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Deliverable D4.2 - *[Policy instruments and influences on co-production]*

WP4 – [Roadmap for policy transformational change]

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HORIZON-MISS-2021-CLIMA-02-05 - Local engagement of citizens in the
co-creation of societal transformational change for climate resilience

Document History

Deliverable Title	Deliverable D4.2 - Policy instruments and influences on co-production
Brief Description	The deliverable D4.2 focuses on analyzing and comparing participatory elements in climate change adaptation policies across the EU, Germany, and Spain. It aims to enhance the effectiveness of policy instruments that support co-production and citizen engagement in climate adaptation processes. By analyzing policies, conducting surveys, and a co-creation workshop, it provides a comprehensive analysis of existing policies and identifies gaps. It emphasizes the importance of inclusive and democratic decision-making to address the varied needs of different communities and stakeholders, ultimately contributing to more effective and equitable climate adaptation strategies.
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1. Executive summary

Deliverable D4.2 titled *"Policy Instruments and Influences on Co-production"* presents an in-depth analysis of participatory elements in climate adaptation policies across the European Union, Germany, and Spain. The report seeks to improve the effectiveness of policy instruments that promote co-production and citizen engagement in climate adaptation processes. It offers a detailed analysis of the current policies, identifies gaps in participation, and provides recommendations for enhancing inclusivity and democratic decision-making in the climate adaptation landscape.

Public participation and stakeholder engagement are crucial to shaping adaptive climate policies. Co-production – where citizens, researchers, and policymakers collaborate – ensures that diverse perspectives, particularly from vulnerable and marginalized communities, are considered. This participatory approach leads to more equitable and responsive climate policies that align with local needs. In exploring the role of co-production, the report highlights the importance of creating policies that are transparent, inclusive, and democratically grounded. Public involvement in these processes fosters greater trust and ownership, leading to more effective policy implementation and long-term success in climate adaptation initiatives.

The report builds on empirical data collected from policy analyses, public surveys, and a co-creation workshop, with particular focus on the participatory dimensions of climate adaptation policies in the EU, Germany, and Spain. The analysis reveals several critical gaps in existing policies. First, some policies lack mechanisms for engaging all relevant stakeholders, particularly at local and regional levels, and vulnerable groups are often underrepresented in decision-making processes. Second, many policies are weak in terms of monitoring and evaluation, with insufficient feedback loops to assess the effectiveness of participatory mechanisms. This means that while citizen engagement is often a policy goal, there is little data to demonstrate its impact or success in practice. Third, there is a strong need for capacity-building initiatives to empower local communities and stakeholders. Without adequate training, technical support, and resources, many stakeholders are unable to meaningfully engage in policy development and implementation.

The report also emphasizes the importance of integrating climate adaptation into various sectors, such as agriculture, water management, urban planning, and transport. Effective climate adaptation policies cannot be isolated but should be mainstreamed across multiple sectors to address the multidimensional challenges posed by climate change. Cross-sectoral collaboration is key to ensuring that adaptation efforts are comprehensive and interconnected.

Through the analysis, the report identifies several key policy recommendations aimed at closing the identified gaps. These include:

- Strengthening participatory mechanisms by ensuring that all relevant stakeholders, especially those from vulnerable communities, are included in decision-making processes.

- Improving transparency and communication between policymakers and citizens to build trust and foster a sense of ownership over climate adaptation efforts.

- Enhancing capacity-building efforts to equip citizens and stakeholders with the necessary knowledge, skills, and resources to participate effectively in co-production.

- Establishing more rigorous monitoring and evaluation frameworks to assess the effectiveness of participatory mechanisms in climate policies and allow for iterative improvements.

In addition to these recommendations, the report stresses the need for enhanced public engagement in monitoring climate adaptation measures and building stronger relationships between authorities and citizens to improve the perceived legitimacy and effectiveness of policies. By fostering more meaningful engagement, the AGORA project aims to build resilient communities better equipped to face the complex challenges of climate change.

2. Introduction

2.1 Project overview

This report is part of the EU-funded Horizon Europe project **AGORA – A Gathering place to cO-design and co-cReate Adaptation**. AGORA's primary objective within the Mission on Adaptation to Climate Change is to bolster communities and regions by leveraging best practices in engaging citizens and stakeholders for effective decision-making and action in adaptation.

The AGORA project drives European climate resilience through collaborative, community-centred adaptation efforts. Its core approach involves co-designing and executing tailored solutions, engaging stakeholders, and advocating for climate justice, empowerment, and societal transformation. With a focus on innovative strategies and impactful policies, AGORA aims to fortify Europe's resilience against climate change. AGORA actively involves citizens, experts, policymakers, and other actors in crafting innovative climate adaptation solutions customized to local requirements. By providing digital tools and frameworks, the project aims to boost awareness and empower informed citizens to actively contribute to shaping sustainable local development. Moreover, it acts as a hub for exchanging knowledge, expertise, and practices and fosters dialogue between communities and scientific endeavours. Pilot regions in Germany, Sweden, Spain, and Italy serve as arenas for co-producing climate adaptation solutions.

The overarching goal is to formulate a roadmap for transformative change, citizen involvement, and effective policy support to ensure a lasting legacy of climate adaptation

across Europe. AGORA's aspiration lies in establishing a robust, engaged community of citizens dedicated to driving positive change in climate action and working toward a resilient climate future.

This deliverable (D4.2) of the AGORA project presents the findings of the analysis and comparison of participatory elements in climate change adaptation policies.

The role participatory elements play in climate adaptation policies makes their analysis highly significant. Firstly, public and stakeholder participation fosters inclusive and democratic decision-making and ensures that diverse perspectives and voices are considered in the formulation and implementation of policies (Chu et al., 2016; Phadke et al., 2015). This consideration is essential for addressing the varied needs and vulnerabilities of different communities and stakeholders, which leads to more effective and equitable adaptation strategies (Chu & Cannon, 2021). Additionally, the inclusion of participatory elements helps build trust and legitimacy in the policy-making, as involving stakeholders and citizens in decision-making can enhance their sense of ownership and commitment to the implemented measures (Thokala & Madhavan, 2018; Michels & De Graaf, 2010). Understanding the level of citizen engagement in adaptation policies allows for the identification of gaps and opportunities for improvement and leads to more responsive and context-specific policy frameworks (Jibladze et al., 2021). By analysing participatory elements, policymakers can ensure that climate adaptation policies are not only robust and effective but also reflective of the diverse needs and aspirations of the communities they aim to serve (Rijal, 2023).

Yet, despite these positive aspects, there are also some limitations to the inclusion of participatory processes as common practices in climate adaptation decision making. These have been extensively discussed in the literature (for an overview see Loeffler & Bovaird, 2021) and include e.g. legitimacy of the decisions, limited representativity of the population, issues of ownership, especially when projects are not viewed as a joint endeavour by relevant actors, prejudices or power asymmetries among participants, and conflict escalation/difficulties in reaching a shared agreement on recommended policy interventions (Scolobig & Lilliestam, 2016). These are some of the reasons why sometimes participatory elements have not been explicitly included in climate adaptation policies. However, little research has been conducted to analyse what policy instruments can support the inclusion of participatory and deliberative practices in climate change adaptation decision making. This deliverable addresses this research gap, by providing an overview on how these elements are included in climate change adaptation policies in Spain, Germany as well as at the EU level. In the following section (2.2.), a detailed description of D4.2. aims is provided.

2.2 Aim

This deliverable (D4.2) presents the analysis of participatory elements in climate change adaptation policies drawing upon findings collected in Task 4.2 (see Text box 1).

Box 1: Task 4.2 description

In particular, this report focuses on the analysis of participatory elements in climate change adaptation policies in Spain, Germany as well as at the EU level. It addresses the research questions of if and how these policies include participatory elements. Building on the results of the analysis, the deliverable identifies policy gaps and challenges and provides recommendations on how to overcome them. A policy gap refers to the shortfalls or deficiencies within existing policies that impede their effectiveness in achieving desired outcomes.

2.3 Structure of the report

Section 3 discusses climate change adaptation policies with a focus on citizen engagement and co-production. Section 4 outlines the methods used, including policy selection, surveys, and the co-creation workshop. Section 5 presents the analysis of adaptation policies in the EU, Germany, and Spain, examining participatory elements, identifying policy gaps and challenges. Section 6 provides recommendations. Section 7 concludes the report by summarizing insights.

3. Climate change adaptation policies and citizen engagement

3.1 Climate change adaptation policies

Climate change adaptation policies are important in addressing the unavoidable impacts of climate change, advancing towards climate resilience, implementing the European Green Deal and the European Mission on Adaptation to Climate Change (European Environment Agency, 2022). They are crucial in addressing climate-related hazards and in minimizing their adverse effects on communities, ecosystems, and economies. Another key aspect centres around the advancement of knowledge on climate risks through comprehensive assessments (Adger et al., 2018). These assessments serve as the bedrock for informed policy development and

provide a nuanced understanding of the risks and vulnerabilities associated with climate change.

A notable trend in contemporary climate change adaptation policies is the mainstreaming of adaptation considerations into sectoral frameworks (European Environment Agency, 2022; Naumann et al., 2011). Sectors such as water resources, agriculture, forestry, biodiversity, environment, transport, urban planning, and buildings are increasingly incorporating adaptation strategies. This integration is critical to ensure that policies are not isolated but interconnected across various facets of society and governance. An additional integral component of effective climate change adaptation policies is the emphasis on enhancing adaptive capacity (Mataya et al., 2020; Yoseph-Paulus & Hindmarsh, 2016). Measures targeting awareness-raising, capacity-building, and training at both regional and local levels are essential. These efforts contribute to building resilience within communities and governance structures to foster a proactive response to climate-induced challenges.

