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Adaptation in progress. Monitoring and evaluation of climate adaptation planning in coastal cities of Western Mediterranean Europe

A study of cities between 20,000 to 100,000 inhabitants

Supervisor:
Ombretta Caldarice
Politecnico di Torino, Italia

Co - supervisors:
Sérgio Barroso
Centro de Estudos e Desenvolvimento Regional e Urbano, Portugal

Graciela Fernández de Córdova Gutiérrez
Pontificia Universidad Católica del Perú, Perú

Candidate:
Evelin Priscila Raico Torrel

To myself, for the patience, self-motivation and perseverance in this journey of learning.

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Abstract

In recent years, climate change adaptation strategies are becoming more widely recognized. However, at a local level, there are still few studies on this subject. This research analyses the current state of climate adaptation planning, and in particular the monitoring and evaluation (M&E) process of coastal cities with between 20,000 and 100,000 inhabitants in Western Mediterranean Europe. The aim is to find out whether these cities are producing plans and whether they are monitoring them to find out their effectiveness. To do this, the analysis is divided into two phases: the first phase seeks to find out how many cities within the profile have a plan, what type of actions they propose, and whether they include M&E; the second phase is based on a semi-structured interview with some municipalities to analyze more in detail their M&E processes and find best practices related to it. The results reveal that only 31.7% of the cities have a climate change plan. However, it is highlighted that among the most predominant actions are those of adaptation and that 91.7% of the plans found include some reference to the M&E. On the other hand, among the cities interviewed, all have a continuous M&E process despite the challenges expressed and one of the key factors for this continuity is the municipality's alliances and/or partnerships with other external organizations that commit them to do the M&E. This study highlights the crucial role of the local scale in the fight against climate change and the importance of the M&E of plans.

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Abbreviations and Acronyms

ACT	Adapting to Climate Change in Time
ADAM	Apoio à Decisão em Adaptação Municipal
ADEME	Agence de la transition écologique
ARPA	Agenzia Regionale per la Prevenzione e Protezione Ambientale
BEI	Baseline Emission inventory
CA	Communauté d'agglomération
CEDRU	Centre for Studies and Urban and Regional Development
CC	Communauté de communes
CDP	Carbon Disclosure Project
CLA	Conselho Local de Acompanhamento
CM	Conselho Municipal
CoM	Covenant of Majors
DACET	Divisão de Ação Climática e Economia Circular
EEA	European Environment Agency
EMAAC	Estratégia Municipal de Adaptação às Alterações Climáticas
EPCI	Établissements Publics de Coopération Intercommunale
EU	European Union
GCoM	Global Covenant of Mayors for Climate & Energy
GIZ	German Agency for International Cooperation
ICLEI	International Council for Local Environmental Initiatives
IPCC	Intergovernmental Panel on Climate Change
ISPRA	Institute for Environmental Protection and Research, Italy
LAP	Local Adaptation Plan
LAU	Local Administrative Units
LFA	Logical Framework Approach
M&E	Monitoring and Evaluation
MEI	Monitoring Emission Inventory
NUT	Nomenclature of territorial units for statistics
OECD	Organisation for Economic Co-operation and Development
OMAT	Observatório Municipal de Ambiente e Território
PAP-RAC	Priority Actions Programme Regional Activity Center
PCAET	Plan Climat Air Énergie Territorial
PMAC	Plano Municipal de Ação Climática
RBM	Result Based Management
SEAP or PAES	Sustainable Energy Action Plan
SECAP or PACES or PAESC	Sustainable Energy and Climate Action Plan
UAST	Urban Adaptation Support Tool
UKCIP	UK Climate Impacts Programme
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change

1 Introduction

1.1. Thesis background

This thesis is based on the analysis of the Monitoring and Evaluation processes at a local scale that was done as part of the internship at the Centre for Studies and Urban and Regional Development (CEDRU), Lisbon during the months of May and June 2024. CEDRU is a company with extensive experience in various urban planning issues and in particular in climate change plans. They have been developing several climate adaptation plan projects and always seek excellence in their proposals. Therefore, the experience was based on learning about the methodologies that other countries are using on this topic, especially in the monitoring and evaluation part of the plans to learn, update or confirm the proposals in execution.

Climate change is a global and serious problem that is advancing very rapidly, which is why preventing its effects and implementing actions to reduce the consequences is key. In this scenario, governments play a crucial role as the entities in charge of planning and, to do so, it is necessary to have the necessary management instruments and the appropriate government structure to support the execution of actions. In this case, in particular, the development,

implementation, and monitoring of climate action plans is essential at the various levels of government.

As for the actions planned to fight against climate change, there are those of mitigation and adaptation. While both are important, they have different objectives. The first seeks to reduce CO_2 emissions and has been applied for many years now. While the second seeks to adapt certain conditions of cities and life in them to adjust to changes. Adaptation is less known and explored than mitigation. The production of knowledge at various scales in this regard is still precarious, especially at the local level where it is the most important scale for its implementation. And it is in this context that the last step of climate action plans, monitoring and evaluation (M&E), plays a central role in determining whether the processes are developing as planned and achieving the expected objectives. With monitoring, adaptation actions can be reconfirmed in their effectiveness, updated or modified to be more efficient, and serve as a source of knowledge for other cases.

1.2. Statement of the problem

How do we know if our cities' adaptation actions work against climate change? Nowadays climate change is, probably, one of the biggest challenges the world is dealing with. Various international organizations and countries are committed to this fight, preparing planning material and carrying out many actions to reduce CO_2 emissions. Nevertheless, there are still two aspects in which there is still a lot to do. On the one hand, the local scale is one of the most important factors when it comes to climate change since local actions are reflected globally and in national objectives; however, planning adaptation actions at this scale is still precarious. On the other hand, monitoring and evaluation of climate action plans, which is a crucial process for assessing the progress, effectiveness, and efficiency of climate action initiatives is in an initial phase of knowledge at a local scale.

While it is true that making climate change plans is important, it is even more crucial to know if they work in the context of uncertainty that climate change means. However, at the local level there is a gap in knowledge about M&E, hindering the experience that municipalities have in implementing it. This may be due to the short track record of climate change adaptation plans, especially at the local level, where governments require greater preparation and technical support to propose and execute them.

1.3. Rationale

This thesis studies Monitoring and Evaluation (M&E) of climate action plans (CAP) at a local scale, specifically in coastal cities in the Western Mediterranean Europe[1] with 20,000 to 100,000 inhabitants. The aim is to recognize how many of these cities have a CAP and how they are implementing and assessing their adaptation actions, focusing on identifying best practices and innovative proposals. With this research, it is hoped to inspire authorities, climate change planners, and various stakeholders in the importance of M&E of climate action plans at a local scale.

The rationale for this research is based on the need for data, examples of effective cases and greater knowledge on monitoring and evaluation of local adaptation actions. As cities are in a strategic and challenging position at the same time, their ability to adapt to climate change successfully is crucial. A strategic position because this level of government if in a direct relationship with other higher levels of government but at the same time they are the level of government closest to the population and in direct contact with them. A challenging position because the effects of climate change directly affect cities and in different ways in each one, so knowledge must be specific to the context. However, cities are an important element in the fight against climate change and their success is crucial for the resilience of the broader national and regional systems. Furthermore, the findings of this study will provide valuable recommendations for policy makers, practitioners and other stakeholders involved in urban climate governance. By highlighting best practices and innovations, this research could contribute to the development of more effective monitoring and evaluation strategies of adaptation actions that can be replicated or adapted by other cities facing similar challenges.

Ultimately, this study aims to improve understanding of climate adaptation governance at the local scale, emphasizing the importance of monitoring and evaluation as a tool for continuous improvement, learning and awareness. The insights gained could help shape future policies and frameworks, ensuring that adaptation efforts are not only ambitious, but also feasible and accountable.

[1] In Portugal, Spain, France and Italy.

1.4. Objective

This research studies the Monitoring and Evaluation of climate action plans. The main objective of this study is:

- Assess the monitoring and evaluation processes in adaptation at local scale

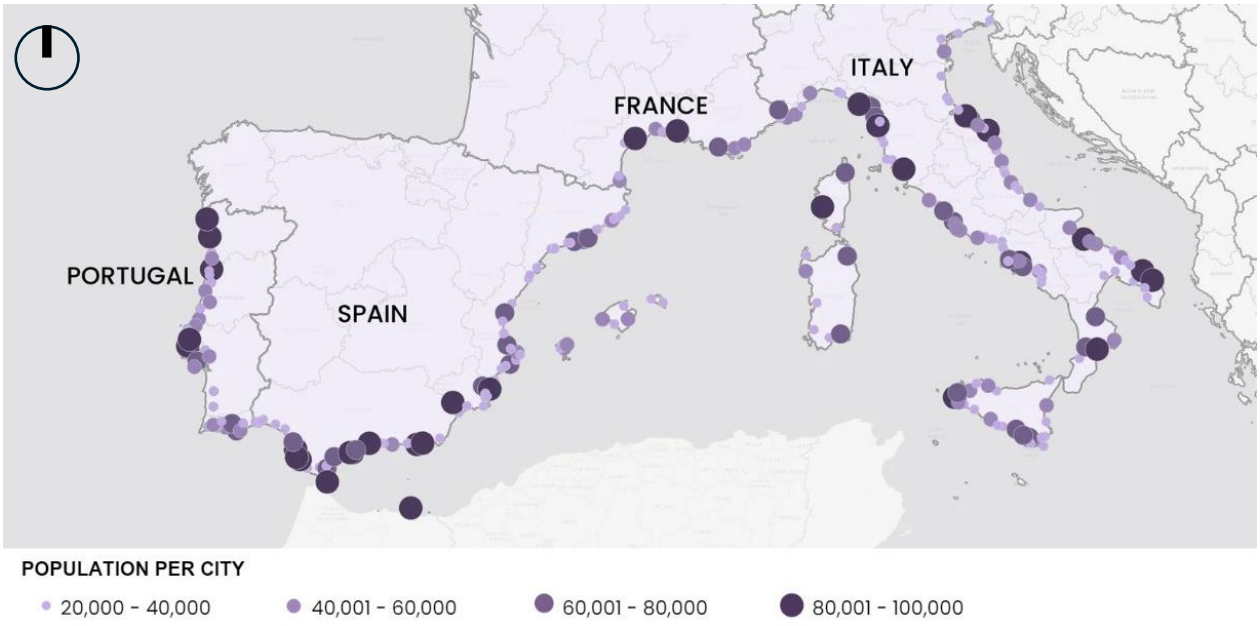
To complement this, some secondary objectives have been settled:

- Evaluate the situational status of climate action plans and M&E small Mediterranean cities
- Identify and analyze best practices and innovative approaches
- Contribute with practical knowledge for municipalities and climate stakeholders

1.5. City profile

For this study, Western Mediterranean European countries are Portugal, Spain, France and Italy. The local scale in Europe is composed of cities or administrative units -for this study, the smallest unit of each country has been considered- located directly in front of the Mediterranean coast with a population between 20,000 and 100,000 inhabitants.

Figure 1: Population per city within the profile of this study



Source: own elaboration

1.6. Structure and Methodology

This thesis analyzes the situation of coastal cities of the Western Mediterranean in Europe in terms of local-scale planning against climate change and whether they are monitoring and evaluating their climate change plans. To study this, there is a theoretical base that will be complemented by the practical experience of some municipalities. To begin, the theoretical framework includes general concepts of climate change adaptation and its importance at a local scale, key concepts of monitoring and evaluation, various frameworks of M&E, environmental and urban governance and policy, and the challenges that coastal cities face in climate change. Subsequently, the methodology is explained, which is based on quantitative and qualitative methods. The analysis is divided into two phases: the first seeks to know how many of the cities that meet the profile have a CAP, what type of actions they propose, and whether they consider M&E; the second, studies in more detail the M&E experience of some of the cities previously analyzed. Subsequently, the results of this analysis are presented, recognizing that less than half of the cities in the study have a CAP and that M&E at this scale is a topic in the process of which is still in development process. Finally, some recommendations are developed to improve the M&E process, based on the theory and practical experience of municipalities; and the conclusions are shown.

This work seeks to answer the following questions regarding local-scale adaptation planning against climate change and monitoring and evaluating those plans:

1. Are coastal cities of Western Mediterranean Europe generating plans against climate change?

2. Which types of actions are being considered in these plans? Do they consider both mitigation and adaptation?

3. Do these plans consider monitoring and evaluation (M&E)?

4. Are these plans being monitored and evaluated after plan approval?

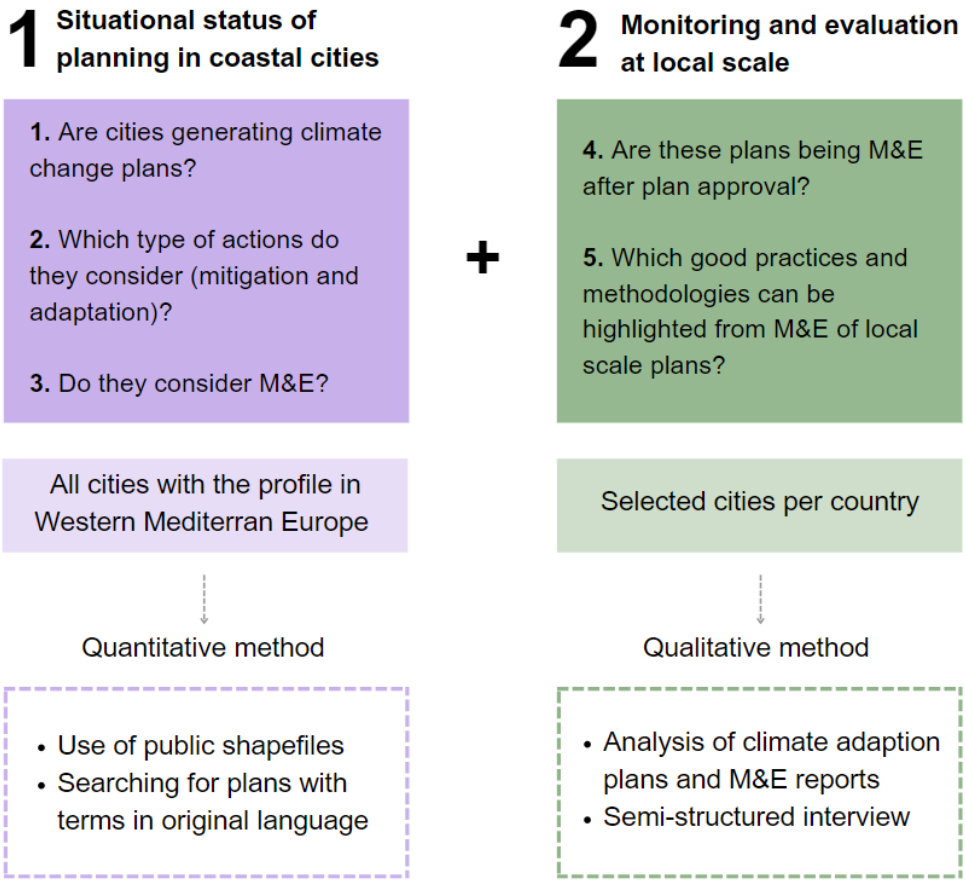
5. Which good practices and methodologies can be highlighted in terms of M&E of local scale plans on the western coast of Mediterranean Europe?

To answer these questions, the analysis is divided into two sections. The first section seeks to answer questions 1; 2 and 3; this part consists of a general analysis of the situational status of the existence of climate change plans in the study area and which action are they proposing. This

section is based on a quantitative method. For the first section, before searching for climate action plans, a study of the political-administrative organization system in each country has been carried out to understand which is the minor administrative unit and how it works. Then, with the use of public shapefiles, the cities that have the profile under study were selected. Finally, plans were searched on Google using terms in the original language for each country.

The second section answers questions 4 and 5. It is aimed at a more detailed and qualitative analysis of some specific plans that have an innovative M&E methodology or best practices because of the process. For this purpose, some cities per country were selected and a semi-structured interview was conducted in each case.

Figure 2: Scheme of structure and methodology



Source: own elaboration

2 Theoretical Framework

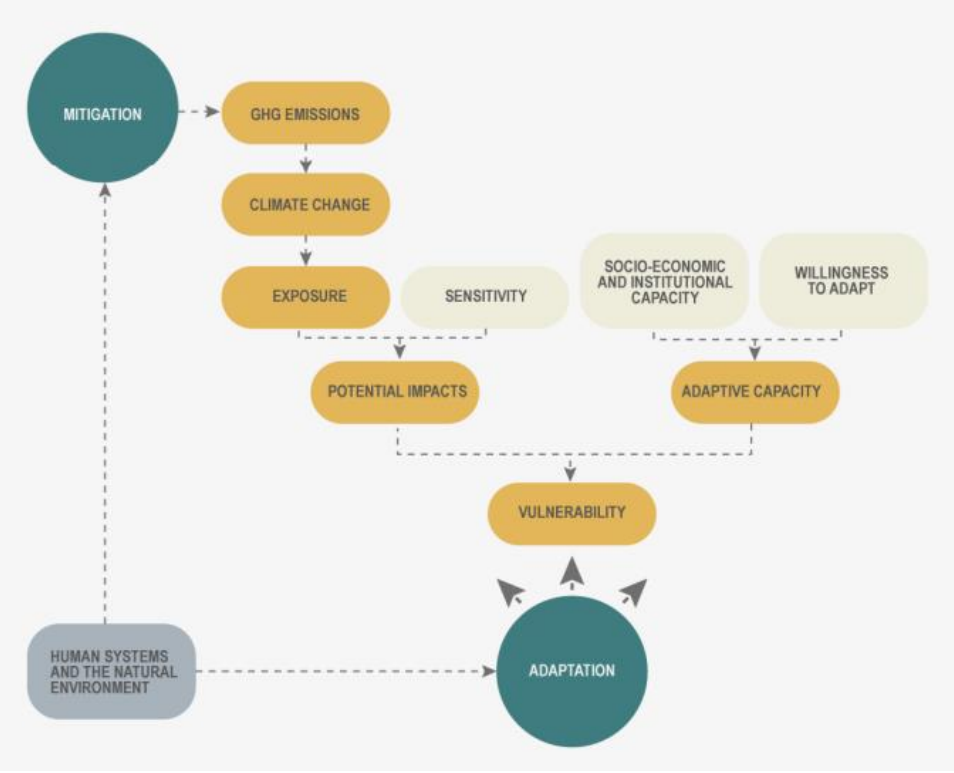
2.1. Adaptation at the local scale

Climate change is a worldwide problem. When it comes to strategies to fight against climate change, there are two types of responses: mitigation and adaptation. The first one deals with the causes of climate change and therefore aims at reducing greenhouse gas emissions (GHGs), while the second one deals with the unavoidable consequences and aims at reducing the vulnerability to climate change (EC, 2009 cited at Giordano et. al., 2013). According to IPCC (2018), adaptation refers to the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Various types of adaptation can be distinguished, including anticipatory and reactive adaptation, private and public adaptation, and autonomous and planned adaptation. These types depend on the response of each area, government, or community.

While mitigation actions are a bit more tangible, quantifiable, and involve more technical structural changes. Adaptation is a process that involves more time and responds to the vulnerabilities of a place. These vulnerabilities must be understood not only as physical risks but also as social or economic risks, for example. Furthermore, in this aspect, the government's management capacity

influences the level of vulnerabilities that a locality faces. In this sense, adaptation involves several aspects to take into consideration because these vulnerabilities can also change over time. Then, adaptation actions are done in the present based on predictions and with results towards the future in the medium or long term. It is also important to consider that Adaptation is a cross-sectoral and transboundary issue that requires comprehensive integrated approaches (European Environment Agency, 2008). Although each type of strategy indeed has different objectives, both are complementary. There is high confidence that neither adaptation nor mitigation alone can avoid all climate change impacts (…) Adaptation and mitigation can complement each other and together can significantly reduce the risks of climate change (IPCC, 2007). Although it is true that mitigation actions have been carried out for a long time and therefore there is more knowledge about them, adaptation actions are taking on greater importance and have proven to be very efficient and key in the fight against climate change. Nowadays many strategies involve both types.

Figure 3: Conceptual diagram for climate change impacts, vulnerability, and adaptation



Source: Giordano, Capriolo, & Mascolo, 2013

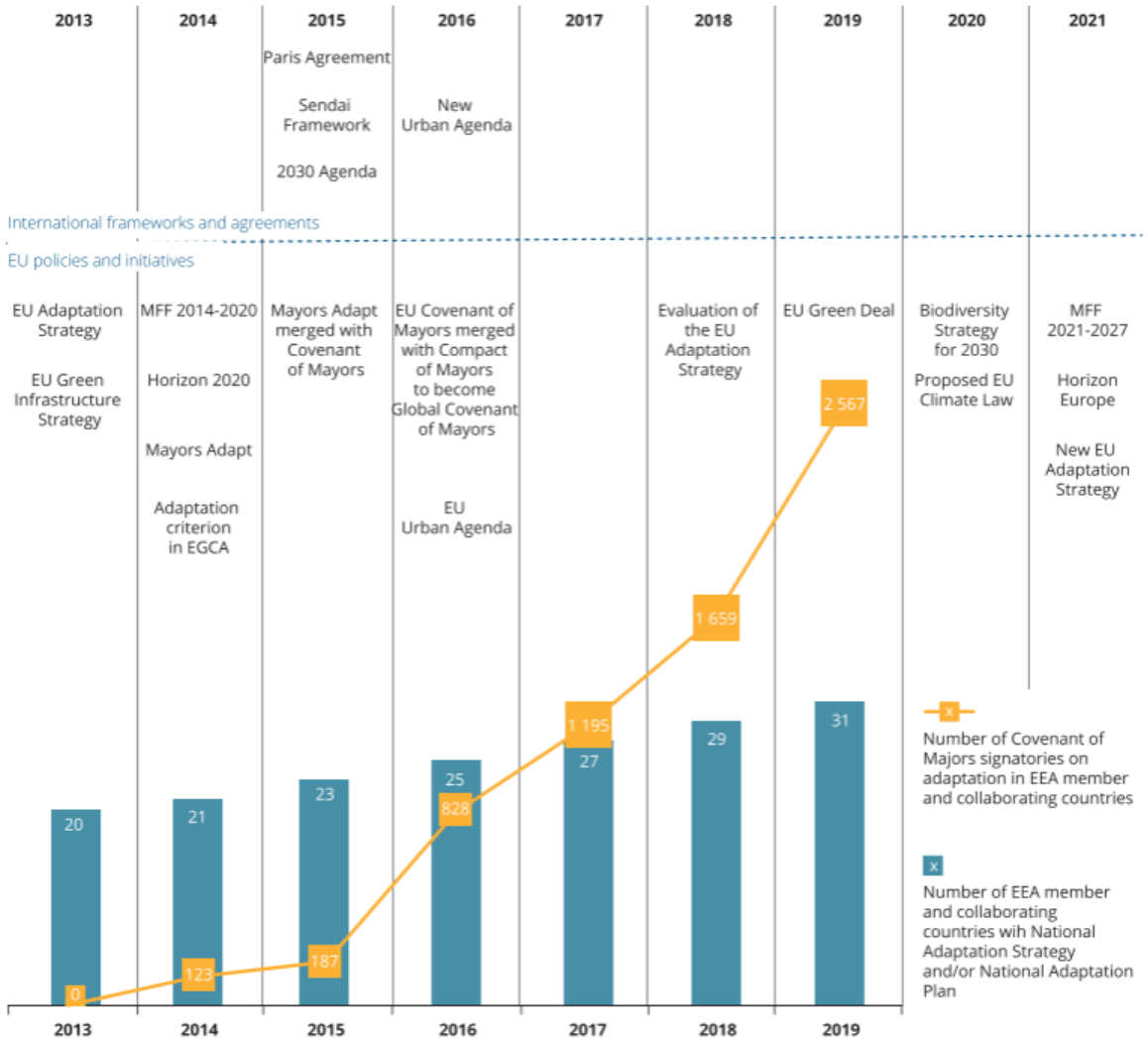
If mitigation is a global concern, adaptation is undoubtedly a local issue (Giordano, Capriolo, & Mascolo, 2013). Adapting today is certainly a necessity. Above all at a local level, where the particularities of each settlement and the risks faced by each territory are specific and need treatment focused directly on it. The international perspective regarding adaptation at an urban scale changed significantly around 2015-2016 with the adoption of several international agreements and frameworks within the structures of the United Nations (UN), highlighting the importance of adaptation action and recognizing the instrumental role of local authorities (European Environment Agency, 2020). As cited by the European Environment Agency (2020) in December 2015, the Paris Agreement was adopted (UNFCCC, 2015), it established the first global goal on climate change adaptation and emphasized its local dimension. The agreement recognized adaptation as a cornerstone of the global response to climate change and thus established its equal importance to mitigation actions (Magnan and Ribera, 2016).

