of the tool, and to collect specific feedback on their tailored Roadmaps.

The design of 5 tailored Roadmaps has shown different degrees of completion of the activities foreseen, as summarized below:

- SHELTER project activities and Tasks have contributed to the inputs needed for completing the Roadmap activities and sub activities in a significant way, demonstrating the relevance of the project to achieve the goals of the PDRP;
- Three out of five OLs (i.e. Ravenna, Dordrecht and Galicia) have already in place recovery plans that can be assimilated to the PDRP foreseen by this methodology. In the case of Ravenna, the planning tool has been designed at the local level, while for the other two OLs, the planning tools are referring to the regional level. Therefore, these three OLs are intended to work to revise and update the existing plans based on the outcomes of this activities, rather than design and approve a brand-new PDRP;
- Few provisions could be found in the existing policy instruments for Seferihisar OL. Therefore, the strategy proposed in this report can serve as an excellent starting point for them for developing their own PDRP;
- Sava River Basin OL has already developed several activities and sub-activities as foreseen in the Roadmap. Although Sava River Basin OL has not already in place a cross-border PDRP, all countries part of the OL have already established their emergency and recovery management plan. Therefore, the starting point is satisfying, although more activities have to be performed.

Concluding, the SHELTER Strategy for Early Recovery Roadmap is an important tool for the resilience of historic areas. It includes simple instructions to be largely applied by any case study. The application of the Roadmap to the five OLS has increased the knowledge of what is currently available at the territorial level for each SHELTER Open Lab, what has been already completed in terms of key activities, and on what they should focus their attention on the adoption of a Pre-Disaster Recovery Plan able to increase the resilience of communities and historic areas.

7 References

Colorado Department of Local Affairs (2019), *Planning for Hazards: Land Use Solutions for Colorado*. Available at: https://planningforhazards.com/home (Accessed: 31 May, 2022).

FEMA (2016), Pre-Disaster Recovery Planning Guide for State Governments. Available at: https://www.fema.gov/sites/default/files/2020-07/pre-disaster-recovery-planning-guide-for-state-governments.pdf (Accessed: 31 May, 2022).

FEMA (2017), Pre-Disaster Recovery Planning Guide for Local Governments. Available at: https://www.fema.gov/sites/default/files/2020-07/pre-disaster-recovery-planning-guide-local-governments.pdf (Accessed: 31 May, 2022).

FEMA (2021), Comprehensive Preparedness Guide (CPG) 101: Developing and Maintaining Emergency Operations Plans. Available at: https://www.fema.gov/sites/default/files/documents/fema_cpg-101-v3-developing-maintaining-eops.pdf (Accessed: 31 May, 2022).

Gencer, E.A. (2017), How To Make Cities More Resilient A Handbook For Local Government Leaders. A contribution to the Global Campaign 2010-2020: Making Cities Resilient - "My City is Getting Ready!", Geneva. Available at: https://www.unisdr.org/campaign/resilientcities/assets/toolkit/Handbook%20for%20local%20government%20leaders%20%5B2017%20Edition%5D_English_ed.pdf (Accessed: 31 May, 2022).

Goniewicz, K. and Burkle, F.M. (2019), Challenges in implementing sendai framework for disaster risk reduction in Poland, *International Journal of Environmental Research and Public Health*, 16(14), 2574. doi:10.3390/ijerph16142574.

IOM (2017), *Taking Sendai Forward - Strategic Work Plan On Disaster Risk Reduction & Resilience 2017 – 2020*. Available at: https://www.preventionweb.net/files/53381_iomstrategicworkplanondrr20172020.pdf (Accessed: 31 May, 2022).

Sobieraj, K. and Zacharczuk, P. (2016), Ecological Connectivity Protection According to the European Union and Polish Law, *Wroclaw Review of Law, Administration & Economics*, 6(1), pp. 78–90. doi:10.1515/wrlae-2015-0040.

UNDP (2020). Risk-Informed Development: A Strategy Tool for Integrating Disaster Risk Reduction and Climate Change Adaptation into Development, United Nations Development Programme. Available at: https://www.undp.org/sites/g/files/zskgke326/files/2021-10/UNDP-Risk-Informed-Development-Strategy-Tool-for-Integrating-DRR-and-CC-Adaptation-into-Development.pdf (Accessed: 31 May, 2022).

UNDRR (2012) Guidance Notes on Recovery: Pre-Disaster Recovery Planning. Available at: https://www.preventionweb.net/files/31963_predisasterrecoveryweb.pdf (Accessed: 31 May, 2022).

UNDRR (2015) Sendai Framework for Disaster Risk Reduction 2015 - 2030. Available at: https://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf (Accessed: 31 May, 2022).

UNDRR (2017) Terminology. Available at: https://www.undrr.org/terminology (Accessed: 31 May, 2022).