The importance of monitoring, reporting, and evaluation mechanisms in shaping adaptation policies cannot be overstated (Klostermann et al., 2018). These tools allow for a dynamic and iterative approach and enable policymakers to learn from successful adaptation initiatives and identify areas where additional measures are required. Such adaptive management is crucial in the face of evolving climate dynamics. Lastly, stakeholder engagement stands out as a cornerstone of effective climate change adaptation policies (Khatibi et al., 2021). Inclusivity in the planning and implementation process, particularly involving vulnerable stakeholders and the private sector, ensures that policies resonate with diverse perspectives and are more likely to be both inclusive and effective.

According to the report of the European Environment Agency (2022), the development of adaptation policies in EEA member countries shows a diverse landscape of approaches and instruments. In 2021, all EEA member countries had a dedicated national adaptation policy in place, typically starting with a National Adaptation Strategy (NAS) and complemented by National Adaptation Plans (NAPs), Sectoral Adaptation Plans (SAPs), and/or Regional Adaptation Plans (RAPs). Over 10 EU Member States had updated their NAS, and more countries have completed the entire adaptation policy cycle, including monitoring, reporting, and evaluation aspects for NAPs. However, there is considerable variety in the approaches to monitoring, reporting, and evaluation, with differences in the use of indicators, criteria, and methodological approaches. The reporting on the revision of SAPs is limited, and it remains unclear whether this is due to a lack of reporting or a lack of proper monitoring and evaluation processes for existing SAPs. Also see Fig. 1 for an overview of adaptation policy instruments in EEA member countries.

Country	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Austria													*					
Belgium																		
Bulgaria																		
Croatia																		
Cyprus																		
Czechia																		
Denmark																		
Estonia																		
Finland										*								
France																		
Germany											*					*		
Greece																		
Hungary														*				
Ireland														*				
Italy																		
Latvia																		
Lithuania																	*	
Luxembourg														*				
Malta																		
Netherlands												*						
Poland																		
Portugal											*							
Romania												*						
Slovakia														*				
Slovenia																		
Spain																*		
Sweden														*				
Iceland																		
Liechtenstein																		
Norway																		
Switzerland																		
Türkiye																		

Legend:
- No adaptation policy adopted
- National Adaptation Strategy (NAS) adopted
- NAS adopted and one or more Sectoral Adaptation Plans (SAPs) adopted and reported (2021 reporting)
- NAS adopted and one or more Regional Adaptation Plans (RAPs) reported (2021 reporting)
- NAS adopted and SAPs and RAPs reported (2021 reporting)
- National Adaptation Plan (NAP) adopted
- NAS and NAP adopted
- NAS and NAP adopted and one or more (SAPs) adopted and reported (2021 reporting)
- NAS and NAP adopted and one or more (RAPs) reported (2021 reporting)
- NAS and NAP adopted and SAPs and RAPs reported (2021 reporting)
- *   NAS revision adopted

3.2 Co-production and citizen engagement

Stakeholder engagement, participatory processes, and the utilization of co-production[1] and citizen engagement policy instruments play a crucial role in the comprehensive development, implementation, monitoring, and evaluation of climate change adaptation policies and foster inclusive and participatory approaches (European Environment Agency, 2022). These policy instruments emphasize the active involvement of communities, stakeholders, and researchers in generating relevant climate information and promoting resilience. The integration of cultural dimensions, flexibility, and participatory governance is essential for long-term

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[1] Co-production refers to the collaborative process where citizens, researchers, policymakers and other stakeholders work together to design, implement, and evaluate policies, ensuring that diverse perspectives are considered and integrated. For the definitions of participation, deliberation and citizen engagement (initiatives), please refer to the Deliverable 1.1 "Mapping of existing citizen engagement initiatives".

adaptation and emphasize the need for usable science and effective public communication (Glaas et al., 2022). Furthermore, the involvement of cities is crucial in achieving ambitious climate targets, with co-benefits such as improved air quality, green job creation, and enhanced public health through active transportation (Bachra et al., 2020).

Public participation is a vital component of effective climate change adaptation and decision-making processes and brings benefits such as democratic governance, knowledge sourcing and distribution, and conflict reduction (Slycan Trust, 2020). It is recognized that enhancing public participation requires multi-stakeholder representation, training, capacity building, and grievance handling mechanisms. The significance of public participation in addressing climate change challenges has been acknowledged in international processes and reports such as the Rio Declaration and the IPCC Special Report (Hügel & Davies, 2020).

Furthermore, citizen engagement and leveraging digital technologies are vital in the fight against climate change, with cities developing smart city technologies and information and communication technologies to support climate action (Lawrence et al., 2017).

Co-production approaches involving local communities, stakeholders, and researchers are advocated for climate adaptation research and recognize the importance of local knowledge, diverse knowledge systems, and social imaginaries in coping with environmental change (Klenk et al., 2017). The co-production of ecosystem services for climate change adaptation highlights the need for proactive management, collective governance, and institutional support to promote collaboration and redistribute power (Lavorel et al., 2020).

Inclusive citizen participation in climate adaptation initiatives is highly important and necessitates the broadening of geographical boundaries, redefining target groups, and co-designing participation targets and approaches (Glaas et al., 2022). Effective communication strategies in engaging civil society and driving action on climate change are fundamental, emphasizing the importance of bottom-up change to mobilize people for comprehensive climate action (Moser, 2009).

So far, participatory and deliberative processes have been included in existing democratic systems in different ways, e.g. climate assemblies at national, regional or local levels; micro-public deliberations to support referendum or popular initiatives; climate living labs activated at local (often municipal) level; already existing participatory processes focusing on other sectors, such as participatory budgets or Agenda 21 processes. Importantly, the vast majority of these initiatives have a consultative role, and decisions or recommendations are not binding for public officials and decision makers. Moreover, several training and capacity building initiatives undertaken by local authorities, educational organisations (from schools to universities) have participatory elements and aim at building skills and capacities to increase resilience and sustain engagement to promote the climate risk reduction agenda.

At the same time, co-production is not a panacea and can sometimes lead to unintended consequences (Wamsler et al., 2020). Several challenges, such as power imbalances,

conflicting interests, and the capacity limitations of both citizens and authorities, can hinder effective implementation and even result in unsustainable outcomes. Therefore, co-production requires careful structuring, clear objectives, and continuous support to ensure it truly contributes to transformative and inclusive climate adaptation efforts.

3.3 Pilot regions

The analysis focuses on two of the countries where AGORA's pilot regions are located, i. e., Germany and Spain[2], with two more pilot regions located in Italy and Sweden. Data on climate change metrics for Germany, Italy, Spain, Sweden, and the EU highlight the significant challenges these regions face in adapting to climate change (see Table 1). The projected temperature increases, CO2 emissions, and potential GDP losses paint a clear picture of the urgent need for robust climate adaptation strategies. By providing an evidence-based overview of climate vulnerabilities, this data contributes to a deeper understanding of the specific risks each region faces and underscores the necessity for tailored adaptation measures. It reinforces the importance of data-driven decision-making in climate policy and demonstrates the critical role that metrics play in shaping effective, responsive, and equitable adaptation efforts across Europe.

Germany has CO2 emissions per capita at 8.0 tons per person and is projected to experience an increase in average temperature in the warmest month by 2050, at 6.1 degrees Celsius (Bastin et al., 2019; Global Carbon Budget, 2023). In terms of public opinion, 85% of respondents in Germany believe in climate change, and 73% consider it a top threat, while 77% believe it is a climate emergency (Dynata, 2022; PEW Research Center, 2022; Browning et al., 2021). Additionally, 64% of respondents in Germany believe that protecting the environment should be given priority, even if it causes slower economic growth (ING, 2019). Under the RCP 8.5 scenario, Germany is expected to experience a loss in GDP per capita of 0.61% by 2050 (Kahn et al., 2021). Germany has an environmental performance index of 62.40 and a climate policy score of 67.50, with a climate risk index of 50.33 (Yale Center for Environmental Law & Policy, 2022; Burck et al., 2019; Eckstein et al., 2019).

Italy and Spain have CO2 emissions per capita of 5.7 and 5.2 tons per person and are expected to experience increases in average temperature of 5.5 and 6.4 degrees Celsius, respectively (Bastin et al., 2019; Global Carbon Budget, 2023). In both countries, 91% of respondents believe in climate change, and a high percentage consider it a top threat and a climate emergency (Dynata, 2022; PEW Research Center, 2022; Browning et al., 2021). 77% and 80% of respondents in Italy and Spain, respectively, believe that protecting the environment should

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[2] Germany and Spain were selected for their shared EU policy context, commitment to climate adaptation, and diverse climate risks, alongside differences in governance structures (federal vs. semi-federal), geographic and climatic conditions (continental vs. Mediterranean Europe), and participatory traditions. These factors allow for comparative insights into how governance and regional contexts shape public participation in climate adaptation policies.

be prioritized, even if it causes slower economic growth (ING, 2019). Under the RCP 8.5 scenario, Italy and Spain are expected to experience losses in GDP per capita of 2.56% and 2.26% by 2050, respectively (Kahn et al., 2021). Italy and Spain have environmental performance indices of 57.70 and 56.60, and climate policy scores of 57.70 and 52.90, with climate risk indices of 45.33 and 54.17 (Yale Center for Environmental Law & Policy, 2022; Burck et al., 2019; Eckstein et al., 2019).

Sweden is expected to experience an increase in average temperature of 5.9 degrees Celsius by 2050 and has CO_2 emissions per capita of 3.6 tons per person (Bastin et al., 2019; Global Carbon Budget, 2023). 70% of respondents in Sweden believe that climate change is a top threat, and 66% consider it a climate emergency (PEW Research Center, 2022; Browning et al., 2021). Under the RCP 8.5 scenario, Sweden is expected to experience a loss in GDP per capita of 0.76% by 2050 (Kahn et al., 2021). Sweden has an environmental performance index of 72.70, a climate policy score of 87.20, and a climate risk index of 108.17 (Yale Center for Environmental Law & Policy, 2022; Burck et al., 2019; Eckstein et al., 2019).