Adaptation at a local scale is key for several reasons. First, adaptation actions are more specific and context-related than mitigation actions. Adaptation proposals are the result of an evaluation of vulnerabilities and risks, which vary depending on the place being evaluated. Secondly, local governments are those that are closer to the population, so they can collect their needs and act to satisfy them. Likewise, they can act by integrating the population in the various phases of the process. Thirdly, although it is true that climate change is a problem on a global scale, climate change impacts are manifested locally (Giordano, Capriolo, & Mascolo, 2013). And that is also why the response of adaptation actions will have direct effects mainly on the local scale. However, we must not lose sight of the fact that all actions taken in the fight against climate change must be interrelated with other scales and other sectoral plans. Understanding the complex, multi-scalar context of local adaptation policymaking, and how non-local forces influence local governments' adaptation policy choices, is crucial for effective local adaptation planning and for providing cities with the best possible support (European Environment Agency, 2020). Cities also have the potential to influence national and international levels, serving as pilots, incubators, or demonstrations of transformational approaches (cited at Kuhl, et al., 2021). Local and small-scale initiatives have the potential to be more innovative and resist mainstream values and thereby spark social change that can spread to higher levels of government (Amundsen et al., 2018)

Although adaptation is indeed a relatively recent topic, especially at a local level, it is important to recognize that thanks to the efforts of many international organizations, it has become more important. The number of cities and towns committed to acting on adaptation to climate change has grown substantially in Europe, supported by the emphasis on urban adaptation in national adaptation strategies, EU policy, and key international frameworks (European Environment Agency, 2020). For example, with the creation of the Covenant of Major in 2008, many European

municipalities began to carry out their action plans for sustainable energy. This evolved in 2015, not only to climate action and sustainable energy plans, including not only actions to reduce CO_2 emissions, but also including adaptation actions and monitoring, and also expanded to a global scale.

Figure 4: Timeline of policies, activities, and milestones relevant to urban adaptation



Source: European Environment Agency, 2020

2.2. Coastal Cities and the Mediterranean Region

An estimated 40% of the world's population lives within 100 km of a coastline. These approximately 3.12 billion people live in settlements of various sizes, from megacities to small urban centers (Kuhl, et al., 2021) in front of the coast. This means the great importance of these cities in the planning structure at different levels and sectors. According to Kuhl et al. (2021), the concentration of people, economic activities, and financial assets within coastal cities make them particularly dynamic places in terms of demographics, cultural development, urban form, economic growth, and governance. Likewise, considering the great importance of these cities and the large number of inhabitants they house also makes them sources of greater exposure to natural risks and therefore the effects of climate change. Urban areas need to act on and prepare for the devastating consequences of climate change on people's wellbeing, ecosystems, and infrastructure systems (Pietrapertosa, et al., 2023)

When we refer to coastal cities in Europe, according to the European Union, through the Eurostat office (2018) glossary, coastal areas are those that are bordering or close to a coastline. A coastline is defined as the line where land and water surfaces meet (border each other). If we study the population proportions in Europe, almost one-third of the Mediterranean population lives in the coastal area and more than 70% in cities (UNEP/ MAP and Plan Bleu, 2020). It is important to consider that coastal areas have particular and temporal dynamics. The concentration of people, economic activities, and financial assets within coastal cities make them particularly dynamic places in terms of demographics, cultural development, urban form, economic growth, and governance (Kuhl, et al., 2021). Above all because they are points of great temporary tourist concentration, which means that the cities have a dynamic during the summer and a very different one the rest of the year. As well as being points of arrival and maritime exchange, coastal cities are centers of concentration, and it is important to plan sustainable development over time.

The latest IPCC Sixth Assessment Report (IPCC, 2022) points out that Mediterranean countries are likely to be significantly affected by climate change impacts in the future as a result of an increased risk of extreme temperatures, drought, and desertification (cited at Pietrapertosa, et al., 2023). Coastal cities face many hazards, such as tides, currents and waves, runoff, storms, sediment flow, erosion in the coastline, sea levels rise, floods, salinization of water sources, heat waves, heavy rainfall, storms, landslides, among others (Kuhl, et al., 2021). This is why planning against climate change in these areas is crucial, in addition to the local scale motivations mentioned in the previous section.

Although it is true that planning primarily occurs at the level of the municipal jurisdiction, natural elements are transversal to more than one jurisdiction. In this case, for example, coastal cities share the coastal coastline and the risks they face often affect more than one jurisdiction. In the case of coastal cities, in addition to having an adaptation plan at a local scale is essential, developing a collective understanding of - and relationship with - the coastline can facilitate cities' cooperation around coastal adaptation (Ocean & Climate Platform, 2022). In that sense, it is important to think about, in addition to having a municipal plan, a regional plan or a project that covers several municipalities. For example, AdriAdapt projects cover different municipalities in regions of Italy and Croatia.

According to the guidebook Climate Change Adaptation in Coastal Cities (Major & Juhola, 2021), there are a range of adaptation strategies to face climate change adaptation in coastal cities:

- Management adaptation options: These are adaptations that can usually be implemented with relatively minor infrastructure changes, and thus are important in near-term adaptation. These can be emergency evacuation plans, communications about climate impacts, transportation management, water systems, and drainage systems.

- Infrastructure adaptation options: These are the adaptations that involve constructed facilities and can be sea walls or breakwaters, flood walls, surge barriers, raising and relocating buildings, improving roads and other facilities, floating structures, urban drainage systems, water systems, wastewater treatment systems, and soft adjustments.

- Policy adaptation options: these adaptation strategies seek to change the framework of adaptation. Such changes can be within a town or city, between two or more settlements, or between a town or city and the regional and national governments. These can be changes in legislation, zoning plans, land use changes, financial incentives, managed retreat, joint system operations, and joint or coordinated construction.

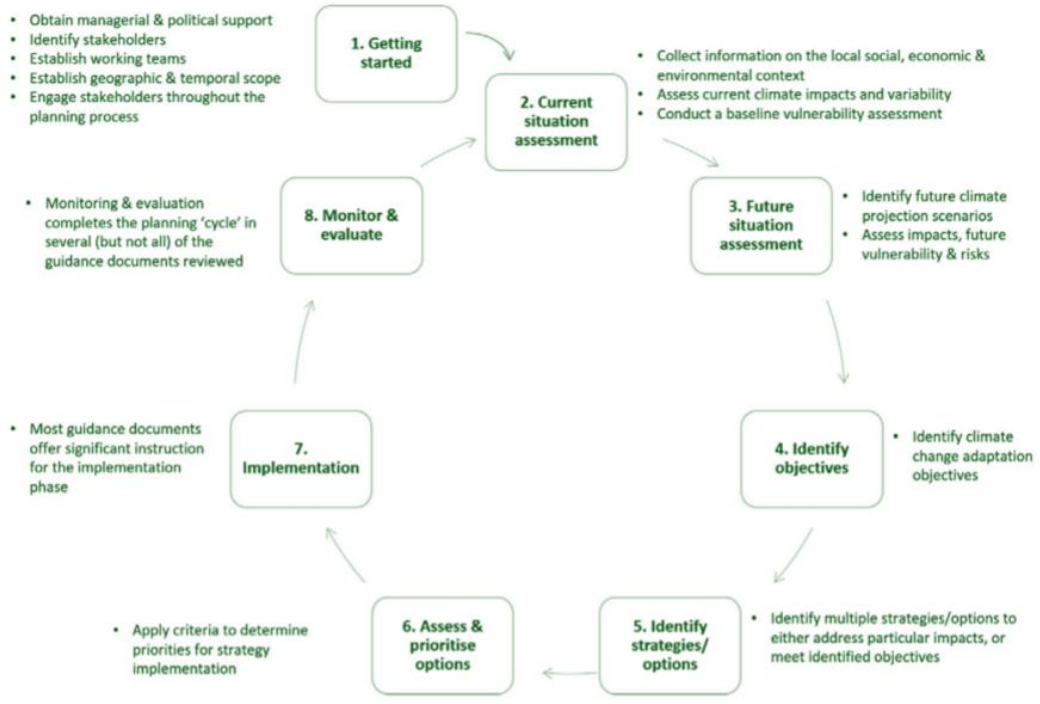
2.3. Monitoring and evaluation (M&E) of climate change plans

When we talk about Monitoring and Evaluation (M&E), we refer to two terms with different meanings but interrelated processes and a crucial role in the implementation and assessment of plans against climate change. Monitoring is an ongoing process that involves systematic and continuous tracking of the process of how the plan is executed. It is the action of continuously keeping track of progress made in implementing a specific adaptation action in relation to its

objectives and inputs (Adaptation Committee, 2014). While evaluation is concerned with establishing the value or worth of the object of evaluation – be that a project, strategy, or policy (Rossi, Lipsey, and Freeman 2004, 2; cited at Scott & Moloney, 2021). Evaluation is a process for systematically and objectively determining the effectiveness of an adaptation action (Adaptation Committee, 2014). Assessing effectiveness involves two questions: first, have the objectives and targets been achieved; and second, can this be attributed to the measure taken? (UNFCCC, 2010). Evaluation is a more in-depth analysis of the outputs.

M&E is an essential step in climate change plan design and execution. M&E is usually the last step (see Figure 5) in the structure and guidelines of local climate change plans. However, it is one of the most important steps since M&E can help to recognize whether the actions proposed and carried out are efficient or require modifications to achieve the desired objectives. The IPCC (2022) similarly places a strong emphasis on the importance of M&E, noting that it "is a key prerequisite for successful iterative risk management and achieving effective and just adaptation outcomes at local to global levels." (cited at Adaptation Committee, 2013). Likewise, as it is a constant back-and-forth process, it can be a tool for learning and adapting the proposals to new requirements or challenges.

Figure 5: The phases of climate change adaptation planning in local government



Source: Scott & Moloney, 2021

M&E of climate change plans is important at all scales at which a plan is proposed. Monitoring and evaluation (M&E) is crucial to ensure that adaptation actions are proceeding as planned and that lessons are drawn to improve them (Bakhtaoui & Taylor, 2023). Additionally, as climate change is not a linear process, adaptation actions may not respond effectively to future challenges, which is why M&E, being a repetitive and continuous process with a certain temporality, plays an important role in keeping track of the effectiveness of what is proposed. Nevertheless, M&E is already a challenge as it is not contemplated in many plans, is poorly planned, or is not reported. According to Klostermann, et al. (2018), there is insufficient information about the effectiveness of adaptation policies, measures, and actions. That is why M&E must be considered as an essential part of planning climate actions.

At a local scale M&E is even more necessary, the particular characteristics of each territory mean that not all adaptation actions are possible to replicate in all places, which is why M&E at this scale plays a crucial role in checking if the proposed actions respond effectively to local challenges and conditions. Learning what works well (or not), in which circumstances, and for what reasons, is critical. It raises two key questions: Are we doing things right? and Are we doing the right things? (Pringle, 2011)

While it is important the specificity of M&E in each context, it is also important to maintain certain common standards for process comparability and to facilitate decision-making at larger scales. This is why there are several frameworks that are a guideline and define a structure on how to structure M&E in the planning instruments. There are many different approaches for M&E which can be based on economic results, participatory interests, or iterative methods. However, the most common approaches for M&E adaptation programs and projects are Result Based Management (RBM) and the Logical Framework Approach (LFA) (Klostermann, et al., 2018). Result Based Management (RBM) is a management strategy focusing on the performance and achievement of outputs, outcomes, and impacts (Bakhtaoui & Taylor, 2023). Logical Framework Approach (LFA or logframe) follows a logical hierarchy of objectives: Activities deliver outputs, which contribute to outcomes, which help bring about the overall goal. It assesses progress against each objective with indicators, means of verification, and external factors such as assumptions and risks (Bakewell and Garbutt 2005, cited at Klostermann, et al., 2018). RBM settles the strategy and LFA is the tool to apply RBM because it structures the strategy. RBM is the most common monitoring and evaluation approach used by development cooperation agencies, or funders (Bakhtaoui & Taylor, 2023).

According to Goonesekera & Olazabal (2022), the most popular approaches to measuring the progress of adaptation across any private or public governance scale are indicator-based

systems. This is why it is key to establish clear, precise, and measurable indicators as well as a robust baseline for monitoring. When it comes to measuring the effectiveness of adaptation actions, the most commonly used indicators are process-based and outcome-based (Covenant of Mayors for Climate & Energy, 2019; Harley & Van Minnen, 2009). The process-based approach seeks to define the key stages in a process that would lead to the best choice of endpoint, without specifying that point at the outset (Harley et al., 2008). While the outcome-based approach seeks to define an explicit outcome, or endpoint, of the adaptation action (Harley et al., 2008). This means that process-based indicators measure how the adaptation action is developing, which is the process and whether it is working or not; while the outcome-based indicators evaluate the effectiveness of the adaptation action, which is the result. It is important to keep in mind that process-based indicators help us in a shorter period of time -when have not yet reached the objective- to evaluate actions and make changes if necessary. And as it is suggested by Klostermann et al. (2018) indicators for adaptation monitoring should meet the SMART criteria: specific, measurable, assignable, realistic, and time-related.

Indicators are not the only tool for adaptation monitoring, but metrics are also important. Metrics is quantitative-based measurements form. Metric provides specific, unambiguous, and quantifiable aspects that need to be measured, counted, or evaluated (Goonesekera & Olazabal, 2022). According to Klostermann, et al., (2018), metrics are attractive as evaluation criteria as they are objective and transparent and can be easily reproduced; also, are easy-to-understand ‘progress checks’ and snapshots of adaptation. While metrics provide quantifiable data, indicators show us a broader vision of the progress, and both should support the monitoring process for quantitative and qualitative analysis. We must monitor what is important in improving our understanding, not only what is measurable (Klostermann, et al., 2018).

Monitoring and evaluation of adaptation in the context of climate change represents a challenge for several reasons. Climate change is not a linear process, and the consequences cannot be fully predicted, there is a lot of uncertainty to cope with. Furthermore, consequences happen in different places with specific conditions (natural, economic, societal, political, among others), which means that adaptation actions cannot be replicated because they are not universal but can be adapted to local conditions. In addition, temporality is a crucial factor, since it takes time to be able to perceive the effects of the adaptation actions taken, but at the same time you do not have as much time to learn, making this a trial-and-error procedure, so it must be a process of doing the best you can while learning at the same time.

When it comes to local scale, M&E can be even more challenging. In addition to what has been already mentioned, it should be considered that sometimes, inexperience on the subject -

especially in smaller localities or with more recent climate change plans- and the non-allocation of resources for the process may be some reasons why M&E is not carried out. It is important to foresee this from the conception of the plan. In this sense, involving different actors in M&E can be a beneficial strategy since it increases knowledge and commitment. Likewise, consider that M&E can be a tool for citizens' credibility in the government when it is friendly reported or communicated.

Finally, regarding M&E of climate change plans, there are two other important concepts to take into consideration and for which M&E may be a necessary element. On one hand, adaptive capacity, which refers to the capacity of an institution to adapt and respond to climate change challenges. This means compiling the information you need and creating the necessary regulatory, institutional, and managerial conditions for adaptation actions to be undertaken (Pringle, 2011). On the other hand, adaptive management, which refers to the ability to learn from what is being done while it is being carried out and be resilient. When we plan adaptation actions against climate change, we try to propose the best with the scientific experience we have, but sometimes the results are not the desired ones, because climate change is a process full of uncertainty. This is when M&E plays an important role, since it will show the results of the adaptation actions and may allow us to adjust them if necessary. According to Harley, et al. (2008), adaptive management is a theoretical approach based both on scientific and practical experience and provides a pro-active pathway to successful adaptation that should serve to increase resilience and reduce vulnerability to climate change impacts. It is important to remember that M&E is a continuous and repetitive process over time that allows us to analyze not only if adaptation actions are being carried out, but also how they are being done and if what is being done works and is efficient, and that is where the importance of this lies.

2.4. Monitoring and Evaluation (M&E) frameworks and tools

To measure the results of adaptation actions, the M&E process is key. Currently, many frameworks are a guide to follow for the preparation of climate action plans and include a special section for M&E proposals. A framework is a structured system, a methodology, or a clear and already systematized set of guidelines that facilitate the process of preparing a proposal, in this case, M&E. A framework is important because it allows comparability between the units that are using it while providing technical support for the development of the proposals.

There are various types of frameworks, with different base methodologies and objectives. For this study, the most relevant ones for the topic under study have been analyzed:

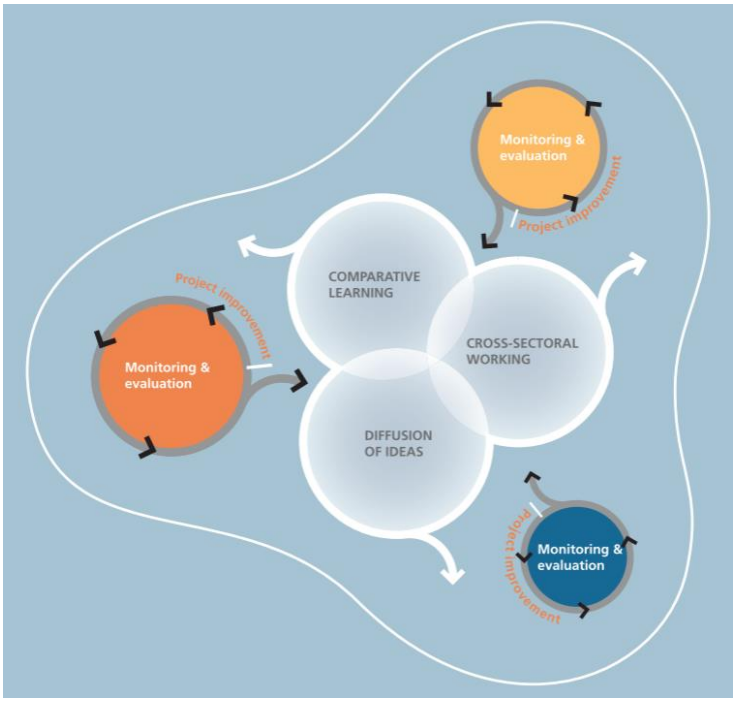
- *AdaptME toolkit / UKCIP Adaptation Wizard*

This toolkit was developed as part of the UKCIP Adaptation Wizard. The UKCIP Adaptation Wizard is a tool to help organizations to adapt to climate change (UKCIP' Adaptation Wizard , n.d.), is a web-based tool that is designed to help users gain a basic understanding of climate change as well as integrate climate risks into their decision-making (Bharwani, et al., 2011). The UKCIP Adaptation Wizard is composed of five-step guidelines, where the last one is related to the evaluation of adaptation progress and performance, for which the AdaptME toolkit was launched.

The document is written in a friendly and easy language to understand by all types of actors involved in M&E. It is aimed at guided self-learning, since it is based on questions to be answered by the municipalities for their process and it includes some references for further consultation. It is not a strict and formal document; but rather a guide that gives a general overview of the subject. AdaptME does not seek to provide a comprehensive evaluation framework as it is clear that there is no one-size-fits-all approach to evaluating adaptation (Pringle, 2011). In that sense, it is presented as a guide adaptable to different scales. In other matters, it does not have a precise set of indicators, but rather a series of instructions and recommendations for choosing indicators.

According to Pringle (2011) for this framework, M&E is crucial in the climate change planning process. Furthermore, it is essential to know the purpose of the evaluation and the type of evaluation that will be done to have a more balanced and effective evaluation approach.

Figure 6: Internal and shared learning the monitoring and evaluation



Source: Pringle (2011)

- *Covenant of Mayors for Climate and Energy (CoM)*

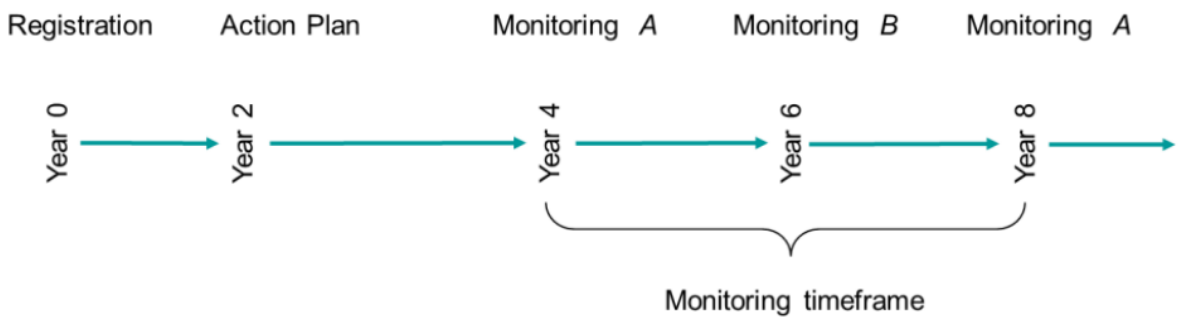
The CoM was launched in 2008, it is an initiative of the European Commission for local governments who voluntarily adhere to the organization, to fight against climate change. It is characterized by its bottom-up governance, its multi-level cooperation model, and its context-driven framework for action (Covenant of Majors, n.d.). The membership not only includes technical support to deal with energy and climate actions, but it is also a commitment to the group and a responsibility towards citizens. After its great success in Europe, in 2015 the Global Covenant of Majors was launched.