At the EU level, the average increase in temperature in the warmest month by 2050 is projected to be 5.7 degrees Celsius. The EU average for CO_2 emissions per capita is 6.2 tons per person, with an environmental performance index of 61.57, a climate policy score of 64.66, and a climate risk index of 73.66 (Global Carbon Budget, 2023; Yale Center for Environmental Law & Policy, 2022; Burck et al., 2019; Eckstein et al., 2019).

Globally, average CO_2 emissions per capita are 4.7 tons per person and the average increase in temperature in the warmest month by 2050 is projected to be 3.3 degrees Celsius (Bastin et al., 2019; Global Carbon Budget, 2023).

Table 1: Overview of climate change indicators

	Germany	Italy	Spain	Sweden	EU	World
Expected increase of average temperature in warmest month by 2050	6.1	5.5	6.4	5.9	5.7	3.3
CO2 emissions per capita	8.0	5.7	5.2	3.6	6.2	4.7
Respondents who believe in climate change worldwide	85%	91%	91%	NA	NA	NA
Climate change seen as top threat	73%	82%	78%	70%	NA	NA
Public belief in climate emergency	77%	81%	71%	66%	NA	NA
Percent loss in GDP per capita by 2050 under the RCP 8.5 scenario	0.61	2.56	2.26	0.76	1.7	1.98
Protecting the environment should be given priority, even if it causes slower economic growth	64%	77%	80%	NA	NA	NA
Environmental performance index	62.4	57.7	56.6	72.7	61.57	43.1
Climate policy score	67.5	57.7	52.9	87.2	64.66	NA
Climate risk index	50.33	45.33	54.17	108.17	73.66	79.25

4. Methods

The methods implemented in this analysis combined qualitative and quantitative approaches to address the task objective of identifying participatory elements in climate adaptation policies and evaluating their effectiveness. The study involved a comprehensive review and analysis of relevant policies using criteria-based and content analysis to assess participatory mechanisms, stakeholder engagement, and monitoring frameworks. Surveys were conducted to gauge public perceptions, knowledge, and willingness to engage in climate adaptation initiatives, providing insights into stakeholder perspectives. Additionally, a co-creation workshop served as a platform to validate findings, explore identified policy gaps, and discuss potential solutions. Together, these methods aligned with the task objective by integrating expert-driven policy analysis, stakeholder feedback, and participatory validation to provide a robust evaluation of participatory elements and their gaps in climate adaptation policies.

4.1 Empirical data collection

4.1.1 Policy selection

The Climate Change Laws of the World database was used for the identification and selection of relevant policies[3]. The Climate Change Laws of the World database is a comprehensive repository of climate change-related laws and policies from around the world. It is a collaborative effort between the Grantham Research Institute at London School of Economics (LSE), GLOBE International, and Climate Policy Radar. The database covers all UNFCCC parties, including 196 countries and the European Union, as well as several territories not in the UN or UNFCCC. It encompasses a wide range of legal documents directly relevant to climate change mitigation, adaptation, loss and damage, or disaster risk management. This includes legislation and policy at the national and sectoral levels, as well as documents from UNFCCC portals, such as Nationally Determined Contributions (NDCs), National Communications, Adaptation Communications, IPCC reports, and submissions to the first Global Stocktake.

Natural language processing (NLP) plays a crucial role in the database's search methodology and allows users to find information without needing to input precise keywords. This is especially valuable for complex topics like climate change laws and policies, where concepts can be described in various ways by different government actors and policymakers. By leveraging techniques such as dense retrieval and fuzzy string search, the system can recognize related and relevant terms and offer a richer search experience. For instance, when users search for terms like "petrol cars", the system can also retrieve results for related terms such as "internal combustion engine vehicles" or "gasoline-powered cars". Even without toggling exact phrase only, users can still retrieve comprehensive and relevant results.

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[3] Sourced from 'Climate Change Laws of the World' interface for the Climate Policy Radar Database, https://climate-laws.org and made available under the Creative Commons CC-BY licence. The data in this database was sourced primarily from the Grantham Research Institute at the London School of Economics.

The search was conducted by keywords and countries. In particular, all climate policies containing the word "adaptation" for Spain, Germany, and the European Union were looked at. Next, it was manually checked what kind of adaptation they are talking about, and those not related to climate change adaptation like, e.g., adaptation to new legislation, were excluded. Those where adaptation only plays a minor role as well as outdated policies were also excluded (before 2020). In total, six policies were selected for Spain, ten policies for Germany, and five policies for the EU. In the respective results sections, the selection processes are described in more detail.

Upon closer examination of the selected policies, it became evident that some also address mitigation objectives. This overlap highlights the interconnected nature of adaptation and mitigation within climate policies. While adaptation focuses on adjusting to the impacts of climate change, mitigation aims to reduce the causes of these impacts. The integration of both aspects in certain policies underscores their complementary roles in fostering climate resilience and achieving long-term sustainability. Acknowledging this overlap enriches the analysis by providing insights into how policies can simultaneously address multiple dimensions of climate action.

4.1.2 Public support for adaptation policies survey

The survey employed a cross-sectional online format, targeting European citizens, with data collected in the summer of 2023. The respondents completed a questionnaire designed to assess public perceptions, intentions, and behaviours concerning climate change adaptation. A 5-point Likert scale was used to measure various constructs.

The survey results from the Likert scale questions were analysed by calculating the mean and standard deviation (SD) for each item. The mean reflects the average level of agreement or support for a given statement across respondents, while the standard deviation provides insight into the variation in responses, indicating whether opinions were generally consistent or diverse.

The survey included questions about (the precise questions are detailed in the results section):

- Support for various climate adaptation policies.

- Participants' intentions to engage in and support climate adaptation policies.

- Willingness to pay for climate programs and participate in government incentive programs.

- Perceptions of whether government regulations made it difficult to adapt to climate risks.

The survey was designed to enhance the objective of identifying policy gaps from the perspective of stakeholders. While analysing policies and pinpointing textual gaps is one

aspect, gathering feedback from individuals allows to understand the gaps they perceive first-hand.

161 participants[4] completed the questionnaire. The respondents had a mean age of 37.77 years, falling within the range of 25-55. The gender distribution was also recorded, with 53.4% male and 46.6% female.

4.1.3 Spanish survey methodology

As this report focuses on studying specific countries within the EU, particular attention is given to these frameworks. In addition, in the case of Spain, the country had outlined an adaptation strategy for key climate change risks that could arise in the region and one of these materialized during the development of Task 4.2, linked to this report. Because of this, the AGORA team decided to take advantage of this opportunity and gather feedback from citizens who were living in the area where the adaptation plan and strategy was being implemented. This took place during the first quarter of 2024, as the region of Catalonia had been exposed to almost two years of severe drought, the water reservoirs and linked resources reached minimums.

The national adaptation strategy plan had specific guidelines and monitoring techniques being implemented, which is why when the water reservoir threshold was below the minimum, the adaptation measures were implemented, limiting usage and availability of water for citizens.

A survey was conducted during the spring of 2024 in the Catalonia region of Spain to gather citizen's perspectives on climate change and its impacts, focusing specifically on the drought emergency affecting the area and it was developed based on a similar survey conducted in Austria (Komendantova & Neumueller, 2020). The survey sought to understand citizen's knowledge of climate change impacts, their trust in policies and authorities, and their willingness to participate in climate adaptation initiatives. The survey also gathered information on which engagement methods were most appealing to respondents.

The survey was designed to enhance the objective of identifying knowledge and engagement gaps from the perspective of stakeholders. Gathering feedback from individuals provides a deeper understanding of the gaps they experience firsthand and can provide important data for future policies and initiatives. The survey was created in an online format and gathered data in an anonymous manner, citizens did not have to use a personal login to access the questionnaire. The objective was to allow the dissemination of the survey through contacting local citizen organizations, associations of neighbours and other key stakeholders that could also share it.

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[4] The survey was distributed using the lead authors' (IIASA) extensive base of contacts across Europe, ensuring a broad and diverse pool of respondents.

The survey was then offered online and in a face-to-face setting during some visits researchers conducted in the city of Barcelona, the capital of the region. It was developed with specific aspects of climate adaptation in mind. These aspects include knowledge of climate change impacts, trust and effectiveness of adaptation policies and initiatives, willingness to participate in adaptation initiatives, willingness to pay for climate initiatives, and preferred engagement method. The survey included a mix of multiple-choice and Likert scale questions. A 9-point Likert scale was used for one question on engagement methods, with 1 being the most preferred and 9 being the least preferred option.

Additionally, the survey was carried out during the first quarter of 2024, right before the regional political elections. These factors stress the willingness of citizens to respond to surveys in general, as well as considering the potential influence of these circumstances on the results of the survey. This implies that in some cases the respondents did not answer all the questions, their interest and enthusiasm dwelling towards the end. They asked several questions whether these datapoints would be used for political purposes and to design any of the proposals that the political parties were creating.

This survey had no support from any political party, nor was it linked to any of the developments of political party proposals. However, the fact that respondents asked these questions raised some interesting qualitative feedback points as it could be the case in the future that decision-makers implement similar surveys as tools to engage and start conversations with citizens. Additionally, it can serve as a mechanism to identify the profiles of individuals living in a region that are more prone to participate, and it may contribute to signal out any specific barriers to using this specific methodology.

By the end of the first round, 172 valid responses were registered. The respondents were between the ages of 18-65+, with the majority of respondents selecting the age ranges of 26-35 (33%) and 36-45 (28%). The gender distribution overwhelmingly favoured female respondents, with 62% female, 33% male, and 5% writing non-binary or prefer not to say. The survey also collected demographic information relating to the highest academic degree obtained, employment type, place of residence, citizenship country, and living situation.