The CoM is currently in its second phase since its creation. For the first generation of signatories, that is between 2008 and 2015, they were asked to sign a Sustainable Energy Action Plan (SEAPs) and signed the commitment to reduce their CO2 emissions by at least 20% by 2020. And then from 2015 onwards, the second phase, the signatories must prepare the Sustainable Energy and Climate Action Plan (SECAP) and the commitment to reduce it by at least 40% by 2030.

The CoM has developed the Guidebook 'How to develop a Sustainable Energy and Climate Action Plan (SECAP)'. This includes a step-by-step guide and provides signatories with a set of methodological principles, procedures, and best practices to develop their SECAP (Bertoldi, 2018). It includes the different stages of a SECAP, in particular: define the key elements of the initiative, elaborate a Baseline Emission Inventory (BEI), perform a Risk and Vulnerabilities Assessment (RVA), develop a Sustainable Energy and Climate Action Plan (SECAP), support the implementation and monitoring of the SECAP (Bertoldi, 2018). The document is written in simple language for the understanding of the different actors involved in the process, it includes examples of good practices and tips. In addition to the guidebook, the CoM has developed some templates that are available on its website for creating SECAPs and a specific document for M&E that includes some additional indications.

Regarding M&E, this framework is based on the constant reporting of progress. Starting on a Baseline Emission Inventory (BEI), to be carried out while the SECAP is being developed. Once the SECAP is approved, every two years, the municipality must upload to the CoM platform the Action Report, which shows in general terms the progress that has been developed (Monitoring A). Every 4 years the Full Report, which is a more in-depth report that includes a Monitoring Emissions Inventory (MEI) (Monitoring B).

Figure 7: Monitoring time scheme



Source: Covenant of Majors, 2020

In addition to constant reporting, the M&E of this framework is based on indicators. Although there are no direct indications in the guidebook or the annex for M&E; in the templates available on their website there are a series of indicators by theme that can be adapted to each location.

- *Climate-ADAPT and Urban Adaptation Support Tool (UAST) / European Commission's Adaptation Strategy*

The European Climate Adaptation Platform Climate-ADAPT is a partnership between the European Commission and the European Environment Agency (EEA) (Climate ADAPT - EU). This platform has developed two support tools according to the scale, the Adaptation Support Tool (AST) for the national and sub-national level, and the Urban Adaptation Support Tool (UAST) for the local level. The UAST aims to assist cities, towns, and other local authorities in developing, implementing, and monitoring climate change adaptation plans (Climate ADAPT - EU).

The UAST provides on its website a step-by-step guide on how to prepare a Climate Action Plan which is constituted of six steps, where the last one is Monitoring and Evaluation. Also, there are various references, data, and examples. Covenant of Majors signatories might use this tool to get inspiration because it is a very friendly platform and stores different resources for further consultation.

- *ACT – Adapting to Climate Change in Time*

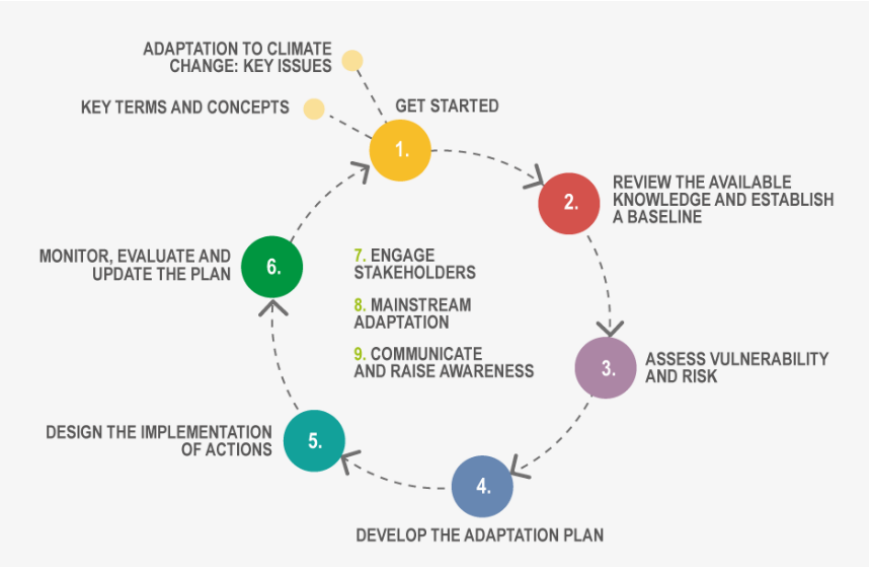
ACT is a project funded by the European Commission within the LIFE program on Environmental Policy and Governance. This program was created to contribute to the implementation, update, and development of policy and legislation in the environmental policy area, thereby contributing to the efforts towards sustainable development (Giordano,et al., 2013). It is important to highlight that in this initiative local actors have the main role.

As part of the ACT project, the "Guidelines for Municipalities" have been developed by the Institute for Environmental Protection and Research (ISPRA, Italy) and the municipalities part of the project. The document is based on a comprehensive methodology aimed at driving the process of designing, implementing, and monitoring a Local Adaptation Plan (LAP), by providing basic theoretical information on key climate adaptation issues that are relevant to cities, examples of successful experiences gained within the project and good practices from other European experiences (Giordano,et al., 2013).

This is a very detailed guideline and is friendly to the user in terms of the concepts and the way they are presented. The proposed methodology in this guideline is composed of six steps and each of them is explained in the document. Through the document, concepts are explained with

examples and there are some questions to encourage critical thinking in each municipality. The monitoring and evaluation section is based on the use of indicators and periodical review.

Figure 8: Structure of the Guidelines for the Local Adaptation Plans (LAPs)



Source: Giordano,et al., 2013

- ICLEI's Adaptation Toolkit

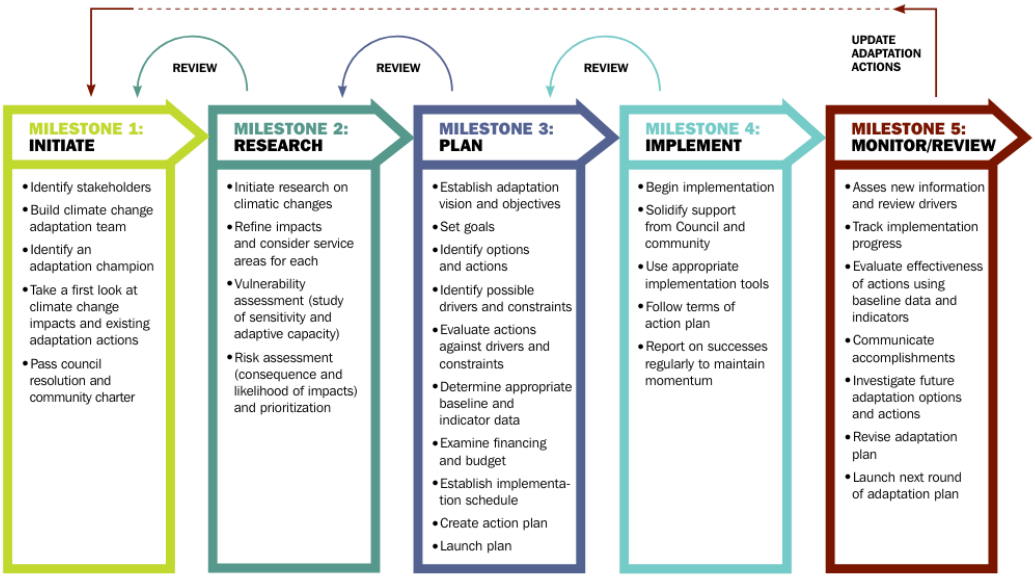
ICLEI – Local Governments for Sustainability is a global network working with more than 2500 local and regional governments committed to sustainable urban development (ICLEI, n.d.). ICLEI, through its different offices around the world, actively works to provide support and knowledge to local governments. For this, it has developed different documents regarding the issue of adaptation at a local scale. For example, the Local Government Climate Change Adaptation Toolkit, developed by ICLEI Oceania (2008). The document begins with a glossary and then explains the steps towards the development of a Climate Action Plan. It is a simple and language-friendly document for different actors. Regarding the monitoring and evaluation proposal, in this toolkit it is called "review of the progress". However, it refers to the same idea behind M&E. Something important about this toolkit is that it highlights the relevant role of external stakeholders in the M&E process as a commitment to the implementation of actions.

On the other hand, ICLEI Canada has developed the Changing Climate, Changing Communities: Guide and Workbook for Municipal Climate Adaptation. The guide is theoretical material on the

steps for developing a climate action plan. This methodology is made up of five steps, where the last refers to monitoring. In this methodology, monitoring is based on a system of indicators and a constant review. According to this document, the importance of monitoring lies in the possibility of learning from the processes that are being carried out and updating them if they are not meeting the objectives. Likewise, it highlights the importance of communicating the processes, thereby helping to raise general awareness about climate change adaptation and celebrate your community's accomplishments (ICLEI Canada). Additionally, this guide is complemented by a practical workbook whose main objective is to operationalize the methodology presented within the main guide (ICLEI Canada). The workbook is made up of 17 worksheets that accompany each of the five steps of the methodology and, interestingly, each one suggests the time to invest, the actors who should be involved in the process, and how that is framed in larger processes. This workbook is a very useful tool, with clear instructions and references to support the process.

In addition to the documents mentioned in the preceding paragraphs, ICLEI has many other support materials for local governments on climate change adaptation issues, such as webinars and other in-person activities.

Figure 9: Milestone Framework Adaptation Plan



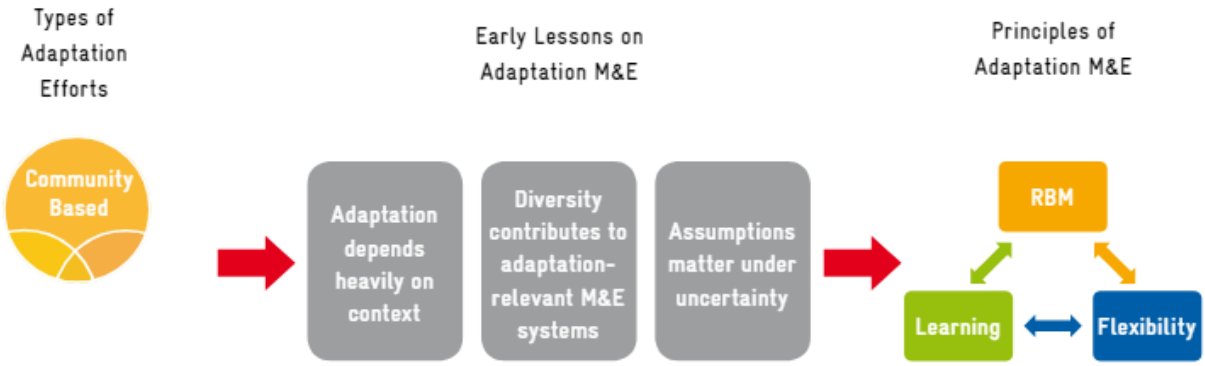
Source: ICLEI Canada

- *Making adaptation count*

Making adaptation count is a report elaborated by GIZ. According to GIZ (2011) with this document, the aim is to provide adaptation and development practitioners with a practical framework for developing M&E systems that can track the success and failure of adaptation initiatives in the development context.

The document provides a wide range of concepts and theories on adaptation M&E. The suggested methodology is based on a system of indicators and a periodic and constant review of the actions that are being executed. The document is quite dynamic and provides examples of the topics they suggest. And it highlights the importance of M&E since it allows learning while doing it.

Figure 10: Building on Early Lessons in Adaptation M&E



Source: GIZ (2011)

Up to now, some of the existing frameworks that have been considered relevant for this research have been detailed. However, it is worth highlighting that there are many other frameworks and tools on the preparation of climate action and M&E adaptation plans or that highlight aspects to consider while doing adaptation to climate change, such as:

- Guidelines for Adapting to Climate Variability and Change along the Mediterranean Coast / PAP-RAC

- Climate change planning for regional and local authorities Handbook / EnercitEE
- Monitoring & evaluating climate change adaptation at local and regional levels / ADEME
- Guide to Climate Change Adaptation in Cities / The World Banck Group
- Monitoring and Evaluation of Climate Change Adaptation: Methodological Approaches / OECD
- Adapting to climate change in European cities: towards smarter, swifter & more systemic action / GCoM
- Among others

As has been seen, most frameworks, in terms of M&E adaptation, are based on a system of indicators -some of them propose the indicators, others give recommendations on how to create them- and a constant and periodic review. They also recognize the importance of involving various stakeholders in the process to generate credibility and commitment. They also highlight the importance of this step-in climate action plans because of the possibility it provides of knowing whether the proposed actions are effective in the context of uncertainty about climate change. Finally, one of the most important characteristics of M&E is that it allows entering a process of learning by doing, since proposed actions may need modifications and governments are only capable of recognizing it after M&E.

2.5. Climate Adaptation Governance

Climate change is a global problem, it is challenging, uncertain, and to a certain extent still unknown -in how to act and its consequences-. In that sense, currently, we must act to mitigate the consequences and adapt to changes at different levels of government and from different sectors. As Dovers & Hezri (2010) mention, mitigation is a global problem, with implementation differentiated across regions and countries, while adaptation is a more local issue responding to global phenomena. This shows the importance of addressing the issue from the international scale to the local scale.

Acting against climate change not only means planning actions -which is the initial step-, but also executing them and making them effective. The challenge falls more on the latter than on the

former and for this, a structured and strong government system is crucial since governments execute these new tasks. Above all at the local level, it means an adaptation of the governance system to accommodate the new responsibilities and learning from the process. Governance is understood as the interactions between public and/or private actors ultimately aimed at addressing collective issues (Termeer, et al., 2016). The purpose is to create governance capability, which is defined as governance actors' ability to act wisely when facing wicked problems, and the ability of the governance system to enable such acting (Termeer, et al., 2016). In this context, governance at a local scale is a key element to the effective implementation of climate action plans.

Climate adaptation governance should have a cross-sector and multi-scalar approach and should involve multiple stakeholders. Cross-sector, because climate change manifests itself in different sectors and is produced by different sectors (for example: agricultural, economic, social, industrial, etc.; or that the plan must be aligned with other urban/territorial plans, etc.). Multi-scalar, because the effects and actions are not only reflected or made in the scale that is worked on (for example: a local action can benefit the national balance, but consequences of climate change do also not end in some municipality's jurisdiction, or national regulations bind local governments with certain policies). And involve different stakeholders, not only public but also private, because this is how climate change adaptation mainstreaming and commitment are achieved.

Regarding the scales, climate adaptation governance at the international level defines agreements among countries to fight with climate change, gives technical support and promotes actions on smaller levels. The national level settles the objectives and the way to make proposals for the smaller scales. National adaptation policies are key for defining governance structures and arrangements that support local authorities' adaptation actions (EEA, 2020d; cited at European Environment Agency, 2020). Likewise, the national level sometimes acts as a role model and financier of smaller scales or as the provider of knowledge. The regional level has an intermediate role between the national scale and local scale. The regional level facilitates the translation of national policies into local adaptation actions (European Environment Agency, 2020). While the local level is the one that is in direct contact with citizens and problems, it is crucial for the implementation of national adaptation strategies (European Environment Agency, 2020). Local adaptation is embedded in a broader governance context, in which cities both are influenced by higher governance levels and can themselves drive change (European Environment Agency, 2020). In this sense is crucial to understand the scale in which we are working on climate change proposals but at the same time, its multiple-level condition to be aware that actions can influence other scales and are also dependent on other scales.

In their article, Termeer, et al. (2016), propose five governance capabilities that are considered crucial for coping with wicked problems -such as climate change-, these capabilities are:

- Reflexivity, which is the ability to appreciate and deal with problems and multiple frames (Termeer, et al., 2016). In the case of climate change, problems are interrelated and caused by multiple reasons. So it is having the ability to holistically consider all the factors related to the problem.

- Resilience, which is the ability to adapt flexibly to unpredictable and frequently occurring and hanging circumstances without losing identity and reliability (Termeer, et al., 2016). Given how uncertain climate change is, this characteristic is key to fighting it. The actions taken to reduce its effects are at a certain point a test to see if they work or if they have collateral effects, so governments need to be flexible to learn from the process, to have the ability to recognize it and change it if necessary.

- Responsiveness is the ability to respond legitimately to continuously changing agendas and public demands (Wexler, 2009; cited at Termeer, et al., 2016). As climate change is a transversal problem, climate adaptation governance needs the capability of responsiveness to be able to adapt itself to the different possible changes -for example political parties or decisions.

- Revitalization is the ability to unblock stagnation and reanimate deadlocked policy processes (Termeer, et al., 2016). Which means taking action to avoid getting stuck in the face of the difficulties of the process.

- Rescaling is the ability to address mismatches between the scale of a problem and the scale at which it is governed (Termeer, et al., 2016). This is crucial in the adaptation process if after M&E an action needs to be updated.

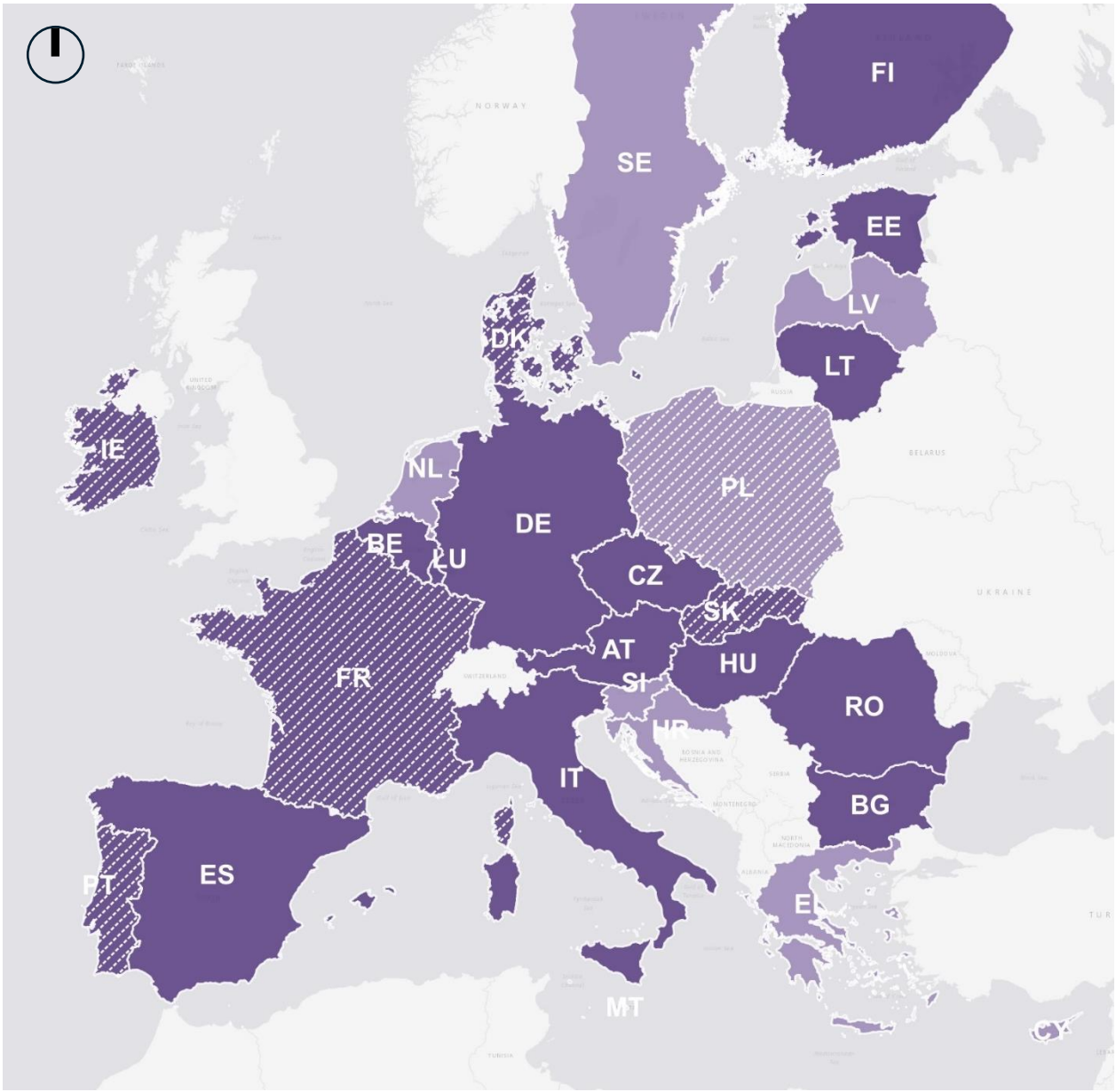
When it comes to climate adaptation governance on a local scale, it is essential to apply what has been mentioned. Many times, the smallest scale, has less knowledge on the subject, which is why it is crucial to look for platforms to build capacity such as national or international organizations -e.g. Covenant of Majors-. Likewise, it is crucial to understand climate adaptation planning as a transversal element to other types of planning -urban, territorial, and strategic-, which must align and work towards a joint objective. This, added to the involvement of various stakeholders, increases engagement, credibility, and the probability that the actions are executed

and accepted. Additionally, a good governance system also facilitates the allocation of resources or obtaining financing to implement a climate action plan.

Governance at the local level is defined by several aspects, as previously mentioned, and must be aligned with the other levels of government. Regarding climate change, national regulations are key instruments for effective and efficient planning and can define local policies or how actions against climate change are carried out or not. The various levels of government have different management instruments. In the case of Europe, at the national level, 67% (18 out of 27) of the member countries of the European Union have both National Adaptation Strategies (NAS) and National Adaptation Plan (NAP). While only 33% (09 out of 27) have only one -NAS or NAP- (see Figure 11). This reflects the efforts of the European Union, and their government policy, which is highly committed to the fight against climate change. At a regional level, the obligation and implementation of plans vary according to each country.

At the local level, the interest of this study, it has been possible to recognize that in the European Union, only 22% (06 of 27) of the member countries make explicit in their national regulations the obligation to develop climate action plans at the local level and subsequently, to execute them (see Figure 11). These countries also have created guidelines for preparing plans at a local level. In terms of governance, it implies greater alignment between the different levels of government to meet the objectives but at the same time, it implies that taking actions at the local level is a product of a national requirement so it could be considered a top-down approach. While for the remaining countries, no national regulation has been found that binds the local scale to develop plans against climate change. However, it has been observed that in many of these cases, the NAS, NAP, or climate act emphasizes the importance of the local scale and suggests its integration to bigger scales in order to do an effective fight against climate change. Furthermore, it has been seen that the obligation in some of these cases depends on the regional scale instead of the national one.