4.1.4 Gap analysis

The identification of policy gaps was conducted through a systematic, multi-step process. Initially, the authors of this report applied their expertise and extensive knowledge of best practices in climate adaptation literature and policies to analyze the selected documents. This expert-driven analysis focused on identifying deficiencies in participatory elements, monitoring frameworks, capacity-building mechanisms, and stakeholder inclusivity within the policies.

To ensure robustness and reliability, these preliminary findings were subsequently validated in a co-creation workshop. The co-creation workshop was held in January 2024 at the AGORA

General Assembly in Zaragoza. Around 15 members of the AGORA consortium participated in the workshop.

The policy gaps identified in the analysis of the participatory elements in the EU, German, and Spanish climate change adaptation policies were grouped into five major clusters: accessibility and representation, communication and education, feedback mechanisms, financial and resources as well as engagement duration and integration. The validation strategy included conducting the co-creation workshop with the aim to discuss gaps within each of the identified clusters and to collect ideas for solving these gaps.

The clusters were presented to the participants, and they were asked to identify policy gaps for each of the clusters. Next, the participants were asked to suggest solutions on how the identified policy gaps could be closed.

This iterative process ensured that the gap detection combined both expert analysis and stakeholder input, providing a comprehensive understanding of the challenges within the selected policies. This approach reinforces the reliability of the identified gaps as actionable points for policy improvement.

4.2 Policy analysis

4.2.1 Arnstein's ladder of citizen participation

To evaluate the level of citizen participation in each of the identified policies, the Arnstein's ladder of citizen participation (Arnstein, 1969) was applied. This simplified model illustrates the diverse levels of citizen engagement and recognizes different degrees of involvement. It offers a framework to grasp the full spectrum of citizen participation to understand the varied demands for involvement. Moreover, it assists in conducting a more detailed assessment of participation dynamics and enables a better understanding of responses from those in positions of authority. The ladder consists of eight rungs, each representing a different level of citizen involvement, ranging from non-participation to citizen control (see Fig. 2).

Co-production aligns closely with the rungs of partnership and delegated power, where stakeholders and authorities share decision-making responsibilities. It transcends tokenistic participation by actively involving citizens as equal partners in policy formulation and implementation.

The evaluation of the citizen involvement type has been conducted based on researcher`s judgements and analysis.

To operationalize the Arnstein's ladder of citizen participation and to analyse participatory elements in the selected adaptation policies a set of criteria was applied related to stakeholders, consultation mechanisms, capacity building, transparency and information sharing, monitoring and feedback (see Table 2). Codifiable data linked to the criteria as well as qualitative data and case studies or best practices were collected. The criteria were developed by the authors and then verified by the members of the AGORA work package 4.

Citizen control	• Citizens have the ultimate control and authority in shaping policies and making decisions. They have the power to influence and direct governance at all levels. • Example: Residents governing a program, being in full charge of its policy and managerial aspect.
Delegated power	• Citizens are given the authority to make certain decisions and have control over specific aspects of governance. They are delegated significant power in decision-making. • Example: Majority of seats on policy boards.
Partnership	• Citizens are actively involved in the decision-making process, and their input is given substantial weight. They collaborate with government or other stakeholders in shaping policies and programs. • Example: Joint policy boards.
Placation	• Authorities seek to appease citizens by offering token participation. Their input may have some influence, but the real decision-making power remains with the government or other authorities. • Example: Giving minority of places on public bodies.
Consultation	• Citizens are asked for their opinions or feedback on specific issues or policies. However, their input is not guaranteed to influence the final decisions, and it may or may not be taken into account. • Example: Attitude surveys.
Informing	• Citizens are provided with information about decisions that have already been made, but they have no real input or influence. • Example: One-way flow of information from officials to citizens through news media.
Therapy	• Participation is minimal, and citizens are viewed as patients who need "therapy" to align their interests with the decisions made by authorities. • Example: Groups brought together to help them "adjust their values and attitudes to those of the larger society."
Manipulation	• Citizens have no real influence or participation in decision-making. They are manipulated or deceived by those in power to support a predetermined outcome. • Example: Placing people on rubberstamp advisory boards to "educate" them or engineer their support.

4.2.2 Criteria based analysis

By applying the criteria to existing policies, we analyze the extent of stakeholder participation as conceptualised by Arnstein. Stakeholder identification establishes a foundation for

meaningful engagement by recognizing and involving diverse groups. The variety of consultation mechanisms reflects different levels of stakeholder influence, ranging from basic information dissemination to genuine collaborative decision-making. Capacity-building empowers participants by enhancing their skills and knowledge, facilitating progression to higher rungs of participation. Transparency mechanisms ensure equitable access to information, fostering trust and accountability in the participatory framework. Monitoring and feedback systems allow stakeholders to evaluate and influence policy outcomes, embodying the concept of shared control and advancing towards the upper levels of participation.

Table 2: Policy analysis criteria

Criteria	Question	Options
Stakeholder identification	Which stakeholders are involved in the participatory elements of the policies?	1=local communities, 2=academia and research, 3=governments and decision makers, 4=civil society representatives, 5=citizens, 6=investors/economic actors, 7=media
Consultation mechanisms	Which consultation mechanisms are mentioned?	1=surveys, 2=focus groups, 3=interviews, 4=workshops, 5=training sessions, 6=gamification, 7=online forums, 8=webinars and live streams, 9=interactive content, 10=personalized communication, 11=meetings, 12=public hearings, 13=participatory research, 14=civic hackathons, 15=online platforms, 16=mobile apps, 17=field data collection
Capacity building	Which capacity building mechanisms are mentioned?	1=training and education, 2=technical assistance, 3=organizational development, 4=resource mobilization, 5=networking and partnership, 6=information and knowledge management, 7=policy and advocacy, 8=monitoring and evaluation
Transparency and information sharing	Are there mechanisms to inform stakeholders about participation?	yes/no
	Are there mechanisms to inform vulnerable populations about participation?	yes/no
	Are there mechanisms for stakeholders to request and access information?	yes/no
Monitoring and feedback	How is the implementation of climate adaptation policies monitored and evaluated?	1=data collection and reporting, 2=performance indicators, 3=stakeholder engagement, 4=evaluation and review, 5=international reporting and accountability, 6=financial control, 7=cross-cutting themes
	Is there a system for stakeholders to provide feedback on policy effectiveness and implementation?	yes/no

4.2.3 Content analysis

A Large Language Model (LLM) Artificial Intelligence (AI) tool was applied to extract relevant information from diverse policy documents. An LLM AI tool allows conducting a dynamic exploration of policy documents for the identification and extraction of relevant words, phrases, and topics beyond the constraints of predefined keywords. This flexibility in data collection aimed to enhance the breadth and depth of the analysis to provide a more comprehensive understanding of the policy landscape. The application of LLMs for content analysis offers a promising alternative to the burdensome and time-consuming process of deductive coding (Chew et al., 2023). While deductive coding is rigorous and well-suited for generalizing results across studies, it can be labour-intensive, especially when coding substantial amounts of data and for nuanced or infrequently mentioned topics. In contrast, LLM-assisted content analysis (LACA) leverages LLMs to reduce the time required for deductive coding while retaining the flexibility of traditional content analysis.

In particular, the LLM AI tool applied in this report is Copula AI. It utilizes vector similarity search, where both the query and the documents are converted into mathematical vectors. By measuring the similarity between these vectors, the system selects the most relevant document parts, usually around seven pages. This leads to the Retrieval-Augmented Generation (RAG) process, where the LLM generates answers based on the extracted content from those pages. This method ensures that responses are directly grounded in the documents, reducing hallucinations and providing more reliable information. Copula AI is data-centric, focused on accurate, document-driven outputs. Copula AI is already being applied in various fields. For example, in the legal domain, it enables lawyers to query case documents to find winning arguments and provides AI-powered services for answering legal questions, such as bankruptcy law. In the medical field, it offers state-of-the-art Q&A platforms for otolaryngologists and delivers recommendations for cost-effective medicines and treatments for various health conditions.

All pre-identified criteria for the analysis were applied to each policy document using this AI system. For example, one of these pre-identified criteria was analysing which stakeholders are addressed by the participatory elements in climate change adaptation policies. The process with Copula AI was as follows: The system first transformed both the question and the document's text into vectors, representing the meaning of the words in a mathematical space. Through vector similarity search, the AI calculated how closely these vectors align, identifying the most relevant sections of the policy. These sections were then retrieved, and the AI generated a detailed answer grounded in the selected document sections. This process ensures transparency, as the retrieved sections were presented to the user for verification, making it clear how the response was derived. Thus, Copula AI functions not as a black box but as a transparent tool, providing traceable and accurate answers based on the document's content. The example on stakeholders illustrates how the analysis proceeded with all the pre-identified criteria.

Following the internal procedures of the AGORA project, the selected LLM tool has been validated to be aligned with GDPR and no personal data is being treated during the use of AI in this context. This allows to ensure that the methodology implemented has no ethical risks while providing greater efficiency to the analysis conducted. Furthermore, to ensure the accuracy and reliability of the collected data, a dual-validation approach was implemented. The information identified by the LLM AI tool was subjected not only to its automated scrutiny but also to a meticulous review by human researchers. This collaborative verification process aimed to combine the efficiency of artificial intelligence with the nuanced understanding and critical thinking abilities of human experts and helped establish a robust and thorough evaluation of the policy data. This integration exemplifies the synergy between advanced technologies and traditional research methodologies, which allowed the creation of a potent and comprehensive analytical framework.