Figure 11: EU countries with NAS and/or NAP, and with the obligation of having climate change plans at the local scale



Source: own elaboration.

For NAS and NAP information, for Mediterranean countries, the information is an updated version of Pietrapertosa, et al. (2023), *while for the rest of the countries, the information is a result of the author's research. For the local scale, it is an updated version of Reckien, et al (2018).*

3 Coastal cities climate adaptation planning

In this first section, questions 1; 2, and 3 (see Figure 2) are answered to know if plans are being generated at a local scale in the coastal cities of Western Mediterranean Europe and to know which type of actions they are taking –if they consider mitigation and adaptation, one or both-; and on the other hand, if they consider M&E within the plan.

Before starting to search for plans, an analysis has been made of the political-administrative organization systems of each country, to understand how a country is organized and its different levels of government. This is important since these are the units in which government decisions are made and in which local climate change proposals are complete. Likewise, an analysis of national regulations for each country was made to know whether climate action plans at the local scale are mandatory or not. It is important to highlight that even all countries are part of the European Union and follow their rules and general structure, each country has a particular political-administrative organization and climate change regulations. At the subnational level, they respect the division of Nomenclature of territorial units for statistics (NUT 1; NUT 2, and NUT 3) proposed by the European Union, each country assigns a name in its official language, thus obtaining 3 regional levels (see Table 1). At the local level, the smallest units of Spain, France

and Italy coincide with the Local Administrative Units (LAU) proposed by the European Union[2]. While Portugal has two local levels, *Freguesias*, which is the smallest unit; and *Conselhos*, which are groups of *Freguesías* and are the smallest administrative level in the Portuguese political-administrative organizational system. Regarding planning against climate change at a local scale, the local administrative unit in which plans are generated is different in each country and is determined by existing national regulations (see Table 1).

In Portugal, according to the *Lei de Bases do Clima* (Act no. 98/2021) approved by the *Assembleia da República* on December 31st, 2021, establishes that municipalities at the local level -in this case, *Conselhos*- must approve a climate action plan within 24 months after approval of the law. As part of this Act, also has been approved in 2024 the document *Orientações para os Planos Municipais de Ação Climática* (Guidelines for Municipal Climate Action Plans).

In Spain, there is no national regulation that compels municipalities to develop plans against climate change. However, it has been found that for some cases, the responsibility depends on regional governments, which is why some of them oblige their municipalities to develop plans against climate change, while others do not. For this study, *Municipio* has been considered as the smallest administrative unit.

In the French system, the *Commune* -which is the smallest organizational unit- forms groups called *Établissements Publics de Coopération Intercommunale* (EPCI) to facilitate territorial administration given the large number of Communes in France. In the French case, for this study, the administrative unit that is considered for analysis is EPCI. In this country, according to the *Article L229-26 - Code de l'environnement*, EPCIs with their own tax regime that group more than 20,000 inhabitants must adopt a Territorial Climate-Air-Energy Plan no later than December 31st, 2018, or within two years from its creation or the date on which they exceed the threshold of 20,000 inhabitants.

In Italy, the smallest administrative unit is the *Comune*. According to the *Piano Nazionale di Adattamento ai Cambiamenti Climatici* (2023), the elaboration of climate action plans is voluntary.

[2] It is important to mention that the LAUs are statistical but not administrative units. However, in the cases mentioned, they coincide with the administrative units.

However, it has been found that for some regions it is mandatory, but that depends on regional regulation.

Table 1: Summary of the political-administrative organization by country

Biggest ← → **Smallest**

Country	NUT 1	NUT 2	NUT 3	LOCAL UNITS		is CAP mandatory?
Portugal	Continent Azore Madeira	Regions (Região)	Sub-region (sub-região)	Concelho	Freguesias	**YES** level: Concelhos source: law 98/2021
Spain	Groups of autonomus communities	Autonomus communities Autonomus cities	Provinces	Municipio		**NO** level: Municipio source: AdapteCCa
France	Regions + DOM	Former Regions + DOM	Departement + DOM	EPCI Commune		**YES** level: Établissement public de coopération intercommunale (EPCI) +20,000 inhabitants source: Code de l'environnement
Italy	Groups of regions	Regione	Provincia	Comune		**NO,** voluntary level: Comune source: NAP

LAU – Local Administrative Unit, statistical unit according to EU

Smallest level of Climate Action or Adaptation Plan

DOM (Département et región d'outre mer)
CAP (Climate Adaptation or Action Plan)
NAP (National Adaptation Plan)

établissement public de coopération intercommunale (EPCI)

communauté d'agglomération (+50 000 inhabitants)	communauté de communes (rural)

Source: own elaboration

After having defined the smallest administrative unit for each country, the analysis for this section was made. For this purpose, cities -which for this research should be understood as the smallest administrative units mentioned in the preceding paragraphs- between 20,000 and 100,000 inhabitants located on the Mediterranean coast have been selected using QGIS. For this process, shapefiles freely available online on the websites of the European Union and the different countries have been used[3]. As a result, a total of 265 cities were obtained (see Table 2).

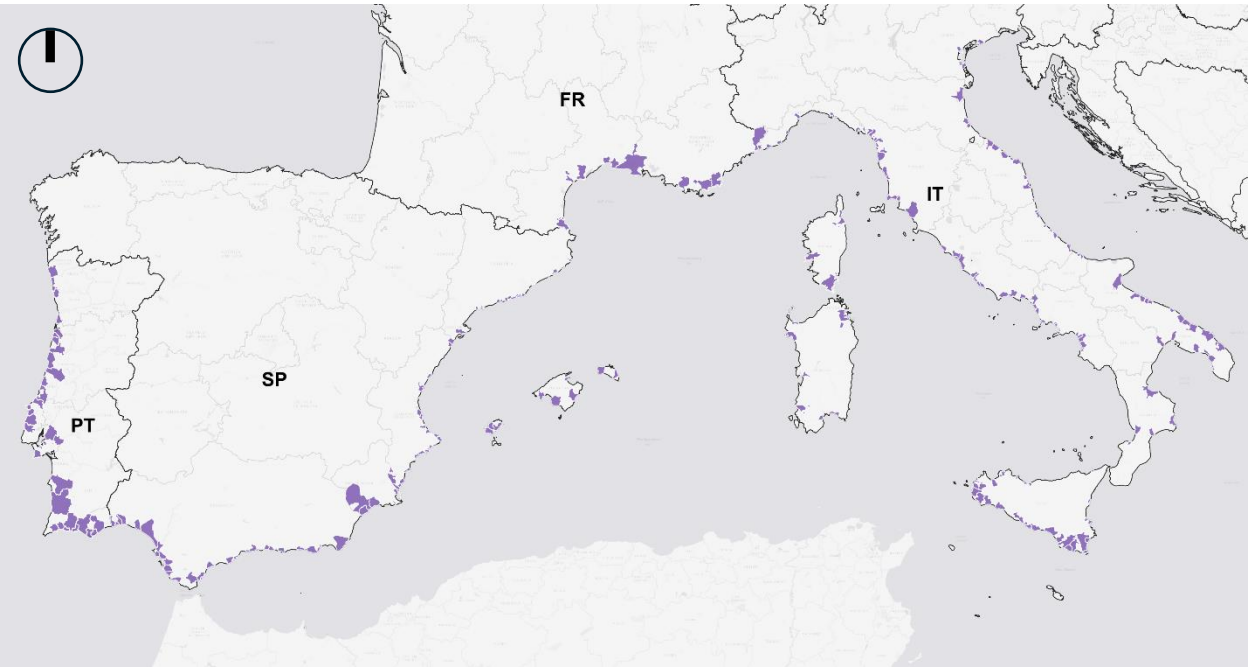
[3] For Spain and Italy, LAU shapefiles of the EU were used. While for Portugal and France, since they have local administrative grouping units, shapefiles available on their websites were used. All this shapefiles had information about the population for every unit, for the EU in 2021, for Portugal in 2021 and for France in 2020.

Table 2: Number of cities per country

Portugal	34 *Concelhos*
Spain	92 *Municipios*
France	15 *EPCIs*
Italy	124 *Comune*

Source: own elaboration

Figure 12: Map of the 265 cities under study



Source: own elaboration

Of these 265 cities, a database has been created, in order to understand how many of the cities under analysis have some management instrument against climate change, what type of actions they propose -mitigation or adaptation- and whether these instruments provide for some M&E system. Based on this, the information fields analyzed in this database are:

a. Management instrument against climate change (Yes / No). For this analysis, the following document typologies have been considered as valid: Climate Action Plan, Climate Change Adaptation Plan, or Climate Change Adaptation Strategy, in that order of hierarchy. Intercommunal plans have also been considered, as long as the analysis and proposals are specific to each locality that is part of the plan.

b. Instrument title in original language

c. Year

d. Link

e. Mitigation actions (Yes / No)

f. Adaptation actions (Yes / No)

g. Methodology used to elaborate the instrument

h. Monitoring section (Yes / No)

i. Mention of the word monitoring (Yes / No, this field has only been evaluated if the *h.* is No)

For each of these cities, research has been done to find which ones have online availability of Climate Action Plans, Climate Adaptation Plans, or Climate Adaptation Strategy -in that order of preference-. The search has been carried out on online platforms of national governments, national reports on the progress of planning against climate change and on Google directly. The search has been carried out between mid-May and mid-June[4] and was done in the official language of each country with the following phrases:

- Portugal:
    - Plano de Ação Climática de *(name of the city)*
    - Plano de Adaptação às Alterações Climáticas de *(name of the city)*
    - Estratégia Municipal de Adaptação às Alterações Climáticas de *(name of the city)*

4 It might be possible that after mid-June some plans were approved, finished or released online but were not considered in this research.

- Spain:
    - Plan de Acción Climática (name of the city)
    - Plan de Adaptación contra el Cambio Climático de (name of the city)
    - Estrategia de Adaptación contra el Cambio Climático de (name of the city)
    - Pla d'Acció per a l'Energia Sostenible i el Clima (name of the city)
    - Pla Local d'Adaptació al Canvi Climàtic (name of the city)

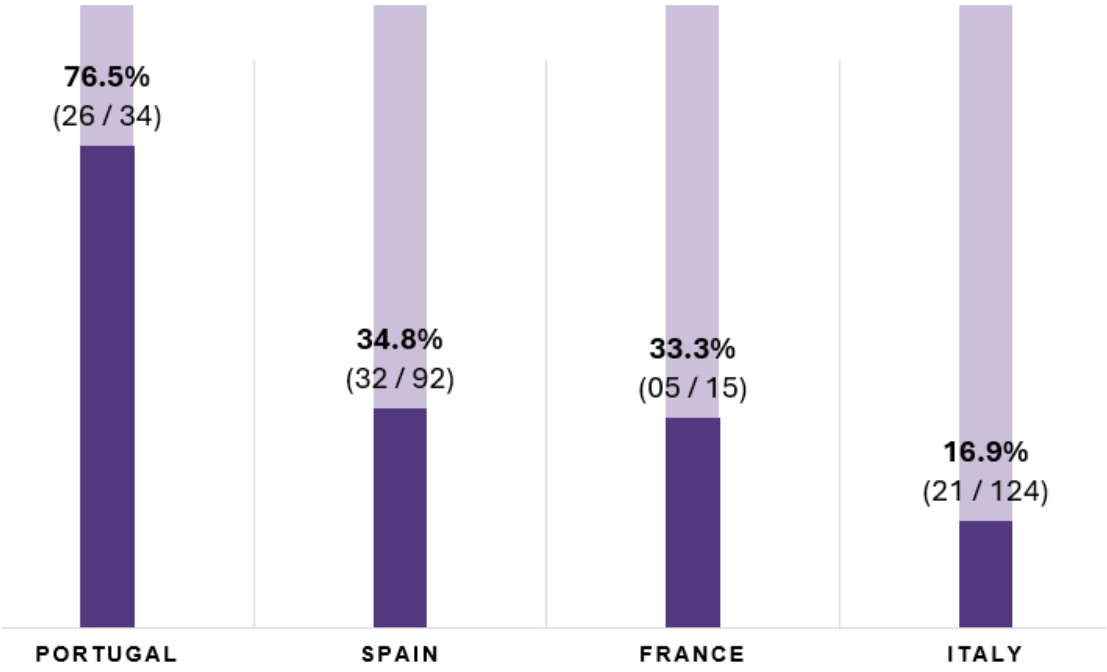
- France:
    - Plan Climat Air Énergie Territorial *(name of the city)*
    - Plan d'adaptation aux Changements Climatiques *(name of the city)*

- Italy:
    - Piano d'Azione per l'Energia Sostenibile ed il Clima *(name of the city)*
    - Piano locale di addattamento climatico *(name of the city)*

As a result of this analysis, it has been recognized that 31.7% (84 out of 265) of cities have available online some planning instruments[5] against climate change and that these have been developed between the years 2014 – 2024 (see Figure 13 for details by country). In general, the oldest ones are Adaptation Strategies to Climate Change, while the most contemporary ones are Climate Action Plans. The quantity and typology of documents are directly proportional to whether or not the elaboration of these climate planning documents is mandatory, indicated by national regulations, and to the associations or memberships that cities may have with international or local organizations.

5 Only cities with documents available online have been considered, since references to the existence of a plan have been found in several cases but they have not been found available online or in municipalities websites.

Figure 13: Percentage of cities per country with adaptation to climate change planning instruments



Source: own elaboration

It should be mentioned at this point that in addition to those reported in Figure 13, reference has been found to the possible existence of plan or the approval for several cities in each country, but those plans have not been found available online or on the websites of each city the aforementioned planning instrument: Portugal 17.6% (06 out of 34), Spain 19.6% (18 out of 92), France 20% (03 out of 15) and Italy 16.9% (21 out of 124). Which represents 18.1% of the total (48 of 265). However, they have not been considered in the total count since it has not been possible to access the plan for analysis. This information is going to be detailed in the following paragraphs for each country.

3.1. Portugal

In Portugal, 76.5% (26 of 34)[6] of cities have some planning instrument against climate change: 23.5% Climate Action Plan, 32.4% Adaptation Plan against Climate Change and 20.6% Adaptation Strategy Against Climate Change. Likewise, there are four intercommunal plans, which represent 26.5% (09 of 34) of the cities, these plans have been considered as local scale since within their drafting there is local specificity for each territory and strategies adapted to the specific context. It is worth noting that the majority of instruments have been developed even before the national obligation with the *Lei de Bases do Clima* Act (2021) and that the country has made several efforts to work on instruments to fight against climate change at different scales. In addition, the instruments carried out after the law, are mostly Climate Action Plans. On the other hand, some of the municipalities that already have an instrument, are in the process of updating to comply with what is indicated by the act to carry out Climate Action Plans, which includes monitoring and adaptation actions within the same document, as well as a monitoring and support section (Agência Portuguesa do Ambiente, 2024).

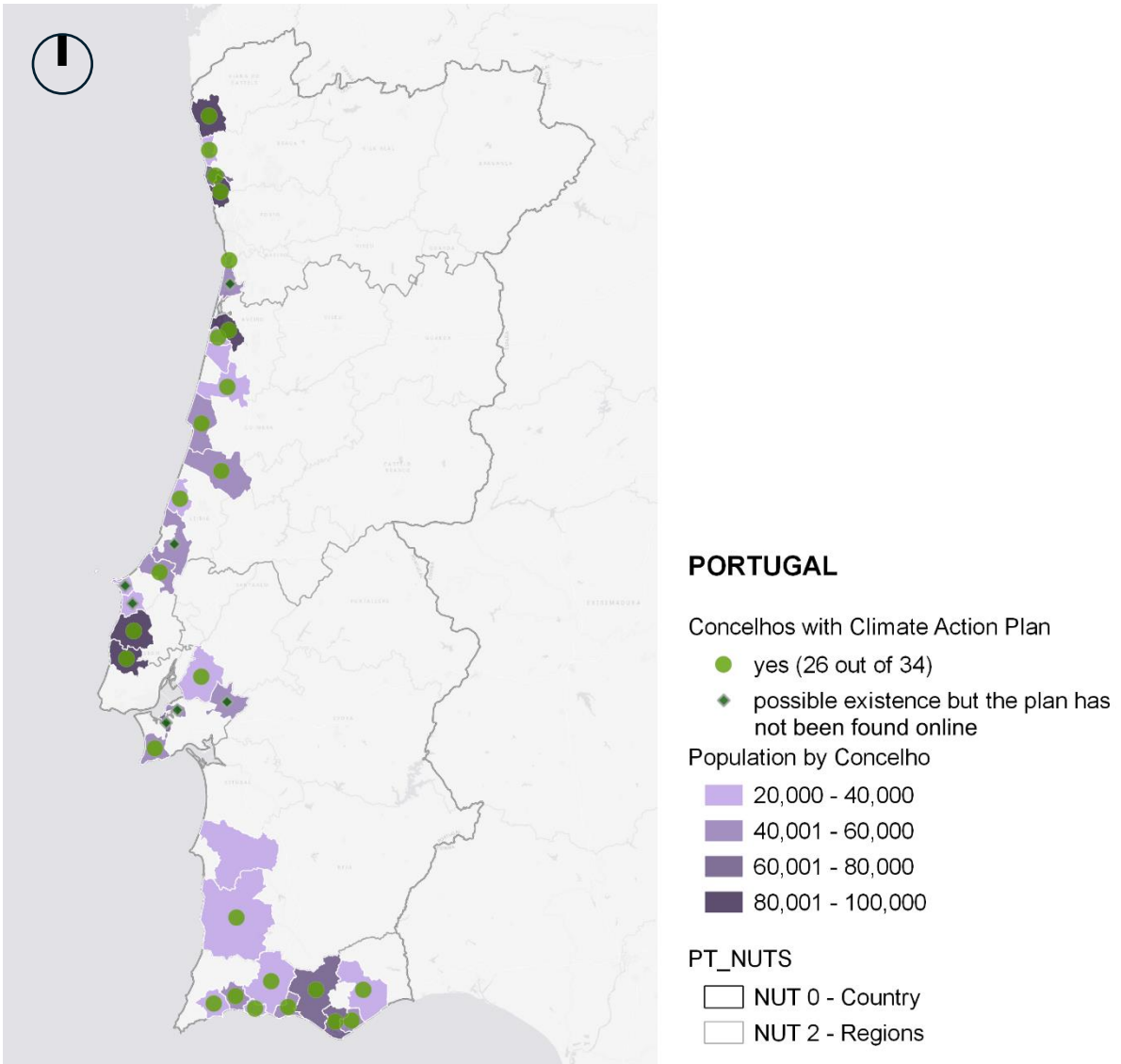
In the Portuguese case, all plans have a section for adaptation actions and only 8 of the 34, also have a mitigation section. It is important to highlight that all plans have a specific section within the plan for monitoring strategy or mention the word monitoring within their texts, and almost all of them have already settled indicators for the monitorization. Regarding the plan's methodology, the majority reports that they have followed the UKCIP Adaptation Wizard methodology, referred to as ADAM (Decision Support in Municipal Adaptation) as part of the project ClimAdaPT.Local; while only three mention having used the EEA Grants methodology.

In Portugal, the coastal *conselhos* that have plans are distributed equally along the coast and it can be seen that they are not very heterogeneous in their territorial dimension. This last point is interesting, since it reflects the homogeneity of the territorial units within the profile under study,

6 It is necessary to mentioned that for 06 of the 34 cities, some reference to the existence or possible existence of climate change plans has been found -publications on the municipality's website referring to the plan, announcement about the public consultation process, among others- but the plan has not been found available online or is not finished yet, so they have not been considered within the group of cities that have a planning instrument against climate change as it was not possible to access to the document to analyzed the content. However, it is important to highlight that if we consider that these six cities are working on their plans it means that in Portugal 94.1% of the analyzed cities have a planning instrument against climate change, which shows the importance of the topic for this country at local scale.

in terms of extension and number of inhabitants, in this country. Since the excluded units are very large like Lisbon (in the center) or smaller like Vila do Bispo (in the extreme southwest of the country). Finally, it is important to recognize the work of the Algarve Region (in the extreme south of the country) since almost the entire southern coast of the country has plans against climate change.