5. Policy analysis

5.1 EU

5.1.1 Policy selection

Fig. 3 illustrates the selection process of relevant climate change adaptation policies in the EU. After the elimination of nonrelevant and outdated policies, five policies remained, which are European Union Biennial Report 4, Regulation (EU) 2021/1119 Establishing the Framework for Achieving Climate Neutrality (European Climate Law), European Union's Adaptation Communication, EU Strategy on Adaptation to Climate Change, Managing Climate Risks – Protecting People and Prosperity Communication (see Table 3).

Figure 3: EU policy selection

Step 1
- Search for climate policies containing the keyword "adaptation"
- Result: 56 policies

Step 2
- Manual check whether relevant "adaptation" (e.g., exclusion of adaptation to new legislation etc.)
- Result: 36 policies

Step 3
- Check the number of "adaptation" mentions (exclusion of policies where adaptation does not play a major role)
- Result: 11 policies

Step 4
- Exclusion of outdated policies
- Result: 5 policies

Step 5
- Analysis of participatory elements in the selected policies

Table 3: Selected EU climate change adaptation policies

English title	Year
European Union Biennial Report 4	2020
Regulation (EU) 2021/1119 Establishing the Framework for Achieving Climate Neutrality (European Climate Law)	2021
European Union's Adaptation Communication	2021
EU Strategy on Adaptation to Climate Change	2021
Managing Climate Risks – Protecting People and Prosperity Communication	2024

5.1.2 Synopsis of selected policies

Below, each of the identified policies is briefly described[5].

The European Union Fourth Biennial Report is a detailed report on the European Union's progress in achieving its economy-wide emissions reduction targets and the policies and measures in place to support these targets. The report covers a wide range of topics, including the Regulation on the Governance of the Energy Union and Climate Action, National Energy and Climate Plans, the Long-Term Strategic Vision on GHG Emissions Reduction, EU policies and measures, sectoral policies and measures in energy, transport, industry, agriculture, land use, land-use change and forestry, waste sectors, and more.

It also discusses the development of policies and measures at both the EU and national levels, the role of legislative proposals from the Commission, and the implementation of Union laws by Member States. The report emphasizes the importance of integrated National Energy and Climate Plans for achieving the Union's energy and climate targets, as well as the need for consistent planning, reporting, and monitoring by the EU and its Member States under the UN Framework Convention on Climate Change and the Paris Agreement.

Furthermore, the report highlights key cross-cutting policies and measures, such as the EU Emissions Trading System, Effort Sharing legislation, Covenant of Mayors, Horizon 2020, and the European Structural and Investment Funds. It also provides an overview of the EU's renewable energy targets, the Energy Union Strategy, and the promotion of renewable energy.

In terms of climate change adaptation, the report highlights the EU's recognition of the critical need for financial support to enhance resilience in developing countries. It discusses the various channels

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[5] To clarify the scope of this analysis, it is important to note that while the focus is on adaptation policies, adaptation and mitigation policies are inherently interconnected, as discussed earlier. Many mitigation policies incorporate adaptation elements, and vice versa. Attempting to limit the scope solely to pure adaptation policies would be both impractical and unrepresentative, as most policies tend to encompass multiple dimensions, and a strict separation would result in a very limited dataset or none at all. Therefore, this analysis includes all policies with a significant focus on adaptation, regardless of whether they are labeled as adaptation policies, mitigation policies, or other types of policies.

through which adaptation support is provided, including bilateral agreements and multilateral funds such as the Adaptation Fund and the Green Climate Fund. The EU emphasizes the importance of aligning its support with the specific needs and priorities of partner countries, as articulated in their national adaptation strategies. The report also notes that EU-funded initiatives aim to diversify livelihoods, improve access to information, and promote sustainable agricultural practices, all of which are essential for building adaptive capacity in vulnerable communities.

The Regulation (EU) 2021/1119 Establishing the Framework for Achieving Climate Neutrality (European Climate Law) aims to establish a framework for the European Union and its Member States to achieve climate neutrality by 2050. It emphasizes the need for enhanced climate action in line with the Paris Agreement and the United Nations Framework Convention on Climate Change. The policy outlines the Union's commitment to stepping up efforts to tackle climate change and to deliver on the implementation of the Paris Agreement, guided by scientific knowledge and the long-term temperature goal of the agreement.

The policy acknowledges the existential threat posed by climate change and the need for a just and inclusive transition to a climate-neutral economy. It highlights the importance of addressing climate-related risks to health, biodiversity, and ecosystems, and emphasizes the need for a balanced approach to economic transformation, sustainable growth, and the achievement of the United Nations Sustainable Development Goals.

Furthermore, the policy emphasizes the importance of sectoral engagement in the pursuit of climate-neutral solutions and the need to ensure a transition to a safe, sustainable, affordable, and secure energy system. It also addresses the risk of carbon leakage and the importance of maintaining effective policy incentives for technological solutions and innovations.

The policy also outlines the process for regular assessment of progress towards climate neutrality, including the submission of reports to the European Parliament and the Council. It establishes the European Scientific Advisory Board on Climate Change and emphasizes the importance of engaging citizens, social partners, and stakeholders in fostering dialogue and the diffusion of science-based information about climate change.

Focusing specifically on climate change adaptation, the regulation stresses that enhancing adaptive capacity and resilience is crucial for mitigating the adverse effects of climate change, which can exceed the capacities of Member States. It calls for the development of comprehensive national adaptation strategies based on robust analyses of climate change impacts and vulnerabilities. Member States are encouraged to adopt policies that are coherent and mutually supportive, particularly for the most vulnerable populations and sectors. The regulation advocates for nature-based solutions and emphasizes the need for shared efforts across all sectors of the economy and society to improve resilience. Furthermore, it highlights the importance of continuous progress in

adaptation efforts, with the Commission tasked to adopt a Union strategy on adaptation that aligns with the Paris Agreement, ensuring that adaptation measures are integrated into broader socioeconomic and environmental policies.

The Adaptation Communication of the European Union outlines the EU's approach to addressing climate change impacts and risks, as well as its efforts to enhance adaptation and resilience. The policy emphasizes the EU's commitment to the objectives of the Paris Agreement and the European Green Deal, which includes measures to cut greenhouse gas emissions and transition to a clean, climate-neutral economy. It also highlights the EU's focus on mainstreaming adaptation considerations into its legislation and instruments, as well as the integration of climate action into its spending programs.

The policy provides an overview of the EU's strategies and actions to address climate change impacts, including the 2021 EU Adaptation Strategy, which aims to make the EU a climate-resilient society by 2050. It outlines specific objectives and actions related to smarter adaptation, systemic adaptation, faster adaptation, and stepping up international action for climate resilience. The policy also discusses the EU's support for developing countries in mobilizing climate finance and efforts to monitor and evaluate adaptation measures.

Furthermore, the policy emphasizes the EU's commitment to gender equality and human rights in the context of climate action, as well as the importance of public participation and stakeholder engagement in designing and implementing climate policies. The policy also includes examples of good practices from EU Member States, which demonstrate various approaches to climate resilience and adaptation.

The EU Strategy on Adaptation to Climate Change emphasizes the need for a comprehensive approach to climate adaptation, which considers the interdependencies between climate change, ecosystems, and the services they provide. It highlights the importance of understanding and addressing climate impacts on terrestrial ecosystems, oceans, and human health. The policy also stresses the significance of data on climate-related risks and losses and advocates for improved data collection and sharing to inform climate-informed decision-making.

Furthermore, the policy underscores the importance of systemic adaptation and emphasizes the integration of climate resilience considerations into all relevant policy fields and the development of effective adaptation strategies and plans at all levels of governance. It also addresses the climate protection gap, the availability and sustainability of freshwater, and the need for financial instruments and innovative solutions to manage climate-induced risks.

The European Commission's Managing Climate Risks – Protecting People and Prosperity Communication highlights the urgent need to manage climate risks to protect people and prosperity. It emphasizes the increasing climate risks facing Europe, the importance of proactive
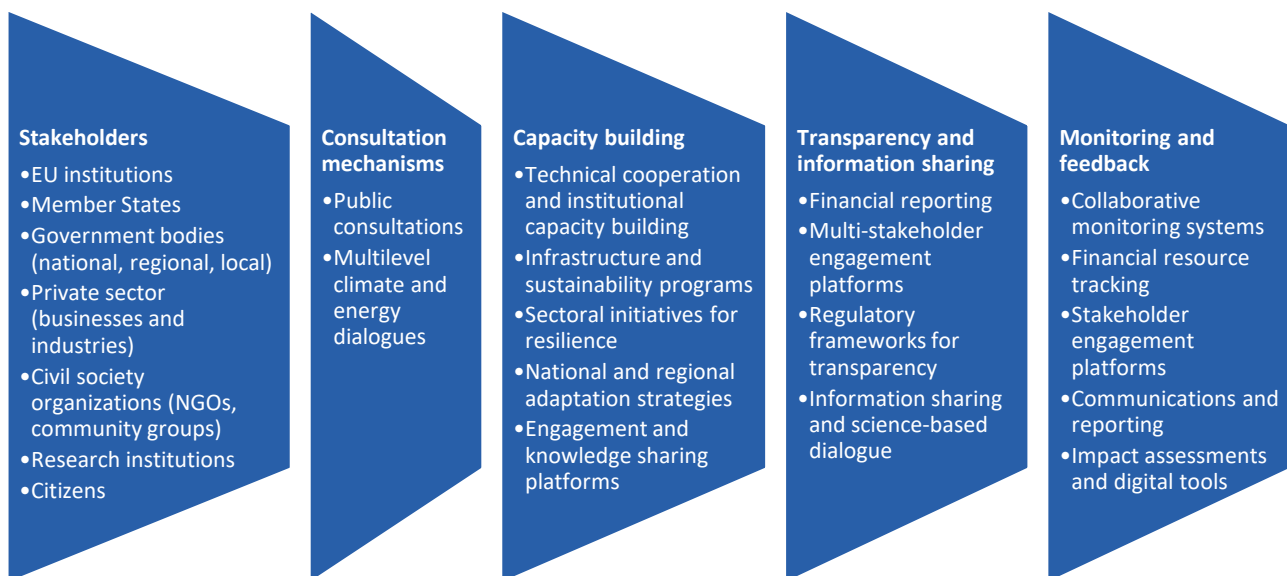
action, and the need for innovative solutions. The Communication outlines key areas of focus, such as enhancing climate data access, building resilience in various sectors, addressing health impacts, supporting SMEs, and strengthening fiscal sustainability. It also emphasizes the importance of integrating climate risk considerations into various policy areas and financial frameworks to ensure a sustainable and resilient future for Europe.

5.1.3 Content analysis

Below, different elements identified in the analysed policies are summarized (see Fig. 4).

Figure 4: EU policies content analysis overview

Stakeholders	Consultation mechanisms	Capacity building	Transparency and information sharing	Monitoring and feedback
•EU institutions •Member States •Government bodies (national, regional, local) •Private sector (businesses and industries) •Civil society organizations (NGOs, community groups) •Research institutions •Citizens	•Public consultations •Multilevel climate and energy dialogues	•Technical cooperation and institutional capacity building •Infrastructure and sustainability programs •Sectoral initiatives for resilience •National and regional adaptation strategies •Engagement and knowledge sharing platforms	•Financial reporting •Multi-stakeholder engagement platforms •Regulatory frameworks for transparency •Information sharing and science-based dialogue	•Collaborative monitoring systems •Financial resource tracking •Stakeholder engagement platforms •Communications and reporting •Impact assessments and digital tools

Stakeholders

The participatory elements of the EU's adaptation policies encompass a wide array of stakeholders and illustrate a deeply inclusive and comprehensive approach to climate adaptation. At the heart of this strategy are the EU institutions, including the European Parliament and the Council, which are pivotal in setting common legislative frameworks at the EU level. These frameworks are then implemented by Member States through national, regional, and local authorities, which highlights a multi-level governance structure that allows for tailored adaptation measures reflective of diverse local conditions and needs.

According to the results, local authorities play a crucial role in the direct implementation of policies and ensure that climate adaptation measures are woven into local planning and decision-making processes. The private sector, encompassing businesses and industries, is another critical player, especially in sectors like infrastructure, procurement, and finance, where their engagement is vital for advancing climate adaptation.

Civil society organizations, including NGOs, community groups, and others, enrich the policy process with advocacy, awareness-raising, and a commitment to holding policymakers accountable.

Similarly, research institutions contribute indispensable knowledge, data, and expertise to support the foundation of evidence-based decision-making and innovation in climate adaptation strategies.

At the individual level, citizens themselves are recognized as key stakeholders, whose actions, advocacy, and community engagement are essential gears in the machinery of adaptation building.

This broad stakeholder engagement underscores the policy's multi-stakeholder approach and ensures that a wide range of perspectives, expertise, and interests are integrated into the decision-making process. This approach not only fosters inclusivity and accessibility but also emphasizes the importance of dialogue, exchange of best practices, and collective action towards achieving the overarching goal of transitioning to a climate-neutral and resilient society in a just and socially fair manner.

Consultation mechanisms

The policies provide a detailed overview of the European Union's consultation mechanisms for climate action and environmental policies and showcase a rich tapestry of approaches designed to incorporate feedback, expertise, and engagement from a broad array of stakeholders. For example, the European Investment Bank engages stakeholders through consultations on its Energy Lending Policy to fine-tune the criteria and priorities for financing energy projects that align with climate goals.

Public consultations (e.g., public consultation on energy lending policy by the European Investment Bank) emerge as a foundational tool for engaging a wide demographic in the policymaking process and facilitating an open exchange of ideas and best practices at all governance levels.

Beyond this, the European Climate Pact and multilevel climate and energy dialogues stand out as broad, inclusive platforms for dialogue and action. The Climate Pact engages citizens and stakeholders in a collective journey towards climate neutrality, while the dialogues provide a forum for local authorities, civil society, the business community, and the general public to discuss and contribute to the EU's climate objectives.

Capacity building

The capacity-building mechanisms within the EU climate adaptation policies encompass a broad array of initiatives and programs designed to enhance the skills, capabilities, and institutional frameworks necessary to address the challenges posed by climate change. These mechanisms include the Technical Cooperation and Capacity Building Facility, which aims to improve the management of the European Development Fund (EDF) portfolio and bolster the participation of Civil Society Organizations (CSOs) in regional policy dialogues. This facility is particularly focused on enhancing coordination, oversight, monitoring, and reporting of EDF-funded actions, as well as strengthening the capacities of regional organizations and stakeholders to implement EU programs in alignment with the Sustainable Development Goals and the Paris Agreement on Climate Change.

The Union Strategy on Adaptation to Climate Change mandates the adoption of strategies aimed at enhancing adaptive capacity and resilience while reducing vulnerability to climate change. It encourages Member States to adopt and implement national adaptation strategies and plans based on comprehensive climate change and vulnerability analyses as well as on the engagement of citizens and stakeholders. Guidelines for climate risk management and engagement initiatives facilitate an inclusive and accessible process at all levels for social partners, academia, the business community, citizens, and civil society, utilizing tools like the European Climate Pact to foster dialogue and disseminate information about climate change.

Technical assistance and capacity building support, such as the InsuResilience Global Partnership and the Netherlands International Water Ambition (NIWA), aim to increase resilience against climate and disaster risks and promote sustainable water management. Programs like Partners for Water and the Interest Group on Climate Change Adaptation facilitate cooperation and exchange in water management and climate change adaptation.

Transparency and information sharing

The European Union has a variety of mechanisms to bolster transparency and information sharing, crucial for fostering participation in climate change initiatives. These initiatives range from technical cooperation and capacity building to leveraging platforms for dialogue and engagement, all aimed at enhancing stakeholders' understanding and involvement in climate action.

Training and capacity-building support is provided to EU and partner country staff and emphasizes national ownership, stakeholder participation, and impact assessment. This approach is reflective of the EU's dedication to ensuring that its climate change initiatives are informed by the principles of aid effectiveness, as outlined in the Paris Declaration on Aid Effectiveness and the Accra Agenda for Action.

In addition to these specific mechanisms, the EU employs a multi-faceted approach to engage and inform stakeholders about their participation in climate action initiatives. This approach includes enhancing stakeholder understanding through capacity building, financial tracking tools, and engaging with regional organizations. Mechanisms like the Global Change Climate Alliance+ (GCCA+), the Resilience Marker, and the Pilot Programme for Climate Resilience aim to support vulnerable countries and communities with a focus on resilience building and climate adaptation.

The Regulation on the European Climate Pact further emphasizes the EU's commitment to engaging with society at all levels to foster dialogue and share science-based information about climate change. This is complemented by sectoral engagement and the development of voluntary roadmaps towards achieving the climate-neutrality objective.

Monitoring and evaluation

Within the European Union's framework for addressing climate change and enhancing climate resilience, a comprehensive system for monitoring, feedback, and stakeholder engagement is

established to ensure effective implementation and improvement of climate policies. This system encompasses various mechanisms aimed at ensuring transparency, accuracy, and accountability in climate action efforts.

Monitoring and feedback mechanisms involve the collaboration of EU Member States, the European Commission's Directorate-General for Climate Action, the European Environment Agency (EEA), and other key institutions.

The framework for monitoring and evaluating climate adaptation policies incorporates tracking financial resources, assessing the impact of support measures, and reporting on progress across sectors and regions. Stakeholder engagement is facilitated through dialogue, consultations, and capacity-building initiatives, which provide opportunities for diverse stakeholders to contribute insights on policy effectiveness and implementation. Public consultations, technical cooperation, and participation in EU-funded initiatives offer platforms for stakeholder feedback, while monitoring and reporting mechanisms ensure that policy impacts are transparently assessed. To this aim, several initiatives have been activated in the past years in parallel with the implementation of the analysed EU policies. For example, the European Climate Foundation funded the Knowledge Network on Climate Assemblies whose aims are to better understand the experiences of climate assemblies across Europe, monitor and evaluate them, disseminate and document best practices and identify future trends.

National communications and engagement in multi-stakeholder platforms further democratize the feedback process and allow a wide range of voices to be heard in shaping and refining EU climate policies. Impact assessments and the use of digital technologies and climate services underpin informed decision-making and offer stakeholders advanced tools for understanding and engaging with climate data.

5.1.4 Arnstein's ladder of citizen participation

Below, elements identified in the EU policies are discussed and allocated along the rungs of the Arnstein's ladder of citizen participation (see Fig. 5).