Figure 14: Concelhos with a climate action plan in Portugal



Source: own elaboration

Figure 15: Conceptual scheme representative of the ADAM methodological basis, used for the development of Adaptation Strategies Against Climate Change

Source: ClimAdaPT.Local, 2015

3.2. Spain

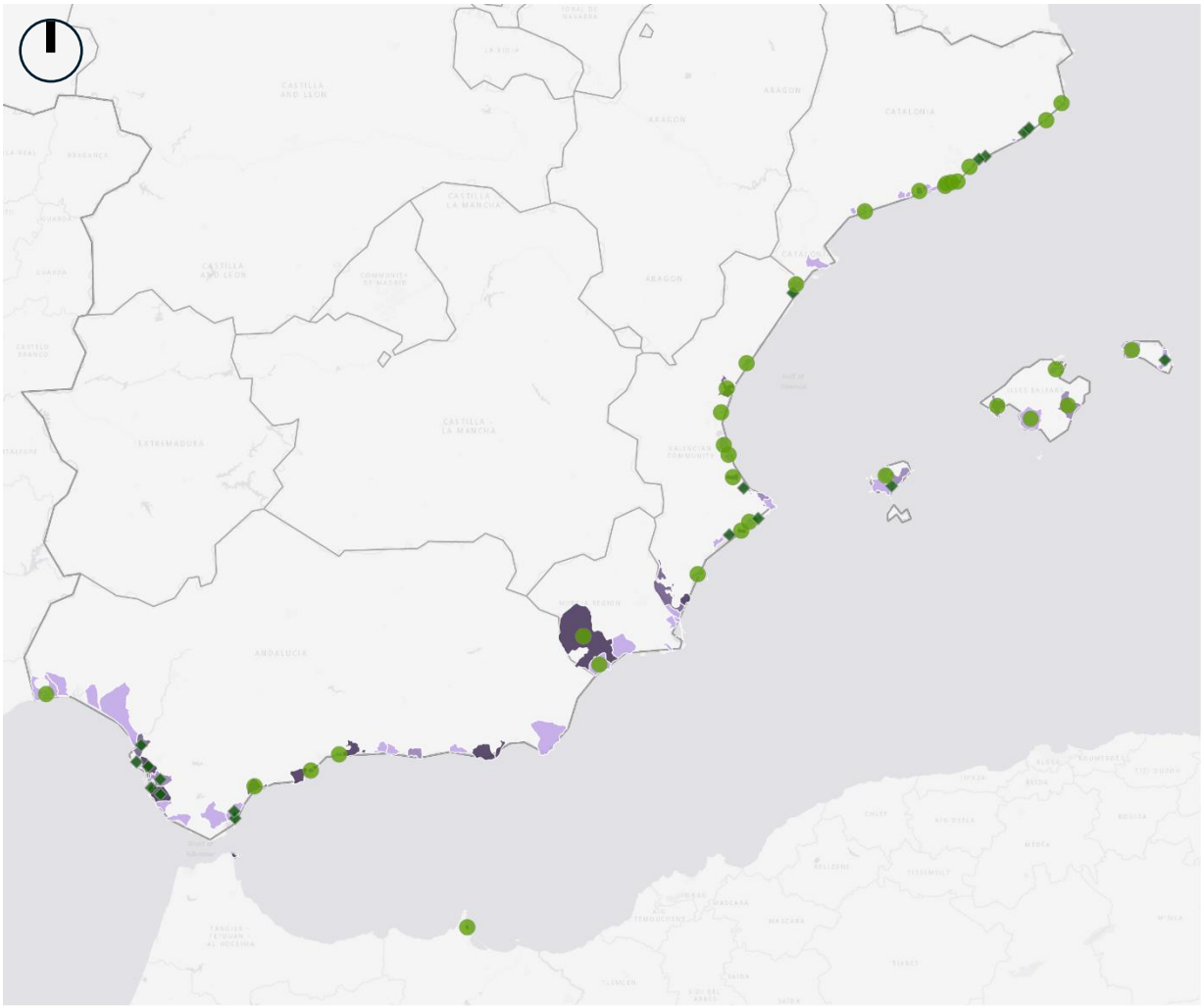
In the case of Spain, only 34.8% (32 out of 92)[7] of cities have some planning instrument against climate change: 25% have a climate action plan and 9.8% have an adaptation plan against climate change. Likewise, there is one intercommunal plan, which represents 2.2% (02 of 34) of the cities,

7 It should also be mentioned that for 18 of the 92 (19.6%) cities, some reference to the existence or possible existence of climate change plans has been found -news in online newspapers about the approval, publications on the municipality's website referring to the plan, among others- but the plan has not been found available online, so they have not been considered within the group of cities that have a planning instrument against climate change as it was not possible to access to the document to analyzed the content.

this plan has been considered as local scale since within their composition there is local specificity for each territory and strategies adapted to each specific context. It is important to mention that most plans have been approved after 2019, so they are relatively recent. Besides, 21 of the 32 plans have been made in association with the Covenant of Majors or within the framework after it adheres to the association, so it is possible to see the great influence of this initiative in planning against climate change in the Spanish context. Although only 10 of these cities expressly mention that they have followed the methodology of the Action Plan for Climate and Sustainable Energy (PACES or PAESC) of CoM, it can be inferred that all 21 follow this methodology since the structure is the same, CoM is mentioned in the text and the plans have been elaborated within the adherence of these cities to the initiative. Moreover, 29 of the 32 cities that have a plan, have also a specific section for adaptation actions, the other three mention actions that they will do but do not specify whether they are adaptation or mitigation ones. While 23 of the 32 cities have a specific section for mitigation. It is important to see at this point, how adaptation is mainstreaming in this country, Finally, it should be noted that only two cities that have a plan do not have a specific section with a monitoring strategy nor do they mention the word within the document.

In Spain, the territorial units with the profile included in this study are much more heterogeneous in size than in the Portuguese case. This is clear when comparing very large units -in terms of area- such as Lorca with 96,238 inhabitants; with very small ones -in terms of area such as Castelldefels which, despite having 67,226 inhabitants -about two-thirds of the population of Lorca- occupies less than 1% of Lorca's land area. This can mean a disparity and a bigger challenge in developing and monitoring plans. In other matters, it can be observed that the few existing plans in this country are dispersed along the coastal edge, especially from the center to the eastern side of the country. Furthermore, we must highlight the existence of some plans on the Spanish islands as well as in one of the territories that the country has on the African continent. It is not possible to affirm that there is a territorial trend in the development of planes against climate change in the Spanish case. However, it is important to highlight that although there is no national obligation, plans to fight climate change are being developed at a local level.

Figure 16: Municipios with a climate action plan in Spain



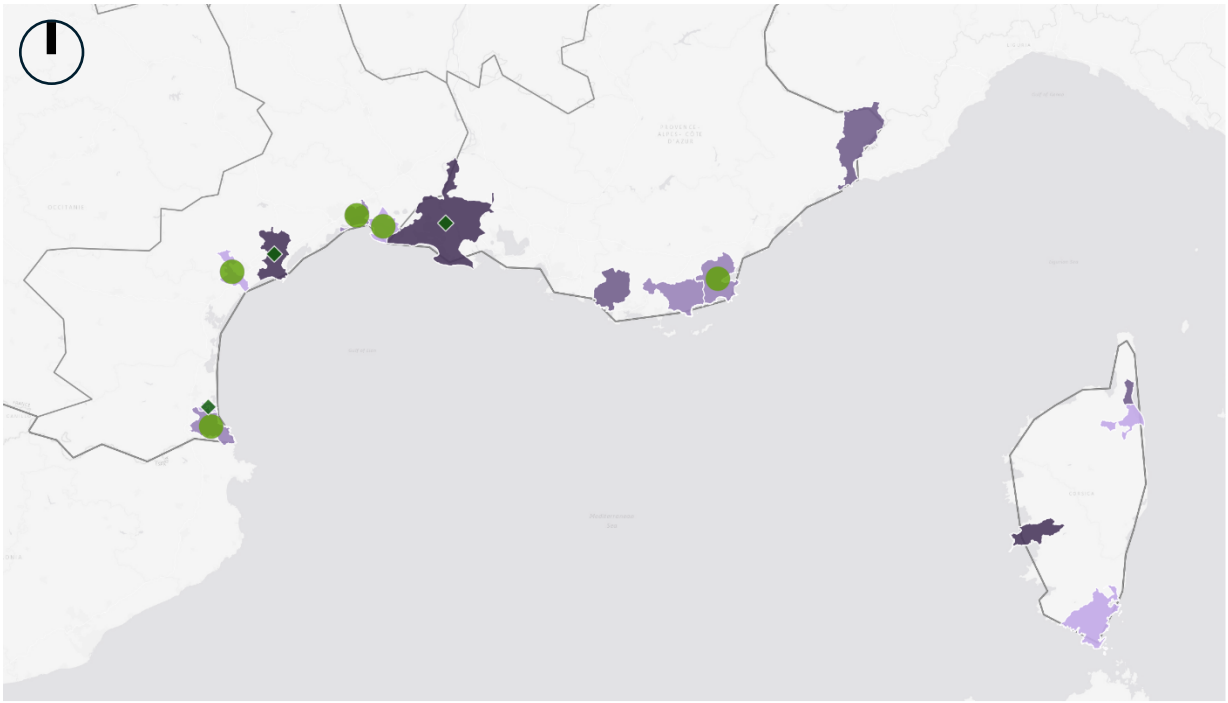
Source: own elaboration

3.3. France

In France there are 15 *établissement public de coopération intercommunale* (EPCI) within the profile of the territorial units under study. Five (33.3%) of them have a Territorial Climate Air Energy Plan (PCAET- *Plan Climat Air Énergie Territorial*) available online. In addition to those, to December 2023, another three (20%) EPCI are reported in the *Carte de l'avancement des PCAET* (PCAET progress map, which is a national platform online to report progress in planning against climate change) in the category that has a PCAET but the document has not been found available online for consultation in that website either on the EPCI's website. To date, the remaining seven EPCIs (46.7%) do not have a PCAET, however, information has been found that refers to the beginning of the works to prepare one or the progress in the elaboration of it in 06 out of 07 EPCIs following the national requirement to develop one. At this point, it is important to mention that almost all of the EPCIs analyzed in France already have a plan or are in the process of being developed, which is a great indication of the local government's effort to fight against climate change and the national policy in this topic. Besides, although it is true that according to the *Article L229-26 - Code de l'environnement*, EPCIs with more than 20,000 inhabitants should have a PCAET no later than December 31st, 2018 for, the five EPCIs of which it has been found available online have been approved from 2019 onwards. The plans follow the structure indicated in *Article L229-26 - Code de l'environnement*, where an update is also proposed every six years. In the French case, the plans have several documents and propose climate change actions without specifying whether they are mitigation or adaptation. And finally, they consider M&E as an integral part of the plan.

In the French case, as in Portugal, there is a greater similarity in the territorial dimensions between the administrative units, except for CC Sud-Roussillon - which is the smallest - and CA d'Arles-Crau-Camargue-Montagnette - which is the biggest-. However, in these cases, there is also a proportion in terms of population concerning the area, with the first one having 24,156 inhabitants, while the second one has 83,698. In this country, the existing plans are observed dispersed along the coast since the other administrative units among the units under study exceed 100,000 inhabitants. On the other hand, it is worth highlighting that the four *EPCI* under study located on the island of Corsica are in the elaboration phase of their climate action plans following the national requirement to develop one.

Figure 17: EPCI with a climate action plan in France



Source: own elaboration

3.4. Italy

In Italy, there is no national obligation to elaborate adaptation plans against climate change. In this country, only 16.9% (21 out of 124)[8] of *comune* have a planning document against climate

8 It should also be mentioned that for 08 of the 124 (6.5%) cities, some reference to the approval has been found or possible existence of climate change plans has been found -news in online newspapers, publications on the municipality's website referring to the plan, among others- but the plan has not been found available online, so they

change. Almost all of them are a Sustainable Energy and Climate Action Plan (SECAP), while only one is a Mitigation and Adaptation Strategy against Climate Change. Additionally, of the 21 *comune*, four of them are involved in intercommunal plans. These intercommunal plans have been considered for their specificity at the local level. It should be noted that most of the plans found have been approved from 2019 onwards, so they are relatively recent and current plans.

Regarding the strategies in Italian plans, it is important to highlight that the majority (17 of 21) propose both mitigation and adaptation actions; and that 17 out of 21 plans have a specific section for monitoring or mention it within the text. Concerning the associations of the *comune* for their plans, on the one hand, it is clear the important role that adhesion to the CoM has, since in the majority of cases plans have been prepared within the framework and the commitments acquired when joining this initiative. On the other hand, in the case of local intercommunal plans, the role of the Interreg Italy-Croatia project developing Joint-SECAP is crucial.

In Italy, there is greater homogeneity in terms of the extension of the units under study. However, as they are very small administrative units, they seem to be fragmented and are dispersed throughout the territory. The highest concentration of *comune* with climate change adaptation plans are in the regions of Marche and Sicily. In Italy, the obligation to prepare climate change plans depends on the regional level but not the national level. Marche has a Regional Plan for Adaptation to Climate Change; however, within the plan no binding reference has been found to the development of plans against climate change at local level. In the case of Sicily, it has a document of guidelines against climate change in the agriculture sector and a Regional Strategy for Sustainable Development; nevertheless, in none of them has been found any reference to the mandatory development of climate change plans at a local scale. Therefore, it can be concluded that the cities that have developed their plans in both regions have been done on their own initiative. Nonetheless, it is evident the huge work that this country still has to do on a local scale in terms of climate change. In addition, at the national level, it is the last of the four countries to have adopted a National Adaptation Plan Against Climate Change, which was approved in 2023.

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have not been considered within the group of cities that have a planning instrument against climate change as it was not possible to access to the document to analyzed the content

Figure 18: Comuni with a climate action plan in Italy

Source: own elaboration

3.5. Learning from countries approaches

In this section, it has been seen that when we talk about planning at the local scale of cities or territorial units between 20,000 and 100,000 inhabitants, there is still little work that has been done so far, only 31.7%[9] of cities have a climate action plan[10]. Furthermore, it is clear that in countries with a national regulation that binds local units to have plans against climate change, the existence of plans is greater (Portugal and France) compared to those that do not have it (Spain and Italy). Local actions significantly influence global climate outcomes. Therefore, it is crucial to address mitigation and adaptation actions at various scales, with a particular emphasis on local involvement. Adaptation occurs at multiple scales, from international and national policies to actions by individuals in local communities. Yet as the impacts of climate change are experienced locally, adaptation itself tends to occur at a local level, even if the intervention you are evaluating operates at an international or national scale. (Pringle, 2011)

However, one of the most crucial issues at the local scale is to avoid the fragmentation of administrative units. Finding the right balance between the size of territorial units with units of local administration is essential. Sometimes territorial fragmentation on small administrative units difficult governance and decision-making. For example, in the cases studied, in Spain and Italy where the smallest decision-making unit is *ayuntamiento* and *comune*, respectively, it is possible to see that this fragmentation can result in numerous small units that making plans and actions against climate change becomes something unviable and also expensive, fragmented and repetitive. Furthermore, it must be considered that these units often vary significantly in both population and area of territory under their jurisdiction, making difficult the comparability in their administration and solutions, and the allocations of resources. This diversity can lead to disparities in the capacity to manage and execute climate action effectively. Likewise, Spain and Italy are the countries with the lowest rate of plans against climate change in the coastal cities of the Western Mediterranean compared to the other countries studied. This could be a result of the

9 With an approved plan and available online

10 Additionally, if we consider for the final calculation those cities for which the plan was not found available online but some reference to the existence or approval of the plan was found, the scenario improves but still, less than half the number of cities under study (49.8%) have a planning instrument against climate change. So, there is still a lot to do in this field.

administrative fragmentation in very small units, in addition to the non-obligation of the development of plans at this scale, as already mentioned before.

In contrast, in countries like France, where there are many small local units, but being organized into groups of communities (*communauté de communes)* makes the administrative and decision-making units at the local level fewer. This organizational aspect is advantageous for administrative efficiency and the formulation of climate change adaptation plans. The same, in the Portuguese case, the grouping makes the organization more manageable, and the answer is that there is a higher percentage of local units with plans against climate change. Naturally, in both cases it must be considered that there is a national regulation that binds these local units to the development of their plans. Likewise, it must be considered that in these two countries, the grouping of smaller units for administrative issues, in the case of adaptation plans against climate change, still reflects local specificity and particular characteristics of the territory it covers. Finally, it is important to highlight the efforts that these last two countries -Portugal and France- make on climate change issues. In addition to what was previously mentioned, both have platforms or reports that inform which local units have climate action plans and those are updated periodically.

It must be recognized that despite the low rates of existence of climate action plans in Spain and Italy, most of their plans are result of the own initiative taken by local administration after their voluntary adhesion to the Covenant of Majors. Therefore, the issue of adaptation to climate change in these countries is carried out from a bottom-up approach in contrast to Portugal and France where there is a national obligation which means that the issue is treated from a top-down approach, thus the central government sets the requirements and guidelines that local governments must follow. However, bottom-up approach might be challenging, particularly in terms of ensuring alignment with national or regional objectives; nonetheless, it is important to recognize the valuable effort that Spanish *ayuntamientos* and Italian *comuni* are making and the responsibility towards their localities.

In this section the objective has been to know how many coastal cities have a climate action plan to subsequently evaluate the situational status of climate adaptation monitoring at local scale. However, due to the relatively low number of cities that had a Climate Action Plan, those with an Adaptation Plan against Climate Change or an Adaptation Strategy against Climate Change were

also considered in the analysis[11], since both documents also include actions or proposals of adaptation. Of the total number of cities (84) with planning instruments in terms of adaptation to climate change, it has been found that 66.7% have a Climate Action Plan -which it includes both adaptation and mitigation actions-, 23.8% have an Adaptation Plan against Climate Change and 9.5% have an Adaptation Strategy against Climate Change.

Regarding the methodologies of climate adaptation plans, it has been possible to see a diversity of options, with the Covenant of Majors framework standing out, especially in Spain and Italy where the majority of cities follow this methodology and have worked on their plans after their membership in this initiative. In the case of Portugal, there is a national guideline for climate adaptation plans at a local scale -*Orientações para os Planos Municipais de Ação Climática, APA, 2024*-, which is often complemented by the one of UKCIP – ADAM and EEA Grants. While in the French case no methodology has been found outside of what it is established by its national regulation, and it is worth mentioning that the plans of this country have a different structure from that of the other countries since they are made up of a series of documents that are elaborated in different stages. Additionally, it is notable that in many of these cases, where the cities are part of the Covenant of Majors, the Sustainable Energy and Climate Action Plan (SECAP, PAESC or PACES, depending on the language) are based on the Sustainable Energy Action Plan (SEAP or PAES, depending on the language) -especially in Italy- which was the first document that the Covenant of Majors requested years ago after adhesion, most of these plans were done before 2015. Although it is true, that SEAP are not part of this study and have not been counted in the calculations, it must be recognized that while the search for climate action plans of the cities analyzed in this study has been carried out, it has been observed that a large number of those cities have SEAP as a product of their membership in Covenant of Majors, many more than those that have SECAP. But also, it has been seen, that many of those SEAP have not evolved into a SECAP. Finally, in terms of methodology, although none of the plans have indeed made mention of the use of a specific methodology for coastal areas, it is expected that in the future cities will

11 The three types of plans have been considered in this study in the following hierarchical order: Climate Action Plan, Adaptation Plan against Climate Change and Adaptation Strategy against Climate Change. If one of the cities had more than one of the documents, the one with the highest hierarchy was considered (more importance from left to right).

be able to use specific methodologies for these areas such as the Climate Readiness Framework for Coastal Cities (2024).

Regarding financing for the elaboration of climate adaptation plans, it has been recognized that the funds come from own resources or from external financing such as the European Union or other European entities such as EEA Grants, which has financed and worked on a significant number of plans in Portugal; or Interreg Italy-Croatia with its Joint SECAP project that has financed several plans in coastal regions of Italy.

Regarding the types of actions that the plans propose, 85.7% include adaptation actions, while 52.4% also include mitigation actions. The remaining plans only mention the list of actions to be executed but do not specify whether they are mitigation or adaptation. However, given that this study seeks to analyze monitoring in terms of adaptation issues and the plans consulted have been action plans, adaptation plans, or adaptation strategies against climate change; it has been assumed that even if they do not specify the type of actions, it includes adaptation actions. And it has been interesting to see that in many cases, projects have already been specified within the plans, with assigned schedules and budgets. As well as specific objectives to achieve with the proposed actions.

Furthermore, regarding the inclusion of monitoring in local climate adaptation plans. It is necessary to highlight that 91.7% (77 out of 84) of cities that have plans have a section that indicates how to carry out the monitoring process when the plan begins to be executed or makes some reference to monitoring within the plans. Additionally, 85.7% (72 out of 84) of cities already have clearly defined the indicators with which adaptation actions will be monitored. This is a sign of the growing importance of this phase in adaptation to climate change on a local scale. Monitoring methodology depends on the framework that has been followed to prepare the plan. Nonetheless, in most cases, monitoring is expressed as a tracking process and is based on a periodical evaluation every a certain number of years -generally every 2 years a general report must be elaborated and every 4th a more detailed report- and the use of indicators compared to a previously defined baseline. It should be mentioned that some plans regarding monitoring aspects are more detailed than others and have important specificities for the future such as the person and/or the office responsible for it, or specific monitoring schedules per action or types of action.

This section of the analysis has examined the existence of local climate action plans or instruments addressing climate change, including adaptation actions and monitoring sections. Likewise, a general analysis of the monitoring sections has been made to give an overview of

how they are being proposed. It has been possible to recognize that many of the plans include monitoring, and while it is true that involve monitoring within the plans is important -and lately very common-, the challenge is to execute it to have a real evaluation of the effectiveness of the plan and learn from what is being done. In the next section, some cases will be analyzed in more detail, specifically concerning monitoring and adding the concept of evaluation. However, what has been recognized while searching for information on the existence of plans is that very few cities have monitoring reports and those that do have are above all those that are Covenant of Majors signatories and it is a monitoring report of SEAP. Rivas et al. (2022) conducted a research about monitoring climate action plans of Covenant of Majors (CoM) signatories 2020. According to their study, by the closing date of the first phase of the initiative (December 31, 2020), a total of 6,620 municipalities had delivered a SEAP. However, only 32.5% of those signatories presented at least one Monitoring Emission Inventory (MEI) until that year, and it has been the largest cities and those that adhered to the Covenant of Majors earlier the ones who have done monitoring report. Although it is true that the research does not delve into the achievements in terms of climate change, it is possible to highlight the low monitoring rate of what is proposed, even though upon joining the CoM the municipalities sign some commitments and CoM's framework indicates monitoring reports every 2 (follow-up) and 4 years (in-depth). That is why it is considered that the challenge is in executing the follow-up of the plans through monitoring, rather than including the monitoring scheme within the plans.

4 Monitoring and evaluation of climate adaptation plans, best practices in coastal cities

In this second section, some cities of each country will be analyzed more in-depth, to answer questions 4 and 5 (see Figure 2). The choice has been made due to the particularity of their proposals -observed while the analysis of the first section was carried out-, due to the availability of information and response from th.

Since this section no longer evaluates the integration of monitoring and evaluation within the plan, but also its execution and assessment of the plan, it is required that the plans be valid for some time now after the approval and at least have one monitoring report per city. That is why only plans until 2021 have been considered. However, it is worth noting that cases of more recent plans with interesting and innovative proposals were observed within the first section of this study. Nevertheless, they cannot be analyzed in this section, since they are very new.

For this section, two cities per country were selected and a semi-structured interview was conducted (see Annex 01 – Interview guide). The following table shows the cities interviewed by each country:

Table 3: cities per country that were analyzed more in-depth

PORTUGAL	CM Loulé
FRANCE	CA du Pays de l'Or
	CC la Domitienne
ITALY	Comune di Jesolo
	Comune di Cervia

Source: own elaboration

The cities of Spain, France, and Italy were contacted through their contact mailboxes or emails on the official website and/or by telephone. While in the Portuguese[12] case, a direct email was sent to the person in charge of the plan. It is worth highlighting at this point, the rapid response and availability of the French, Italian, and Portuguese[13] municipalities and thank all the municipal officers who have given their time for this interview. This is already a positive sign of the importance of the M&E of climate adaptation actions from local governance perspective and the openness with the public of the municipal proposals.

The interview covered aspects such as the current monitoring practices, methodologies, and tools they use for M&E, key actions and best practices, challenges encountered, and solutions implemented in the process of M&E. Interviews were conducted during July 2024 and were done in original language for Italy and Portugal, while in English for France. All the interviews were

12 This research has been made as part of an internship in CEDRU, Portugal during May and June 2024. They have worked before with many Portuguese municipalities, and they provided me with their contacts.

13 In Spain, the request was sent by mail to four municipalities and an attempt was made to contact them by telephone but there was no response. So, municipalities from this country were not considered for this study.

done online -except for the CM Loulé and CC la Domitienne, who prefer to send the answers in written form- and had a duration of around 45 minutes.

Various municipal officials in charge of the plan or in particular of the monitoring and evaluation process of the plan were interviewed (see Table 4).

Table 4: Position of municipal officials interviewed by city

COUNTRY	CITY	MUNICIPAL OFFICER
PT	CM Loulé	Head of the Climate Action and Circular Economy Division
FR	CA du Pays de l'Or	Ecological transformation and resilience project manager
	CC la Domitienne	Energy transition mission manager
IT	Comune di Jesolo	Technical Officer of the Environmental Policies, Maritime State Property - Civil Protection Division
	Comune di Cervia	Engineer of the Urban Planning and Urban Sustainability Service

Source: own elaboration

Below there will be a brief review of the situation of each city based on their plans, the notable aspects of the interview, and other materials found online. Subsequently, a comparative analysis of all cities will be carried out and best practices will be summarized.

4.1. Conselho Municipal Loulé, Portugal:

The conselho municipal of Loulé is located in the south of Portugal. It is composed by 9 freguesias: Ameixial, Salir, Alte, União de Freguesias de Querença, Tôr e Benafim, Boliqueime, Sao Sebastião, São Clemente, Quarteira, Almancil. Loulé has 72,332 inhabitants (INE, 2021). The municipality is characterized by the richness and diversity of its landscape (Câmara Municipal de Loulé, 2021). Loulé's area is subdivided into three sub-regions: biologically and geomorphologically distinct: Litoral -coast-, Barrocal -between the mountains and the sea- and Serra -mountains- (Câmara Municipal de Loulé, 2021). Based on the Plano Municipal de Ação Climática (2021), Loulé's main economic activities are based on tourism and related activities such as real estate and banking, which is mainly developed in the littoral area. According with the same document, the most frequent hazards are high temperatures/heat waves, drought, intense precipitation and strong wind. Regarding the climate, in the Köppen-Geiger classification, Loulé's climate is a Csa, which is the mediterranean climate characterized by its very rainy winters and very hot and dry summer (Câmara Municipal de Loulé, 2021).

The Plano Municipal de Ação Climática (PMAC) -Municipal Climate Action Plan- was approved in December 2021. The conselho municipal has vast experience in the fight against climate change, prior to the PMAC, it had an Estratégia Municipal de Adaptação às Alterações Climáticas (EMAAC) -Municipal Strategy for Adaptation to Climate Alterations- approved in 2016. According to what was stated by the municipal officer, the PMAC of Loulé emerged as a result of the intense collaborative work developed since 2015 within the scope of the Loulé EMAAC Local Monitoring Council and the work resulting from the Energy and Climate Sustainability Action Plan (PASEC) and seeks to accelerate local climate action towards a more systemic and prepared response to climate change.

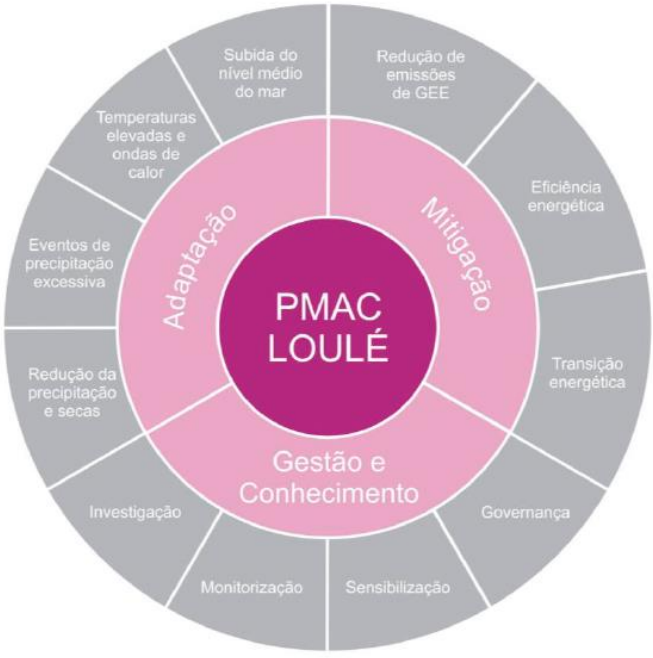
The strategic vision of the conselho municipal with the PMAC is to transform Loulé into a territory more resilient to Climate Change, committed to decarbonization and energy transition, following a path of climate action that promotes sustainability and social justice, built with the local community (Câmara Municipal de Loulé, 2021). To achieve this, the Câmara Municipal de Loulé (2021) has established six strategic objectives:

- Reduce vulnerability to climate risks, increasing the resilience of communities, activities, and territory.
- Promote the reduction of greenhouse gas emissions, progressive decarbonization and sustainable local economy, contributing to green growth.

- Promote an economy based on the efficient and sustainable use of resources, based on the principle of circularity.
- Promote the integration of climate action into local policies, increasing the municipal capacity.
- Motivate the local community to participate in the definition and implementation of individual actions and collective responses to the challenges of climate change, in line with a governance model that enhances local, regional, and national synergies.
- Stimulate and promote research, innovation, monitoring, and production of knowledge about vulnerabilities, impacts of climate change, and respective response measures.

These objectives are operationalized into three strategic axes: adaptation (adaptação), mitigation (mitigação), and management and knowledge (gestão e conhecimento) (see Figure 19). These are materialized in 33 measures, which in turn are operationalized through 72 priority actions, which will be developed in the next decade. Of the 72 priority actions, 40 are aligned with the strategic axis of adaptation. According to the municipal officer, these are based on a coherent management and monitoring model and clearly explain the ways of integrating adaptation into municipal territorial management instruments.

Figure 19: Summary of the operational approach of the Loulé Municipal Climate Action Plan



Source: PMAC - Câmara Municipal de Loulé, 2021

The PMAC management and monitoring model is based on the following three cornerstones: the leadership *(liderança)* of local climate action policy by the Loulé City Council, operationalization *(operacionalização)* by municipal services, and the monitoring *(acompanhamento)*, by the Local Climate Action Monitoring Council of the Municipality of Loulé (Câmara Municipal de Loulé, 2021). This last one was created in 2017, as the *Conselho Local de Acompanhamento (CLA) da Ação Climática do Município de Loulé*, its mission is to follow, promote, and monitor climate action at the local level. It is led by the municipality of Loulé, and currently involves around 85 entities, it is a flexible and inclusive structure, of a consultative nature and on a voluntary basis, which brings together a set of key actors and institutions that represent civil society, committed to the implementation process of climate action at the local level (Municipal officer, 2024). In fact, Loulé was the first Portuguese municipality to establish a body of this nature which, since then, has operated regularly, has integrated new participants and has given very significant contributions to improving the operationalization of EMAAC and, above all, contributed decisively for the design of the PMAC strategy and action plan (Câmara Municipal de Loulé, 2021). The CLA is organized in thematic working groups (GT): GT1 – Extreme Events: Coordination and Promotion of Responses; GT2 - Water: Strategic Resource; GT3 - Energy: Efficiency and Decentralized Production and GT4 - Desertification: Combat Strategies (Municipal officer, 2024). As well as the *Divisão de Ação Climática e Economia Circular* (DACET) -Climate Action and Circular Economy Division- was created to follow up the EMAAC implementation and monitorization. The DACET and CLA are still part of the municipal organization and complement the work of the PMAC. It is important to highlight the municipality's adaptative capacity with the creation of these municipal bodies which are specifically working on climate change issues.

Figure 20: Summary of the operational approach of the Loulé Municipal Climate Action Plan

Source: PMAC - Câmara Municipal de Loulé, 2021

Regarding monitoring and evaluation, this is a process of great importance for Loulé's PMAC. It is structured as a systematic review of the proposed actions and it is based on the evaluation of indicators. According to the PMAC (2021), the monitoring indicators were according to three essential criteria: its assessment capability, its relevance, and its feasibility. The monitoring of this plan includes three axes: climate monitoring, based on climate parameters and executed annually; monitoring of climate impacts, which seeks to update the profile of climate impacts; and monitoring the performance of the PMAC and each of its priority actions.

The stakeholders involved in the M&E process are the organic structure of the Municipality, and the Climate Action and Circular Economy Division (DACET), no citizens or external actors are involved in the assessment. The DACET is responsible for the M&E and it is a multidisciplinary team of six professionals. There is no specific budget for monitoring climate action, but it is part of each division's tasks. Data collection is done by the *Câmara Municipal de Loulé*, based on data from its own sources, that is from the different municipal divisions, and national statistical organizations.

According to the municipal officer who has been contacted, the municipality has specific monitoring instruments such as:

- OMAT de Loulé - Municipal Observatory of Environment and Territory of Loulé (*Observatório Municipal de Ambiente e Território de Loulé*) which is a digital platform.
- the ODSLocal Loulé Platform, which aims to monitor the municipality's evolution in relation to the various SDG targets.
- the CDP - Carbon Disclosure Project, a non-profit charity that manages the global disclosure system that allows investors, companies, cities, states, and regions to manage their environmental impacts.

Even though, these organisms are not exclusively linked to adaptation actions. It is important to highlight the effort that the municipality makes to share its information and have a partnership with international organizations to have greater credibility. Likewise, the creation or adhesion to these organizations can be considered a key and innovative action for the execution of monitoring, since it makes the municipality commit to carry it out and report.

The monitoring reports are not shared publicly. However, results are sent to national entities and the CDP who follow up the climate actions. Likewise, the results are shared with citizens through the OMAT de Loulé, newsletters or the municipality's website.

The *Câmara Municipal de Loulé* has been carrying out various adaptation projects in relation to the actions proposed in the PMAC. According to the municipal officer who was contacted, among the most notable are environmental impact studies, to be prepared for possible risks. For example, the “Study of the Rise of the Average Level of the Sea and Coastal Erosion” and the “Strategic Water Line Recovery Program”. On the other hand, adaptation actions for the effect of heat islands in the urban environment, such as the planting of trees, until 2024, 197 trees and shrubs have been planted, to increase the microclimatic, visual, and acoustic comfort of the intervened spaces (Câmara Municipal de Loulé, 2024). Likewise, an important action that has been carried out is the “Water Crisis” communication campaign, an awareness campaign that aims to convey to the community the reality of the drought and the need to preserve this valuable water resource.

The municipality recognizes that among the challenges when doing M&E is its own structure, since it has several divisions, the process is not always fast and effective. However, the fact that the Climate Action and Circular Economy Division exists, a specific division for climate change issues, makes the process be carried out. However, despite the challenges, the municipality recognizes the importance of M&E and continues to do it. The monitoring and evaluation of the Municipal Climate Action Plan allows a real perception of the climate action situation in the municipality, contributing to a clear strategy and intervention paths for its adaptation and mitigation policies (Municipal Officer, 2024). In this sense, the municipality considers that there should be a national structure where specific progress in terms of actions against climate change can be reported. From its side, the municipality, in 2016, joined Adapt.Local - Network of Municipalities for Local Adaptation to Climate Change, an association whose mission is to promote a continuous process of adaptive planning that increases the capacity of municipalities to incorporate adaptation to climate change. climate change in their policies and instruments of action (Municipal Officer, 2024).

For this municipality, the integration of the PMAC with other sectoral plans or policies is key. The PMAC is integrated with local, regional, and national urban planning and territorial plans. The territorial and urban planning approach makes it possible to highlight the specific conditions of each territory and take them into consideration when analyzing the effects of climate change (Câmara Municipal de Loulé, 2021). According to PMAC (2021), there are four ways to promote local adaptation to climate change through spatial planning and urbanism: strategic, producing and comparing territorial development scenarios; regulatory, by establishing instruments of a legal and regulatory nature relating to the use, occupation and transformation of land and buildings; operational, by determining provisions on priority interventions; and territorial governance, by mobilizing and stimulating awareness, training and participation of various actors of local, regional

and central administration. It should be noted that this PMAC includes a specific chapter for its integration with the other plans that concern the municipality. In addition, specific actions to be reviewed in the other plans are detailed to align all local policy towards the same objective. Finally, this plan also includes a section to describe how the actions will be financed.

4.2. Communauté d'agglomération du Pays de l'Or, France:

CA du Pays de l'Or is an agglomeration of 8 *communes*: Candillargues, La Grande Motte, Lansargues, Mudaison, Mauguio-Carnon, Palavas-les-Flots, Saint-Aunès et Valergues. Located in the Occitanie region, Pays de l'Or is a recent territory but with cultural richness and environmental importance, which forges its identity and its specificity (CA du Pays de l'Or, 2019). It has 45,099 inhabitants[14]. It presents a strong specificity from a geographical point of view since its territory is organized around three zones that contribute to compartmentalizing space: the litoral, the hinterland plain and, between them, the Etang de l'Or which constitutes both a barrier natural, but also a remarkable natural space (CA du Pays de l'Or, 2019). Regarding the climate, in the Köppen-Geiger classification, CA du Pays de l'Or's climate is a Csa, which is characterized by its moderate temperatures and changeable, rainy weather, and summers are hot (Skybrary, n.d.)

CA du Pays de l'Or's plan, *Plan Climat Air Energie Territorial* (PCAET), was approved in 2019, running from 2020 and with a validity period until 2026, corresponding to the French system which settles a validity for six years. According to the PCAET (2019), the bigger risks facing CA du Pays de l'Or are flooding due to overflowing watercourses and maritime submersion, coastal erosion, and heat waves. The PCAET's strategic objectives to fight climate change are to accelerate the energy and transition, preserve resources and promote natural and agricultural spaces in a context of climate change; and support all stakeholders towards energy and ecological transition. These strategic objectives are materialized in 39 actions and 12 operational objectives. Of these 39 actions, 9 are related to adaptation to climate change. It is remarkable too, that the PCAET seeks to integrate the challenges of adaptation to climate change in local planning policies

[14] Data back to 2020

planning and development projects. As well as other important topics for the plan such as circular economy and biodiversity protection.

In the French system, CA du Pays de l'Or is still a small agglomeration of *communes*, so to some extent it is still dependent on its region, Occitanie. CA du Pays de l'Or is a member of Occitanie Europe, a body that helps position EPCIs within the region in the European system on various issues, acting as an intermediary between the EU and the local level. Through Occitanie Europe, CA du Pays de l'Or has managed to obtain technical assistance regarding climate change from the EU. This dependency and association are beneficial but at the same time establish more challenging objectives and stronger commitments for the EPCIs within it to meet the regional objective. By 2050, Occitanie aims to become the first positive energy region in Europe. To achieve this objective, energy efficiency is at the heart of the approach: energy consumption must decrease by 40% by 2050, in all sectors combined. To achieve the objective, in Occitanie, 16 proactive territories have signed a territorial objective contract with Ademe (the ecological transition agency) to implement measures in favor of the climate, air quality, energy, and circular economy. This contract makes it possible to finance actions carried out over 4 years, subject to progress by the agglomeration within a national benchmark (CA du Pays de l'Or, n.d.)

The PCAET structure, it follows the one which is indicated in *Article L229-26 - Code de l'environnement,* the national regulation. It should be noted that various administrative areas of the agglomeration are involved in this plan. As for the proposed actions, there are 39, as previously stated. As well as, it is notable that each of the actions indicates the area and person in charge, as well as possible partners, the implementation calendar, and the annual budget assigned for each action. This is considered a very important detail since it makes the actions concrete and subsequently, the M&E can be carried out based on the proposed objectives, times, and budgets.

Regarding monitoring and evaluation, according to the PCAET (2019), it is essential in order to assess the progress and be able to carry out adjustments as it is implemented. The M&E system is composed of the strategy, the action program, and the approach. To carry out this, a governance system has been created that can support the new requirements.

The M&E proposal consists of an annual evaluation, where the various areas of the municipality and other actors involved in the plan present their progress based on a previously proposed set of indicators, and from this, a qualitative reflection is made on what worked or not. Every three years, a more in-depth evaluation is carried out based on the strategic indicators and then a seminar is held on to share the results with citizens. This evaluation every 3 years allows the

proposals to be redirected if necessary. It should be noted that to date the agglomeration has been very consistent with its M&E reports, preparing the sustainable development report annually, where they specify what has been done and how much has been invested. Likewise, the PCAET mid-term balance document has been prepared in 2023, with more with more specificity of the percentages achieved by objectives and details of the actions.

The M&E is done in-house for the circular economy proposals, while for the climate, air, and energy actions, a small company works on that, because the municipality does not have the team and enough capacity to process data; however, the municipality provides the data. And there is a budget allocated for the purpose.

While doing the first yearly reports, the municipality realized that their plan had too many indicators and that it was unfeasible to manage and measure all of them. Therefore, for the mid-term report, a group of main indicators has been selected, which are those reported in the document.

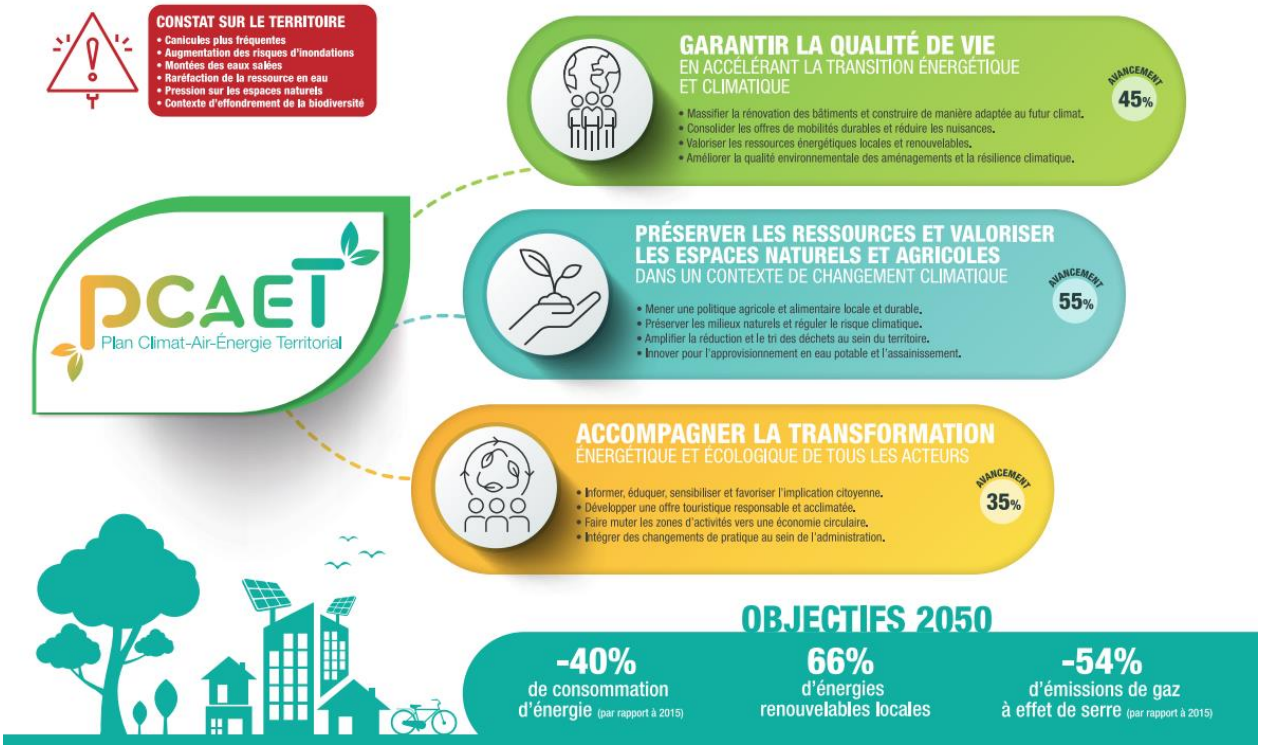
In the M&E process, the stakeholders involved are the municipality, ADEME, and the company, no citizens are participating in it. However, the results are shared with the citizens in a meeting, with the interested ones. Additionally, a very dynamic and easy-to-understand report is available on the CA du Pays de l'Or website.

The CA du Pays de l'Or plan includes both mitigation and adaptation actions. Mitigation actions have been the first to be implemented, such as reducing non-renewable energy consumption in public buildings. As for the adaptation actions, they are being executed, but since they take more time to execute and see the results, their monitoring is still not clear. One of the most important adaptation actions that is being carried out is the coastline project. This project involves other surrounding communities and what it seeks is to monitor the sediment and the evolution of the coastline. Based on that, predictions are made towards 2050 in order to be able to prevent damage. Among other adaptation actions that the agglomeration has been carrying out are the planting of trees to minimize the effects of heat waves. However, both initiatives have been launched recently so they have not been able to be monitored and according to the information provided by the agglomeration, the process will probably begin this summer when temperatures intensify.

Thanks to the constant M&E that the agglomeration has been doing since the beginning of its plan, it has been possible to see the first results in the mid-term review report for 2023. From this report, it can be seen that the agglomeration is at a general average of 45% progress in their

proposed actions (see Figure 21). This report has details for each of the proposed actions in a dynamic and easy-to-understand manner, including the percentage of progress per action and the budget used to date for execution. As well as the details of the actions already completed, those that are in progress, and those that still need to be executed. It also includes who are the partners involved in each action are and some other interesting information about it.

Figure 21: CA du Pays de l'Or achievements to the 2023 mid-term review report



Source: PCAET: Bilan à mi-parcours. - CA du Pays de l'Or, 2023

The agglomeration points out that when it comes to M&E, among the most significant challenges to executing it are time and money. And before this, during the execution of projects, such as the one of the coastline, there is its acceptance by all those involved, as well as recognizing that it is a possible hazard for the community. Another challenge, but more operational, is the number of indicators to monitor, since there are so many it becomes unfeasible to obtain data for all of them. According to agglomeration, it is better to have few indicators that reflect status and achievements than many that cannot be tracked.

It is also important to mention that the PCAET is linked to other sectoral plans of the agglomeration, such as the housing plan, as well as the territorial plan SCOT (*Schéma de cohérence territoriale*). At the regional level, it is aligned with the SRADDET (*Schéma régional d'aménagement, de développement durable et d'égalité des territoires*).

4.3. Communauté de communes la Domitienne, France:

CC la Domitienne is an agglomeration created in 1993. It is composed of 8 *communes*: Maureilhan, Cazouls-lès-Béziers, Colombiers, Lespignan, Maraussan, Montady, Nissan-lez-Enserune, Vendres. It is located in the Occitanie region, and it has 28,852 inhabitants[15]. The landscape is mainly agricultural, with 80% viticulture, and includes numerous spaces and remarkable sites (CC La Domitienne, 2019). According to the PCAET (2019), the risks that CC la Domitienne faces are above all floods, and to a lesser extent forest fires and maritime submersion. Regarding the climate, in the Köppen-Geiger classification, CC la Domitienne's climate is a Csa, which is characterized by its moderate temperatures and changeable, rainy weather, and summers are hot (Skybrary, n.d.).