Figure 5: Overview of participatory elements in EU policies
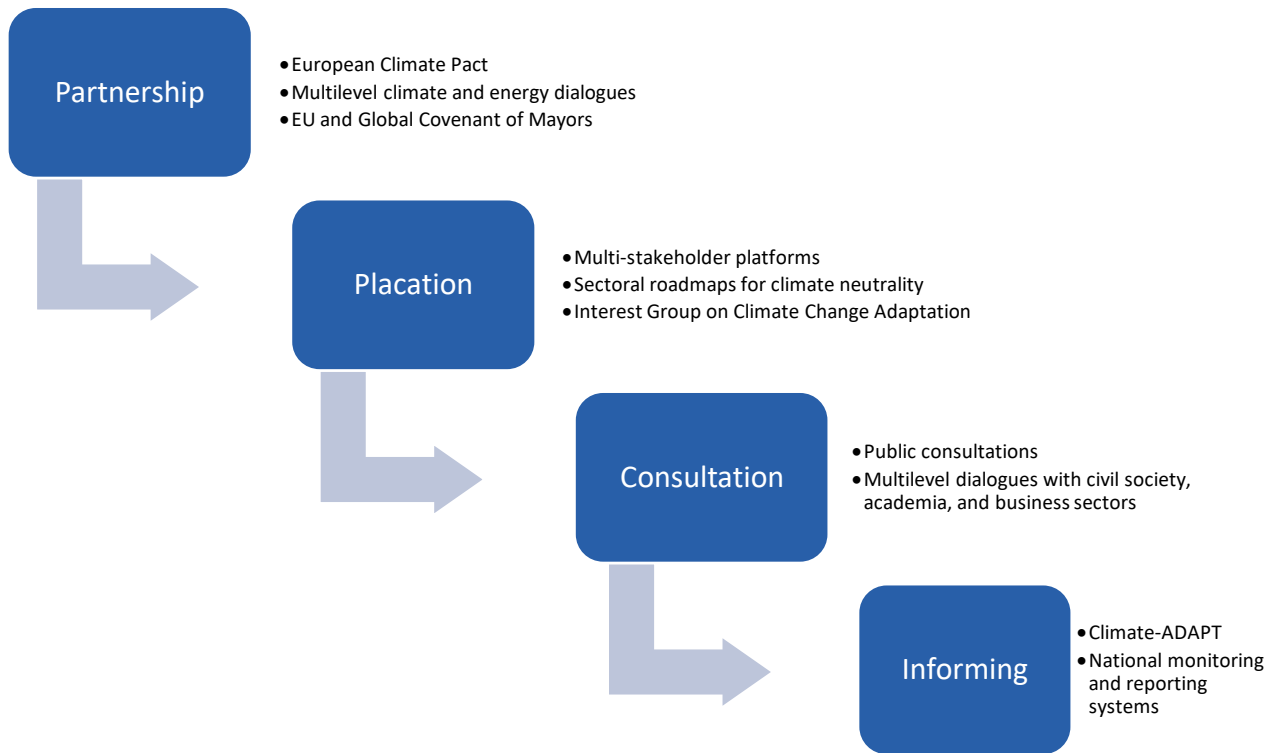
Partnership

The European Climate Pact and multilevel climate and energy dialogues are examples that demonstrate genuine collaboration across government levels and sectors. These platforms facilitate dialogue, exchange of information, and sharing of best practices and enable stakeholders to have a real influence on policy outcomes.

For example, partnering with various entities to address climate disinformation and develop climate and disaster risk assessment tools illustrates the practical application of partnership. This involves collaborative efforts where stakeholder expertise is crucial to achieving effective and reliable outcomes.

Initiatives like the strengthening of the EU and Global Covenant of Mayors, and the establishment of a policy support facility under the EU Covenant of Mayors, underscore the movement towards empowering local and regional authorities. This collaboration helps to tailor climate action and adaptation strategies to local needs and ensure that local insights and priorities are integrated into broader policy frameworks.

Placation

Stakeholders contribute to the design and implementation of policies through multi-stakeholder platforms, technical cooperation, and capacity-building initiatives. Examples like the creation of sectoral roadmaps for climate-neutrality and the engagement in regional capacity-building initiatives highlight the EU's attempt to involve various groups more actively.

Entities like the Interest Group on Climate Change Adaptation facilitate cooperation and exchange of experiences and provide stakeholders with a platform to voice their opinions and share expertise. Yet, these platforms typically do not grant stakeholders the power to enact or veto policies.

Initiatives like the European Social Fund Plus (ESF+), Erasmus+, and the European Solidarity Corps, which focus on reskilling and education in response to climate change, demonstrate the EU's commitment to involve citizens in adaptation efforts. Nonetheless, while these programs engage citizens, they do not necessarily empower them to influence policy outcomes significantly.

Consultation

The EU engages in public consultations and multilevel climate and energy dialogues, which include stakeholders from cities, civil society organizations, the private sector, and academia. These consultations aim to gather diverse perspectives and input on climate policies and initiatives. Stakeholders are invited to share their feedback and concerns, which can help shape the broader discussion on policy directions. While these consultations allow for a range of opinions to be expressed, there is often a gap between the feedback provided and its influence on final decisions. The decision-making power remains with the authorities, and stakeholder inputs, although considered, may not necessarily lead to substantial changes in policies or actions.

In certain areas, the EU seeks input from specific groups such as academia, research institutions, and the business community. These consultations are aimed at gathering expert opinions and data that could help shape more effective and informed policies.
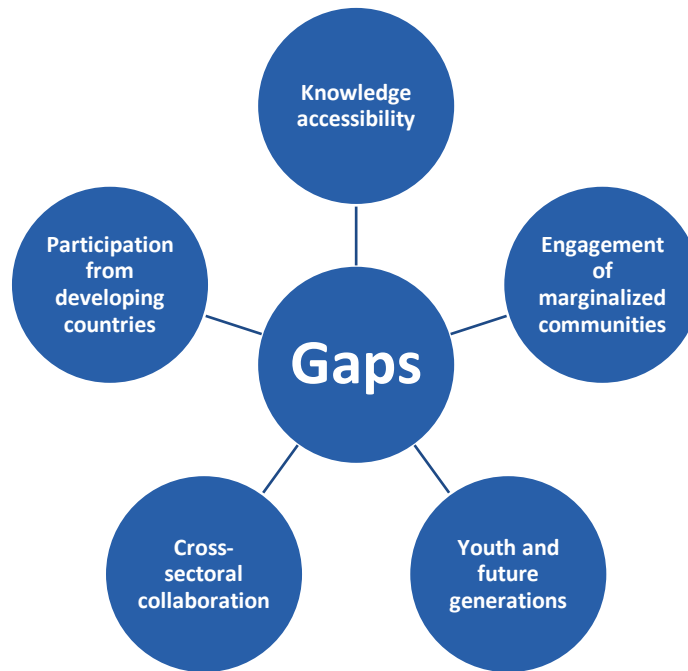
Informing

The EU uses various platforms and systems to provide stakeholders with information related to climate policies and adaptation strategies. This includes Climate-ADAPT as a central hub, and national monitoring and reporting systems that provide insights into the adaptation activities of Member States. Efforts are made to enhance capacities through training materials, online courses, and climate data tools that facilitate informed decision-making. These resources aim to raise awareness and provide the necessary tools for stakeholders to understand and potentially engage with climate-related issues.

5.1.5 Identifying gaps

Several gaps can be identified in the analysed policies. Addressing these gaps in participation can enhance the effectiveness and inclusivity of climate change adaptation efforts in the EU and beyond (see Fig. 6).

Figure 6: EU participation gaps

The policies highlight the importance of knowledge in informing effective adaptation actions. However, there may be a gap in ensuring that this knowledge is accessible to all stakeholders, including local communities, vulnerable groups, and non-governmental organizations. Ensuring that information is presented in a clear and understandable manner can enhance participation.

The policies emphasize the need for adaptation strategies at all levels, including national, regional, and local. However, there may be a gap in actively engaging marginalized communities and other vulnerable populations in the development and implementation of adaptation plans. Their perspectives and traditional knowledge can be valuable in shaping effective strategies.

The policies mention the importance of long-term adaptation strategies and plans. However, there may be a gap in engaging youth and future generations in the decision-making processes related to climate change adaptation. Their involvement is essential as they will bear the brunt of climate impacts in the future.

While the policies mention the importance of integrating adaptation considerations into various sectors, there may be a gap in fostering cross-sectoral collaboration. Participation from sectors such as agriculture, infrastructure, health, and education is crucial for a holistic approach to climate change adaptation.

The policies highlight the significance of international engagement and exchanges on adaptation. However, there may be a gap in ensuring meaningful participation from developing countries in shaping global adaptation efforts. Their unique challenges and perspectives need to be actively included in the dialogue.

Last but not least, a vast majority of the identified policy instruments are voluntary. Guaranteeing that the outcomes of public participation processes are binding and make funding available to support their implementation are other important gaps

5.2 Germany

5.2.1 Policy selection

Fig. 7 illustrates the selection process of relevant climate change adaptation policies in Germany. After the elimination of nonrelevant and outdated policies ten policies remained, which are Immediate Climate Adaptation Programme, Federal Climate Adaptation Act, Measures Programme for the Implementation of the Agenda on the Adaptation of Land Use, Land Use Change and Forestry (LULUCF), Fisheries and Aquaculture to Climate Change, Forest Strategy 2050, Federal Action Plan on Nature-Based Solutions for Climate and Biodiversity, Arable Farming Strategy 2035, Climate Action Program 2030, Eighth National Communication and fifth Biennial Report of the Federal Republic of Germany under the United Nations Framework Convention on Climate Change, Germany's Recovery and Resilience Plan, Action Plan for the Dialogue and Work Process on the Middle Class, Climate Protection and Transformation (see Table 4).
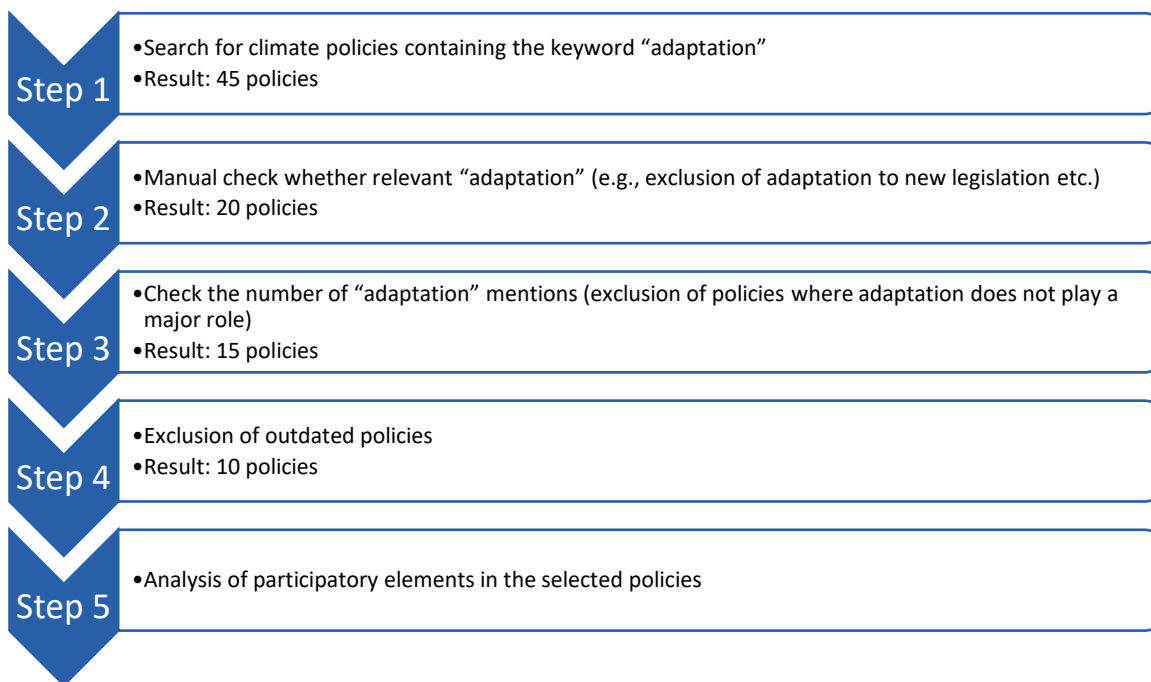
Figure 7: German policy selection