CC la Domitienne's plan, *Plan Climat Air Energie Territorial* (PCAET), was approved in 2019, running from 2020 and with a validity period until 2026, corresponding to the French system which settles a validity for six years. The PCAET's objectives are to reduce GHG emissions by -40% by 2030 and reduce energy consumption by 20% by 2030, both aligning with the national objectives. Likewise, as in the previous case of CA du Pays de l'Or, CC la Domitienne is part of the Occitanie region and is therefore linked to following the regional objectives. To follow this, the agglomeration aspires to the level of Positive Energy Territory by 2045. To achieve this, the PCAET (2019) is structured around five axes:

- Make the agglomeration an area with space-saving development and limiting travel, controlling urban expansion, defining urban centers, and efficient public transportation.

[15] Data back to 2020

- Be a territory adapted to changes and new climatic constraints, anticipate risks, study how to manage them, and preserve biodiversity and water resources.
- Be a territory with positive energy, reducing energy consumption from non-renewable sources and increasing energy production from renewable sources.
- Be a territory of low-carbon consumption and production, reduce waste production, develop short food circuits, and promote sustainable economic development
- Make the PCAET a structuring policy for the development of the territory in the agglomeration, place energy and climate issues at the center of decisions and operation of CC la Domitienne.

The PCAET structure follows the one which is indicated in *Article L229-26 - Code de l'environnement,* the national regulation. The plan was done in a participative process that involves cities, citizens, representatives of companies, and water and energy institutions (Municipal Officer, 2024). The vision of the territory -and the PCEAT- is structured into major goals, or Axes -as it was mentioned in the previous paragraph-, which bring together 14 strategic objectives, broken down into 34 objectives themselves which are broken down into 102 measures which can evolve over time, be enriched, be supplemented or replaced (CC La Domitienne, 2019). Each of the 34 objectives has a sheet that contains the general description and scope of the action, as well as execution specifications, budget, partners, and monitoring indicators. And 21 out of these 34 objectives include adaptation actions.

The monitoring and evaluation is aligned with national and regional guidelines. According to the PCAET (2019), the monitoring and evaluation framework is expressed through two main dimensions:

- Context elements, in order to globally monitor the situation of the environmental state of the territory and changes in certain external parameters.
- The results and impacts (positive and negative) of the actions and measures defined by the PCAET.

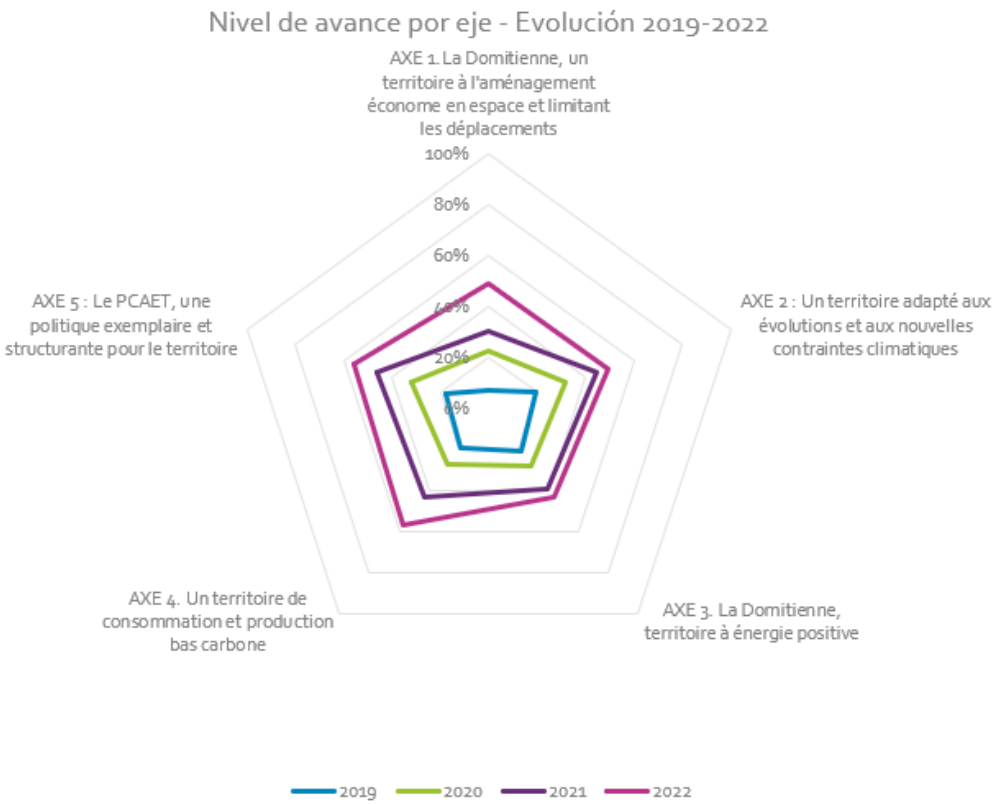
The M&E for this agglomeration is based on the periodical assessment of some predefined indicators. Some of these indicators are monitored annually, while others are every 3 years. These specifications are already stated in the PCAET. Additionally, in the 3rd year, an in-depth progress report must be prepared, in accordance with national and regional regulations, which is the mid-term report and has been done in 2023. Beyond the regulatory obligation, the mid-term

evaluation is an opportunity to update the PCAET strategy and action program by taking into account the new priorities that have emerged since its approval (CC La Domitienne, 2023).

According to the municipal officer (2024) who was contacted, there is an organization to follow and evaluate the plan that is based mainly on the two committees, technical and directive. The technical committee is made up of people from various institutions associated with the areas of water, agriculture, tourism, territorial development, among others. In the directive committee, there are representatives of the cities -that is, the mayors plus two elected by each city who are references on the issue of energy and climate-, of the state, of the energy networks, of the water management structures, among others. Both committees meet annually. Operationally, M&E is carried out by the Energy Transition manager with the support of an external company. M&E of the agglomeration is based on the table of indicators and in conjunction with those responsible for each action. Additionally to the national guidelines, the agglomeration has followed the process of continuous improvement EEA since 2018. With this, the municipality has an external advisor who comes every year to assess the progress (Municipal Officer, 2024). On the other hand, M&E does not have a budget per se but is included within the specific budgets of each action or the agglomeration's general budget. According to the agglomeration, the first climate evaluation of CC la Domitienne will be carried out this year.

The results of the M&E process are shared with the committees and citizens through various platforms in the region. And thanks to the mid-term report it has been possible to recognize the progress that has been achieved in the execution of the actions (see Figure 22). The mid-term evaluation shows that La Domitienne is committed to the implementation of its PCAET action program and that the level of progress is consistent with expectations, with 51% of implementation at the end of 2022 (CC La Domitienne, 2023). The mid-term report has allowed the agglomeration to recognize the actions that are working efficiently and those that need some type of modification or replacement. The structure of this plan and the constant M&E of its actions allow this to be possible and to achieve the objective beyond following the actions as they were initially proposed. Furthermore, thanks to this evaluation, it has also been possible to recognize which actions need to be modified in terms of governance. For example, involving new stakeholders, new funding sources or recognizing the importance of PCAET communication.

Figure 22: Progress level per axis



Source: Rapport d'évaluation à mi-parcours, CC La Domitienne (2023)

CC La Domitienne has proposed several adaptation actions in various sectors. Among the most representative adaptation actions that the agglomeration is doing are preserving water resources in quality and quantity, as well as preserving biodiversity, and natural and agricultural spaces. In other sectors, develop local food circuits and low-carbon food. Additionally, put energy and climate issues at the heart of La Domitienne's decisions and operations, and raise awareness and support elected officials and agents in terms of climate change. The municipal officer contacted mentioned that one of the most innovative and representative practices of the agglomeration is "the traineeship to a group of farmers to make a diagnosis in terms of biodiversity of their plots. Then we accompany them in installing agroecological infrastructure (hedges, ponds, etc.) to improve the biodiversity and production contained in the plot. Also, within a project on the French Mediterranean coast, we carried out a diagnosis to find out the state of the sugarcane fields and try to learn more about the measures that favor adaptation to climate change in these areas".

Likewise, the municipal officer highlighted that many times the administrative capacities of the agglomeration are limited because they overlap or correspond to other levels of government. But in general, the agglomeration guides the actions and those that correspond to the government level execute them. And as for actions like the farmers traineeship, they have not yet been monitored, because the effects take time to be noticeable. However, according to the mid-term report (2023), actions such as preserving biodiversity, natural and agricultural spaces present a level of progress of 60%.

The agglomeration states that when it comes to M&E of climate adaptation actions, among the most significant challenges are the large number of indicators and their low precision, as well as the time to execute M&E. To face this, the agglomeration will make the necessary adjustments for the next plan.

It is also important to mention that the PCAET is linked to other sectoral plans of the agglomeration, the regional, and the national objectives. As mentioned previously, one of the axes that structures the PCAET is to “Make the PCAET a structuring policy for the development of the territory in the agglomeration, place energy, and climate issues at the center of decisions and operation of CC la Domitienne” (CC La Domitienne, 2019), which demonstrates the importance of the issue of climate change for this agglomeration.

4.4. Comune di Jesolo, Italy:

Jesolo is an Italian *comune* of 26,145 inhabitants, located in Venice region. The *comune* of Jesolo is characterized by an important tourist reality that took its first steps in the period of the "Great Reclamation", when the first hotels, the first restaurants, and the first shores appeared (Comune di Jesolo et. al., 2021). The residential system is made up of two centers: the historic centre, Jesolo Paese, characterized by single or two-family houses, and a small town, Jesolo Lido, which is distributed along the Adriatic coast and is characterized by a very dense urban fabric made up of buildings intended for use commercial-residential and hotel facilities to satisfy the great demand of tourism (Comune di Jesolo et. al., 2021). Among the most notable risks that the *comune* faces are heat waves, extreme precipitation, floods and droughts, and to a lesser extent, sea level rise. Regarding the climate, in the Köppen-Geiger classification, Jesolo’s climate is a Cfa, which is characterized by hot and humid summers, and cool to mild winters (Skybrary, n.d.).

The plan *Venezia Orientale Resiliente - Piano congiunto per l'energia, l'ambiente e il clima della Venezia Orientale* (Resilient Eastern Venice - Joint plan for energy, environment and climate for Eastern Venice) is a plan developed jointly[16] with 22 *comuni*. It arises from the will of the participating municipalities, with the support of the Metropolitan City of Venice, to capitalize on the experiences and resources put in place since 2012 as part of the Covenant of Mayors. It was approved in 2021 and is the continuation of the PAES that each commune had as part of its accession to the CoM. The objective of this plan is to reduce at least 40% of greenhouse gases by 2030, improving energy efficiency and increasing renewable energy sources. In addition to increasing resilience, and adapting territories to climate change. Moreover, with the PAESC (2021), the signing majors recognize that “It is our collective responsibility to build more sustainable, attractive, livable, resilient and high-quality territories energy efficiency" and this is the framework policy that defines all the proposed actions.

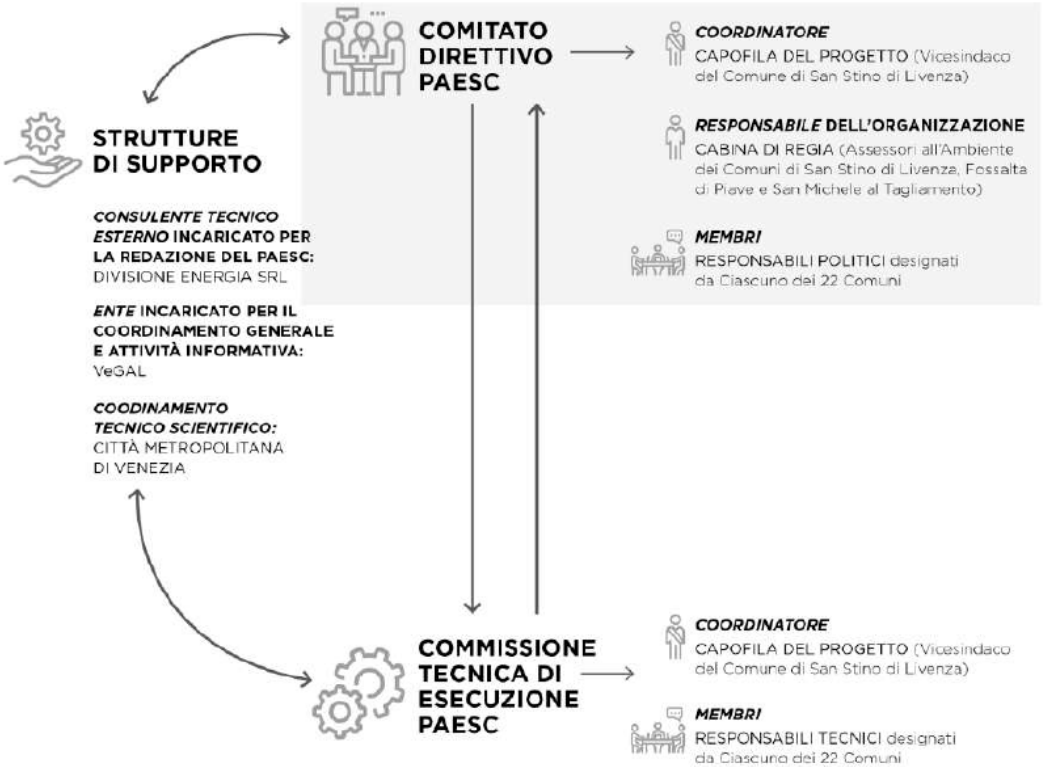
The plan follows the methodology outlined by the Covenant of Majors. Since this is a joint plan, it has a particular structure to involve all the *comuni*. There is a project leader, and each *comune* must select a political and a technical representative. These constitute the Directive Committee *(Comitatio Direttivo PAESC)* and the Technical and Execution Committee *(Commissione Tecnica di Esecuzione PAESC),* respectively. All are accompanied by external support entities *(strutture di supporto)* (see Figure 23). For this plan, it is important to involve citizens and other stakeholders in the various phases of the action, since through this a relationship based on credibility between citizens and administrators can be built, and with this ensure the effectiveness of the PAESC (Comune di Jesolo et. al., 2021). Territorially, this plan is divided into three macro areas: Coastal area, Portogruarese, and Sandonatese. The plan contemplates joint mitigation and adaptation actions between the various sectors, but at the same time, particular actions according to the conditions of each *comune*. The *comune* of Jesolo has proposed 12 mitigation actions, 3 adaptation actions, and 2 adaptation and mitigation at the same time.

Regarding monitoring and evaluation, the plan includes a section that specifies how to carry it out. As well as Comune di Jesolo (2021) in its PAESC recognizes that this document constitutes an innovative tool that overcomes the rigidity of traditional plans by implementing an open, adaptive, interactive process aimed at the intelligent transformation of the community and the territory, with the peculiarity of being flexible and adaptable, periodically allowing strategic actions

[16] Even though, this is a joint plan, it was considered for this study since each *comune* has individuality both in the analysis and in the proposals, as well as in the subsequent monitoring.

to be recalibrated, reorder priorities and correct specific objectives in light of the dynamics that prevail in the territory, the evolution of the context and the responses of the plan actions over time. And this can be recognized only with the results of a process of constant monitoring and evaluation of the plan. This plan follows the CoM structure, and in accordance with it, the M&E must be done every 2 and 4 years after the approval of the plan, based on a series of indicators already proposed and in comparison to the baseline (2005). Every two years, an action report should be submitted, containing the implementation status of its actions (Comune di Jesolo et. al., 2021). Every four years, a full report should be submitted, containing a monitoring report on emissions through an Emission Monitoring Inventory (IME) as well as on the implementation detailed status of its actions (Comune di Jesolo et. al., 2021). To date, this group of *comuni* has already submitted the first action report in 2023.

Figure 23: Organizational structure adopted for the implementation of the PESC.



Source: PAESC Venezia Orientale, Comune di Jesolo et. al. (2021)

In the *comune* of Jesolo, the Environment division oversees executing M&E. The other divisions involved in the PAESC send the data to the Environment division for data processing. It also has the support of the Agenzia Regionale per la Prevenzione e Protezione Environmentale del Veneto (ARPA Veneto). While citizens are not involved in the process. In the 1º monitoring report (2023), the *comune* has reported that of the five proposed adaptation actions, 2 are in the process of execution; while other two have already been finalized, related to planning against climate change; and one has not started yet. Likewise, they indicate that the reduction of CO_2 emissions through the actions -both mitigation and adaptation- is 69% in accordance with the forecast for reaching the objective of -40% by 2030 (Comune di Jesolo et. al., 2023).

The most notable adaptation actions that the *comune* has carried out, are the construction of breakwaters along the coast, which prevent coastal erosion due to rising sea levels. Although this action was not initially planned in the PAESC, the municipality has executed it because it aligns with the objectives of the document. This project has been the result of a public-private alliance and has been concluded recently, so the effects it has had have not yet been monitored. However, it is important to highlight the agile municipal response in this case, since when the opportunity to execute an adaptation project presented itself, it was framed within the objectives of municipal management and adaptation to climate change.

The *comune* considers that monitoring is an important step in planning against climate change, so the motivation of knowing the results and informing the various organizations with which they are committed makes this process happen. Among the most notable challenges of their experience when doing M&E is the timing of the actions results and the time that the municipal management has to do it. However, since it is considered a priority, the municipality is organized to execute M&E. Likewise, the *comune* considers that to improve the M&E process it would be important to involve citizens, which in turn would make them more aware of the effects of climate change and what actions they could take individually or collectively to contribute to the fight against climate change.

In this *comune*, the PAESC is strongly integrated with other municipal and regional management documents. For example, with the communal regulatory plan or the urban planning plan. For this municipal management, according to the municipal official who was interviewed, the PAESC could, in fact, be considered the main document from which all the rest of the instruments can then start. It is important to remember that at the same time, this PAESC is a joint document with other surrounding communities, so the integration with other planning instruments covers a larger area than just the municipal jurisdiction of Jesolo.

4.5. Comune di Cervia, Italy:

Cervia is an Italian *comune* of 28,521 inhabitants, located on the east coast of Italy in the Emilia-Romagna Region. Territorially, Cervia is divided between a coastal strip with over 9 km of coastline and an internal area mainly for agricultural use (Comune di Cervia, 2017). The weather in Cervia is warm and temperate with significant rainfall throughout the year. Even in the driest month, there is a lot of rainfall. The average temperature is 13.2 °C. However, the annual temperature range is rather limited, the maximum rarely exceeds 30 °C and the minimum -2 °C. There is an average annual rainfall of 666 mm (Comune di Cervia, 2017). According to the PAESC of Comune di Cervia (2017), among the risks that the city faces, the greatest is extreme heat; at the medium level are extreme cold, extreme precipitation, and flooding; while at a lower level are sea level rise, drought, and storms. On the other hand, when it comes to economic activities, Cervia is mainly focused on the development of commercial and hospitality activities, but agriculture, healthcare, and the construction sector are also important sectors (Comune di Cervia, 2017). Regarding the climate, in the Köppen-Geiger classification, Jesolo's climate is a Cfa, which is characterized by hot and humid summers, and cool to mild winters (Skybrary, n.d.).

Regarding the *Piano d'Azione per l'Energia Sostenibile ed il Clima* (PAESC), it was approved in 2017, being the oldest Italian plan among all the ones analyzed in the first part of this research. Cervia is a member of the Covenant of Majors (CoM), so the plan was done in the framework of its adhesion. The plan has been done by the municipality with the technical assistant of CoM and involves the different divisions related to climate change topics. The main objective of the plan -following CoM's objective- is to accelerate decarbonization through the commitment to reduce CO_2 emissions by 40% by 2030; and the 60% for 2040 and 80% for 2050. As well as strengthening the capacity to adapt to the inevitable effects of climate change through assessment of risks and vulnerability of the territory and the proposal of adaptation actions climate. And guarantee citizens access to safe, sustainable, and affordable energy, through on-site energy production from renewable sources (Comune di Cervia, 2017).

Cervia joined the CoM in 2017 and its PAESC dates to that same year. The structure of the PAESC follows the guidelines established by the CoM. It contains all the previous contextual and risk analyses, as well as the emissions inventory that will later be the baseline. It also includes mitigation actions and adaptation actions, as well as the monitoring and evaluation section. Specifically, Cervia's plan includes 32 mitigation actions and 9 adaptation actions. It is interesting that in addition to the explanatory sheet for each action -which is usual in most of the plans-, there is a summary table specifying the expected percentage of contribution to the reduction of CO_2 emissions per action compared to the global one, as well as the execution period, the amount of

public investment and the possible amount of private investment- this has been seen in very few cases of those cities that follow the CoM model for the preparation of their climate action plans. Likewise, it should be noted that the actions are presented as projects rather than proposals for actions, which seem to be more concrete.

It should be considered that the almost 30,000 inhabitants previously reported are those who are permanently living there, especially in winter. However, Cervia is an important tourist destination, and according to the information given by the municipality, during the summer the visiting population reaches up to 5 million people. That is why, for this *comune*, it is highly important to consider preparatory and adaptive actions for this scenario. The involvement of citizens is key, but at the same time the tourism sector.

Regarding monitoring and evaluation, the plan includes a section that specifies how to do it. As well as Comune di Cervia (2017) in its PAESC recognizes that the plan does not constitute an unchangeable and definitive document, but by its very nature, it is a "living" document that is constantly evolving, also in response to stimuli external factors that may have some influence on the tendency towards the objectives set. This shows the importance of M&E for this *comune* and the realization of the objectives of its plan. As the plan follows the CoM structure, and in accordance with it, the M&E must be done every two and four years after the approval of the plan, based on a series of indicators already proposed and in comparison to the baseline (2007). Every two years, an action report should be submitted, containing qualitative information on the implementation of the PAESC and a contextual qualitative, corrective, and preventive analysis (Comune di Cervia, 2017). Every four years, a full report should be submitted, together with a Monitoring Inventory of Emissions (IME), with quantitative information on the measures implemented and the effects on consumption energy and emissions, and any corrective and preventive actions in case of deviation from the goals (Comune di Cervia, 2017). According to the *comune*'s profile on the Covenant of Majors website, it has presented three reports to date, in 2020, 2021, and 2023, which are two intervention reports and a full report.

The monitoring and evaluation, according to the interview carried out, is done by external professionals in terms of emissions calculations, but the data is provided by the municipality. The municipality collects data from the different divisions of the municipal organization as well as from private entities, based on the indicators provided for each action. When external professionals process the data, the results are obtained in terms of CO_2 reduction.

Regarding the stakeholders involved in the M&E process, there are various areas of the municipality, the industrial sector, other private actors, and the professionals in charge of

emissions calculations. City residents are not involved in the M&E process; however, they are involved in the execution of some actions.

According to the *comune*, among the most important mitigation actions are the replacement of public lighting bulbs with LED system that allows the reduction of CO_2 emissions and energy efficiency. This has been a great project in both economic and practical terms, which has had a good result. Another example is the execution of the nursery school in Castiglione. The project was planned, but with the PAESC approval, the project has been adapted to a building with zero energy and completely LED.

Among the most representative adaptation actions are making the city more permeable and increasing urban greenery. One of the most important projects of the Cervia *comune* for achieving this objective is the redevelopment of a space in the center of the city designed in the 80s, intended for parking and therefore with a lot of impermeable surfaces. The area presented various critical issues such as architectural barriers, waterproof paving, limited shaded areas, and lack of systems for collecting and recycling rainwater (Comune di Cervia, 2023). The municipality has redesigned the plaza to include more vegetation and permeable surfaces. According to their website, Comune di Cervia (2023) the aggregation spaces have been redesigned and the ecological-environmental equipment has been increased with the creation of new green areas -approximately 50% of the total surface-, which are also useful for reducing the impacts of climate change and as an element to contrast urban pollution. As well as the use of permeable paving and the creation of two "rain gardens" in the center of the square guarantees the recovery of rainwater. The project has been inaugurated in September 2023.

On the other hand, Cervia is part of the project Interreg Italy – Croatia AdriaAdapt 2019-2021, which is an information platform for strengthening climate change resilience for the Adriatic coastal local communities. The Adriadapt project aimed at supporting the building of local and regional resilience by developing the knowledge base required to identify and plan appropriate climate change adaptation options (Adriadapt, n.d.). The project involves municipalities from Italy and Croatia. With this Project, Cervia has been able to acquire instruments and knowledge to monitor changes in the city's climate, analyze vulnerable areas, evaluate soil salinization levels on the coast and propose solutions for it, and empower stakeholders. Likewise, the creation of a platform that allows sharing experiences with other municipalities

As has been seen, the municipality has been making several efforts in the fight against climate change. As shown by the 2020 and 2021 reports, intervention (qualitative) and full (quantitative) reports respectively, the results of the actions can be positive, medium or negative. According to

the Comune di Cervia, in their full report (2021), they indicate that CO_2 emissions have been reduced by a total of 21.5% compared to the base year (2007). Likewise, regarding the adaptation actions, according to the M&E of the 2020 intervention report, the 9 actions originally proposed in the PAESC had a positive result. By 2021, 5 of the 9 had a positive result, while the other four had a medium result. Therefore, these actions are evaluated in more depth to ensure efficient results for the next monitoring. Some actions, such as *ADAPT 02 – Più permeabilità*, become more specific projects such as that of *Piazza Premi Nobel*. Regarding these projects, some of them have not yet been able to be monitored because they have been recently completed. For example, in the case of *Piazza Premi Nobel*, as it was completed at the end of summer 2023, the change in thermal comfort could not yet be measured until the interview was carried out since the hottest season of the year 2024 had not started yet. On the other hand, another reason is that the municipality does not have the necessary technical instruments to carry out monitoring, which would have to be rented. However, despite everything, the *comune* has had positive and real achievements. And that it continues working on the actions that have not yet achieved what was expected.

As for the biggest challenges that the community has had to face while doing M&E, it has been precisely the collection of data. According to what has been stated, it is often not immediate, since the data collection times of the various public areas of the community and private organizations are not the same, especially the latter, which takes more time. To overcome this challenge, one of the main strategies is to raise awareness through communication, among external actors, companies, and citizens.

However, after the M&E of the actions that have begun to be executed, it has been possible to recognize how some were being developed as planned and achieving the expected objectives. Others were not efficient, which is why they needed to be updated on those actions. This has occurred especially with mitigation actions rather than adaptation, which were implemented, and the expected results have been achieved.

Among some of the strategies that the municipality considers could contribute to improving M&E practices, are the standardization of indicators with other settlements at the same level to facilitate implementation and comparison, and the guidance of external organizations such as the CoM. As well as reducing the number of indicators, since the difficulty of obtaining the data could make the process long and the desired information could not be obtained.

It is also important to mention that the PAESC is linked to other sectoral plans of the *comune*, such as the General Urban Plan (PUG) and the recently approved Urban Plan for Sustainable

Mobility (PUMS). The integration of these planning instruments means that all community efforts have a common vision. The community has completed its planning instruments and is at the forefront, being one of the first communities in the region. Likewise, the PAESC is also aligned with a regional strategy for mitigation and adaptation to climate change.

4.6. Learning from case studies

Table 5: Synthesis of interviews with cities

	Portugal	**France**		**Italy**	
	CM Loulé	CA du Pays de l'Or	CC la Domitienne	Jesolo	Cervia
Inhabitants	72 332	45 099	28 852	26 145	28 521
Plan Title	Plano Municipal de Ação Climática (PMAC)	Plan Climat Air Energie Territorial (PCAET)	Plan Climat Air Energie Territorial (PCAET)	Piano congiunto per l'energia, l'ambiente e il clima della Venezia Orientale	Piano d'Azione per l'Energia Sostenibile ed il Clima (PAESC)
Year	2021	2019	2019	2021	2017
Methodology	Own	National	National	Covenant of Majors	Covenant of Majors
Main risks/ vulnerabilities	- high temperatures - heat waves - drought - intense precipitation - strong wind	- floods - maritime submersion - coastal erosion - heat waves	- floods - forest fires - maritime submersion	- heat waves - extreme precipitation - floods - droughts - sea level rise	- extreme heat - extreme precipitation – floods - sea level rise - drought - storms
Nº of adaptation actions	40	9	21	5	9
Representative adaptation action	"Water Crisis" communication campaign	Monitor the sediment and the evolution of the coastline	Traineeship to a group of farmers to make a diagnosis in terms of the biodiversity of their plots	Construction of breakwaters along the coast	Piazza Premi Nobel permeabilization and greening

M&E strategy	annual evaluation, based on indicators	annual evaluation, based on indicators every 3 years a more in-depth evaluation is carried out	annual evaluation, based on indicators every 3 years a more in-depth evaluation is carried out	every two years - action report every four years - full report based on indicators	every two years - action report every four years - full report based on indicators
Stakeholders involved in M&E	- Municipality - DACET	- Municipality - ADEME - External company	- Energy Transition Manager - Technical and directive committee - External company	- Environment division - Directive Committee - Technical and Execution Committee	- Municipal divisions - Industrial sector - Private actors Professionals in charge of emissions calculations
Best practices of effective M&E	-inclusion of observatories in the monitoring -have a specific division for climate change in the municipal structure	- detailed actions, responsibilities and funding alternatives from the beginning - platforms to share results	- platforms to share results - commitment to higher levels of government and international organizations	- participation in an intercommunal plan	-participation in international projects
M&E challenges	-municipal structure	- time - money - number of indicators	- large number of indicators and their low precision - time	- timing of the actions results - time that the municipal management has to do it	-collection of data is not immediate
Suggestions to overcome M&E challenges or to do the M&E	-create a national structure to inform M&E results	-to have few indicators		- to involve citizens in the process	-raise awareness through communication standardization of indicators - reducing the number of indicators
Integration with other plans	yes	yes	ye	yes	yes

Source: own elaboration

In all the cities interviewed, as has been seen so far, adaptation actions are being carried out and at the same time their monitoring and evaluation. All plans follow a clear methodology that is very similar to each other. The methodology can be its own proposal or based on national guidelines or an international framework. This organized and structured status of all plans makes it easier for the actions to be executed later. Although it is true that all cities carry out mainly mitigation actions, all of them are carrying out at least one adaptation action in their territory. This is because mitigation actions can be more easily quantifiable and have more immediate results than adaptation actions. However, all cities have recognized the importance of adaptation actions and even if they have only recently begun to propose and/or execute them; they have the commitment and interest to implement them. This is also recognizable in the fact that all the plans were approved relatively few years ago. On the other hand, it should be mentioned that some of these plans come from or are based on a previous plan, which was the Sustainable Energy Plan (SEAP). The evolution from an energy plan to a climate action plan implies the inclusion of adaptation actions within the plan and thus reiterates that in the fight against climate change, both mitigation actions and adaptation actions must be considered.

The approach to developing climate change plans for these cities has been different. On the one hand, the top-down approach of Portuguese and French cities who must comply with national regulations that bind them to have plans at a local level. While in the Italian case, it is a bottom-up approach, where the plans emerge as a voluntary action of the cities. Despite this, all plans have very similar structures and the same validity. Perhaps in the Portuguese and French case, the allocation of resources could be easier from the central government; while in the Italian case, the projects are executed through projects financed by external entities or by alliances between communities. It is important to see that despite the different motivations for having plans or financing options, climate change is taking center stage at the local scale planning structure.

Regarding the adaptation actions that cities are proposing, a wide variety has been observed, which include greening and permeabilization of spaces to communication campaigns, constant monitoring of areas exposed to risks or training on adaptation issues. This shows that even though they are all coastal cities, more or less exposed to similar risks, there are many ways to cope with a problem and this lies in the particularity of how the local government system is and other conditions, such as the tools or external support that each city seeks or the integration of citizens in the development of the proposal and execution of the actions. Likewise, it has been possible to recognize that some municipalities, especially the Italian ones, have carried out adaptation projects that, although it is true that were not initially proposed in the plan, a financing opportunity arose, and the municipality decided to take advantage of it. This is a positive point, being aware

that the climate action plan is an open and moldable document and that it should be a little restrictive as long as the general objectives are met.

Regarding the monitoring and evaluation methodology proposed by the cities, it is mostly based on an annual or biannual assessment on a basis of comparison with a baseline and with indicators previously established in the plan. These particularities depend on the general methodology that the city has followed to prepare the plan. That is, in Portugal, it is a mixture of its own methodology with national guidelines, which makes M&E annually. In France, agglomerations have followed the national guidelines that establish an annual follow-up evaluation with a more in-depth report every three years, after which the actions can be modified. In the case of Italy, both cities are signatories to the Covenant of Majors, so M&E is done every two years, an action report is presented biannually and a full report is every fourth year.

It is important to mention that to mainstream climate change issues within the local government structure, governments have had to modify their organizational charts. All governments have created a specific division or assigned a person in charge of climate change issues, who in turn is in charge of the climate action plan and the respective M&E. This in terms of governance gives power and greater ease of action to climate change plans. To prepare the plans, cities have involved various actors and stakeholders outside the public structure, such as the private sector, experts, citizens or international entities. However, when it comes to M&E, local municipal governments have expressed to involve only those directly responsible for the actions or those who provide data for the evaluation of the indicators. That is, in the M&E processes have been involved various divisions of the municipal body or committees, national environmental agencies, and external specialist technicians or companies who have carried out the data analysis. None of the cities studied have involved citizens in the M&E processes.

Regarding the execution of M&E, it has been possible to recognize a lot of enthusiasm and work in the studied cities to execute it. They all recognize in any way -whether within the plan or during the interview- that M&E is a key step on the path to fighting against climate change. Among the most notable reasons why this step of the plan has been carried out is the commitment to inform. Inform either the citizens of the jurisdiction, inform national organizations or inform the international projects of which they are part. Secondly, another reason why M&E is carried out in these cities is to know at which level of achievement the objective is and finally to become aware of whether the action as proposed is efficient. Although it is true that one of the objectives of the M&E of a plan is precisely the latter to evaluate a possible modification, for very few of these cities this has been an option.

It has been recognized that, in the studied cities, M&E is already a constant and frequent process that is part of the administrative structure and responsibilities of the local government. It is notable to emphasize that although none of the municipalities stated that they had a budget allocated especially for M&E, this is an activity that has been carried out continuously. Among the best practices for the continuity of this process, it has been observed that the municipality's alliances and/or partnerships with other external organizations -such as the central government, European Union organizations, other municipalities, among others-. These agreements generate a commitment for the local government, not only to execute the proposed action but also to measure the impact it has and to do so frequently to comply with the agreement established with the other. Moreover, these alliances represent technical training or guidance from specialized professionals to have better results and be more efficient with actions against climate change. Another best practice that has been recognized and has been repeated in some of the municipalities is the creation of online platforms or the allocation of a special place on their website to share the results with the population and other stakeholders. In this case, some work better than others due to their friendly user interface or because it is easier to understand the information. Additionally, the fact that there is a division or person responsible for M&E within the local government makes the process more likely to be executed frequently.

Regarding the challenges when carrying out M&E, the majority of municipal representatives expressed that the large number of indicators that their plan contemplated was a negative point. Initially, when the plan was being proposed, the municipalities thought that a greater number of indicators would mean greater detail in the information and clearer M&E results. However, when executing the M&E it was recognized that the large number of indicators actually made the process more difficult than it is already, since this implies a longer time in data collection and analysis, as well as the increase in costs of the M&E process in itself. Additionally, one of them recognized that the indicators were not very precise to evaluate the objective; however, this plan allows the update within the validity period. To a lesser extent, they pointed out that the municipal structure itself was an inconvenience for the collection and data analysis since data came from different divisions of the local government. To overcome these challenges, municipalities have taken various measures such as the selection of priority indicators or the empowerment of the officers or divisions that are in charge of the M&E of climate action plans.

Based on the experience that the studied municipalities have had when carrying out the M&E of their plans, they suggest that in order to make the process more efficient, a small number of indicators should be maintained that can reflect the state of progress and facilitate the process. Likewise, thinking about comparability with other localities or for national statistical results, municipalities consider it important to standardize the indicators to facilitate comparability. This

could be a point to include within national guidelines or international frameworks. Additionally, one of the missions of M&E is to raise awareness and credibility, and for this, it is important to involve different actors. While it is true that none of the municipalities involve citizens in the M&E process, they recognize that it could be important. This exclusion of citizens in M&E could perhaps be due to the difficulty that this process already represents within the municipal structure. However, they could think about making this a participatory process where citizens also can express, based on their perception, the improvements or negative points that the adaptation actions carried out by the government have had in the city. For example, through focus groups, citizens' opinions could be collected so they feel part of the entire adaptation process, from the conception of the proposal to its evaluation.

Finally, it is important to recognize - and thank- the openness and good disposition that all these municipalities have had to be part of this research. That is already an example of the open information policy they have and of their commitment to fight against climate change. Additionally, it is important to highlight that in addition to mainstreaming climate change in municipal structures with the creation of new divisions or assignment of specific responsibilities, all these municipalities have stated -either through the plan or during the interview- that the local action climate change plan is interrelated with other local, regional and national sectoral plans in order to maintain a common policy and objectives in the fight against climate change. This is very notable since in this way the actions have a greater effect and coordination with the different levels of government.

5 Conclusions

Nowadays, climate change is a global problem and of different scales. The fight against climate change should be one of the main issues in national, regional, and local governments. On the international scale and larger scales at the country level, various regulations and actions have already been implemented to minimize the effects of climate change through mitigation and adaptation actions. However, on a local scale, this issue is still poorly disseminated, especially in adaptation actions. This thesis is based in the analysis of Monitoring and Evaluation (M&E) processes at a local scale, conducted during an internship at CEDRU Lisbon. This study seeks to know the situational status of planning at a local scale and above all to assess and look for best practices in the monitoring and evaluation processes in adaptation at a local scale in coastal cities of the Western Mediterranean Europe -Portugal, Spain, France and Italy- with a population between 20,000 to 100,000.

This study has been divided into two phases of analysis. The first sought to know the existence of plans against climate change in the cities within the profile and whether these included monitoring and evaluation. And the second, where some selected cities were interviewed to learn more about their monitoring and evaluation process, the challenges they face while doing it and looks for best practices for an efficient and useful M&E.

The first part of this research reveals that 31.7% (84 out of 265) [17] of the studied cities have a climate action plan[18], and that these have been developed between 2014 – 2024. In countries like Portugal and France, where there is a national law that binds local governments to have plans against climate change, the rates of existence of plans are higher compared to Spain and Italy where it is voluntary. However, the motivation of both cases is valid and so is the proposal, in the first case it is possible to recognize a top-down approach, while in the second a bottom-up approach, showing that the interest and need of fighting against climate change exists beyond the regulations that could exist. Regarding the methodology followed by the plans, a variety of sources have been found in this study. The most common is the Covenant of Majors framework in Spain and Italy, where the proposal to prepare a plan is voluntary and therefore cities seek allies and technical support for the preparation. While in Portugal and France, the own guidelines established by national regulations are followed. However, all the different framewroks or guidelines have a similar structure between each other.

The fact that only a third of the studied cities have the planning instrument is relatively few in comparison with the dimension of the problem. Nonetheless, it is positive that 91.7% (77 out of 84) of cities have plans with a specific section for monitoring and evaluation processes or make some reference to monitoring within the document. Furthermore, the majority of these plans (85.7%) already included within the document the list of indicators based on which the monitoring will be done. On the other hand, it has also been possible to see that among the typology of actions, most of the plans include adaptation actions (85.7%) and just over half of them (52.4%) consider both mitigation and adaptation. While the remaining ones do not indicate the type of action.

For the second part of this study, five cities in Portugal, France, and Italy[19] were selected. These cities have relatively recent plans and all of them have been carrying out constantly the monitoring and evaluation of their plans as it was proposed in the document. Although it is true that previously

17 Only cities with documents available online have been considered, since references to the existence of a plan have been found in several cases but they have not been found available online or in municipalities websites.

18 For this research, Climate Action Plans, Climate Adaptation Plans or Climate Adaptation Strategy -in that order of preference- have been considered. And they have been found in these proportions, of the total number of cities (84) with planning instruments in terms of adaptation to climate change, it has been found that 66.7% have a Climate Action

19 Spain was not considered for this part, because it was not possible to contact the municipalities for an interview.

in this research, it was mentioned that most of the plans included more, in general terms, adaptation actions than mitigation. In this part, it has been recognized that in specific quantities mitigation actions are more abundant than adaptation actions. And that municipalities recognize that it is easier to execute mitigation actions because they are clearer, more tangible and it is easier to see the results than adaptation actions. But at the same time, they are aware of the importance of adaptation actions and have been carrying them out too, Additionally, it has also been observed that all the climate action plans of these cities are interrelated with other local, regional or national sectoral plans.

In this study, it was identified that the adaptation actions proposed by cities are diverse even though they are all coastal cities and face -more or less- similar risks. This depends mainly on the political decision, government strategy, resources, and opportunities for partnership or external financing options. In fact, this shows that even though this study has analyzed cities with similar general characteristics, the problems are particular as well as the responses. This is why addressing adaptation to climate change at a local scale is of major importance since adaptation is a local issue responding to global phenomena (Dovers & Hezri, 2010)

Regarding the M&E methodologies of these cities' plans, it has been recognized that they follow the general methodology proposed by the plan. For the most part, the methodologies are similar and are based on an annual or biannual review of the indicators in comparison with a baseline. And it is important to mention that a key point for this to take place has been the restructuring of the local government system, to include a specific division or person in charge of dealing with the issue of climate change in the jurisdiction. This has been very important in all cases since despite not having funds specifically allocated for M&E, all cities have executed the process thanks to the change in the government structure. On the other hand, regarding the actors involved in the process, they are mainly the various divisions of the municipality, national or international entities, and external companies that carry out the analysis. None of the cities involve citizens in the M&E process, but rather in the proposal of actions or in the previous phases.

From this study, it must be highlighted that among the best practices for the continuity of M&E, it has been observed that the municipality's alliances and/or partnerships with other external organizations are a key factor that compromises the municipality to do the M&E to inform the other. Another best practice is the creation of online platforms or the allocation of a special place on their website to share the results with the population and other stakeholders, which at the same time creates awareness and credibility. Additionally, changes in their government structure have had a positive effect on M&E. On the other hand, the most frequent challenges that have been

mentioned are the extensive quantity of indicators, poor precision of some indicators, time and money. However, all of the municipalities have been able to overcome these challenges.

These results contribute to a better understanding of climate change planning at the local scale and how adaptation actions are being monitored and evaluated. This study highlights the importance of the local scale in the fight against climate change and the importance of the adaptive capacity of governments to deal with it, as well as having a structured system and networks of technical or financial support. By documenting both successes and challenges while doing M&E, this study provides valuable insights for other municipalities embarking on or refining their own processes. As well as, it will contribute to the development of the climate action plans prepared by CEDRU, Lisbon with new insights to be considered, such as the importance of alliances for the continuity of the proposals.

Future studies can explore this topic in a more quantitative than qualitative way, perhaps analyzing the M&E results in more detail based on the M&E reports and not only on the experience. Likewise, the geographical scope or profile of the cities under study can also be expanded for a better understanding of how other cities are acting against climate change and how they are monitoring it. Likewise, a cross-sectional analysis can also be carried out at various scales, which allows for a comparative study of similarities or differences between adaptation actions and M&E practices.

In conclusion, M&E is not merely a procedural component but a critical mechanism for assessing, validating and updating climate adaptation actions at the local level. Since climate change is a problem with an uncertain future, having constant M&E of the proposed actions increases the adaptive and response capacity. Robust M&E frameworks will be essential in building resilience and ensuring the long-term success of adaptation strategies. The cases analyzed in this study can serve as inspiration for the development of future policies and increase the number of cities taking action against climate change.

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Annex 01 – Interview guide

Municipality Background

1. Climate Action Plan Overview
    - Please, can you briefly describe the municipality's climate action plan (CAP):
        - Objectives and goals of the CAP.
        - Timeline and main phases of implementation.
        - Stakeholders involved in the development process
        - Was the plan made with an international organization or within an EU project?

Monitoring and Evaluation Process

2. Current Monitoring Practices
    - How is your municipality monitoring the climate action plan?
    - Who are the stakeholders involved in the process? Describe the structure and organization responsible for monitoring (e.g., department, team, citizens).
    - Outline the specific components or aspects of the CAP that are monitored (e.g. which adaptation strategies)
    - Do you have a specific budget for monitoring?

3. Monitoring Tools and Indicators
    - Which methodologies, tools, or frameworks does your municipality use for monitoring adaptation actions?
    - In your opinion, which are the most important indicators or metrics used to assess the progress of the plan?
    - How is data collected, analyzed, and reported within your monitoring process?
    - Do you send your monitoring report to some international organization or the national government?
    - Do you share the result of the monitoring process with the community? If yes, which is your strategy?

Key Actions and Best Practices

4. Effective Actions and Innovations
    - Can you describe some key actions or initiatives that have proven to be effective in achieving climate change objectives in your municipality?
    - Describe any innovative approaches or best practices adopted specifically in the context of monitoring climate adaptation actions.
    - How have these initiatives contributed to improving the effectiveness of your municipality's monitoring process?

Challenges and Solutions

5. Challenges
    - If after monitoring an adaptation action, results are not what you were expecting, what do you do?
    - What are the main challenges or barriers encountered in monitoring CAP?

6. Solutions
    - How did you overcome these challenges?
    - Do you have any recommendations for improving future monitoring efforts in your municipality?

Conclusion

7. Interrelation of the Climate Adaption Plan with other sectorial plans
    - How is the climate action plan related to other sectorial plans?

8. Additional insights
    - Do you have any additional insights, observations, or specific examples related to your municipality's experience with monitoring climate actions?
    - Based on your experiences, do you have any recommendations for enhancing monitoring and evaluation practices in climate action planning?