Step 1
- Search for climate policies containing the keyword "adaptation"
- Result: 45 policies

Step 2
- Manual check whether relevant "adaptation" (e.g., exclusion of adaptation to new legislation etc.)
- Result: 20 policies

Step 3
- Check the number of "adaptation" mentions (exclusion of policies where adaptation does not play a major role)
- Result: 15 policies

Step 4
- Exclusion of outdated policies
- Result: 10 policies

Step 5
- Analysis of participatory elements in the selected policies

Table 4: Selected German climate change adaptation policies

English title	German title	Year
Immediate Climate Adaptation Programme	Sofortprogramm Klimaanpassung	2022
Federal Climate Adaptation Act	Bundes-Klimaanpassungsgesetz	2023
Measures Programme for the Implementation of the Agenda on the Adaptation of LULUCF, Fisheries and Aquaculture to Climate Change	Maßnahmenprogramm zur Umsetzung der Agenda Anpassung von Land- und Forstwirtschaft sowie Fischerei und Aquakultur an den Klimawandel	2020
Forest Strategy 2050	Waldstrategie 2050	2022
Federal Action Plan on Nature-Based Solutions for Climate and Biodiversity	Aktionsprogramm Natürlicher Klimaschutz	2023
Arable Farming Strategy 2035	Ackerbaustrategie 2035	2021
Climate Action Program 2030	Klimaschutzprogramm 2030	2021
Eighth National Communication and fifth Biennial Report of the Federal Republic of Germany under the United Nations Framework Convention on Climate Change	/	2023
Germany's Recovery and Resilience Plan	Deutscher Aufbau- und Resilienzplan	2021
Action Plan for the Dialogue and Work Process on the Middle Class, Climate Protection and Transformation	Aktionsplan zum Dialog- und Arbeitsprozess Mittelstand, Klimaschutz und Transformation	2022

5.2.2 Synopsis of selected policies

Below, each of the identified policies is briefly described.

The Immediate Climate Adaptation Programme is a comprehensive initiative by the German government to address the urgent need for climate adaptation measures. It consists of three main pillars: funding and capacity building, on-site consultation as well as enhanced networking.

Funding and capacity building focuses on enhancing local climate resilience through the expansion of the climate adaptation management program. It also aims to better protect vulnerable groups in social institutions and support innovative projects. On-site consultation aims to provide better support for municipalities in adapting to climate change by offering specialized advice on developing and implementing heat action plans, as well as facilitating networking and knowledge exchange among local actors. Enhanced networking seeks to improve the networking of municipal actors through conferences and mentoring programs, as well as the establishment of best practice examples and social media channels for a nationwide community of climate adaptation.

The program also includes plans for the Week of Climate Adaptation, which offers concentrated advisory and information services for municipalities and social institutions. Additionally, it outlines future steps, such as the introduction of a Climate Adaptation Act, the development of a proactive

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adaptation strategy, and the establishment of a systematic funding mechanism for climate adaptation measures.

The Federal Climate Adaptation Act is a German federal law aimed at protecting lives, health, society, economy, infrastructure, nature, and ecosystems from the negative impacts of climate change. It focuses on adapting to current and expected climate change effects, conducting climate risk analyses, and implementing measures to reduce these risks. The law requires the federal government to develop a proactive climate adaptation strategy, update it every four years, and conduct climate risk analyses at least every eight years. It also mandates the consideration of climate adaptation in public planning and decision-making, as well as the adaptation of federal properties to climate change. Additionally, the law outlines the cooperation between the federal government and the states in achieving climate adaptation goals. It emphasizes the importance of integrating climate adaptation into various sectors and encourages public participation in the development and implementation of climate adaptation strategies.

The Measures Programme for the Implementation of the Agenda on the Adaptation of Land Use, Land Use Change and Forestry (LULUCF), Fisheries, and Aquaculture to Climate Change is a comprehensive plan aimed at addressing the extensive and current impacts of climate change on agriculture, forestry, fisheries, and aquaculture. The programme acknowledges the increasing frequency and intensity of production risks and aims to intensify both on-farm and off-farm risk management in these sectors. It also emphasizes the need for a long-term adaptation to climate change to ensure the independence of the agricultural and forestry sectors from state financial aid.

The programme includes measures such as strengthening on-farm risk management through vulnerability analysis and adaptation of production systems, targeted support for risk management through risk communication and promotion of multi-peril insurance or investment support, and the expansion of crisis management instruments and their practical application. Additionally, it highlights the importance of continuous research to understand the impacts of climate change and develop adaptation strategies. This involves research on adaptation of production systems and ecosystems, breeding research to improve stress tolerance and resource efficiency, and the establishment of agricultural landscape laboratories for testing innovative adaptation strategies.

Furthermore, the programme emphasizes the integration of scientifically based information on climate change and adaptation into the education, training, and advisory services for agriculture, forestry, fisheries, and aquaculture. It focuses on the development of digital tools and platforms for education and advisory purposes. The programme also highlights the importance of breeding resilient and adaptable crops, livestock, and trees, taking into account the societal acceptance of different breeding methods and goals.

To ensure the successful implementation of the programme, a permanent working group of federal and state governments will be established to continuously review and propose adjustments to regulatory and funding policy frameworks related to climate adaptation in agriculture, forestry, fisheries, and aquaculture. The programme also emphasizes the need for regular dialogue and coordination with industry associations, states, and other affected sectors.

The Forest Strategy 2050 is a comprehensive and forward-looking plan developed by the German Federal Ministry of Food and Agriculture to address the challenges and opportunities for sustainable forest management. The strategy aims to ensure the preservation and adaptation of Germany's forests to changing climatic conditions while also catering to the diverse needs of society, nature, and the economy. It emphasizes the importance of forests as a crucial ecosystem, highlighting their role in carbon sequestration, biodiversity conservation, wood production, recreation, and water and soil protection.

The strategy is built on the principles of sustainability, considering the economic, ecological, and social aspects of forest management. It sets out ten key action areas, each with specific milestones to be achieved by 2030. These action areas include climate protection and adaptation, biodiversity conservation, wood production and utilization, recreation and health, soil and water management, sustainable forest management, ownership and new value creation, digitalization and technology, research and development, and communication and information.

The Forest Strategy 2050 also emphasizes the need for ongoing monitoring and evaluation of progress, as well as the integration of scientific insights and public engagement in the decision-making process. It acknowledges the interconnectedness of forest management with international and European commitments related to sustainable forest management, climate change mitigation, and biodiversity conservation.

The Federal Action Plan on Nature-Based Solutions for Climate and Biodiversity is a comprehensive strategy developed by the German government to address the challenges of climate change and biodiversity loss through nature-based solutions. The plan encompasses a wide range of measures aimed at protecting and restoring ecosystems, promoting sustainable land use, and integrating nature-based solutions into various sectors and policies.

The plan emphasizes the importance of nature-based solutions in mitigating climate change, enhancing biodiversity, and building resilience to environmental risks. It aligns with international goals and commitments, such as the Agenda 2030 for Sustainable Development and the EU's restoration targets, and seeks to integrate nature-based solutions into national and international cooperation efforts.

Key components of the plan include the protection and restoration of intact ecosystems such as forests, wetlands, and coastal areas, as well as the promotion of sustainable land management

practices. It also focuses on integrating nature-based solutions into urban and infrastructure planning, fostering research and capacity building, and promoting education and awareness about nature-based solutions.

Furthermore, the plan emphasizes the importance of international cooperation and the mobilization of financial resources to support nature-based solutions in developing countries. It aims to leverage multilateral development banks and other international mechanisms to increase funding for nature-based solutions and promote their integration into global climate and biodiversity agendas.

The Arable Farming Strategy 2035 is a comprehensive plan developed by the Federal Ministry of Food and Agriculture in Germany to address the challenges and opportunities in arable farming. The strategy aims to ensure a productive and diverse crop production system while considering environmental sustainability, economic viability, and social acceptance.

The strategy is based on six guiding principles, which include ensuring the supply of high-quality food, securing the income of farmers, protecting natural resources, preserving biodiversity in agricultural landscapes, adapting agriculture to climate change, and increasing societal acceptance of arable farming practices.

Furthermore, the strategy outlines twelve action areas, covering various aspects such as soil management, crop diversity, fertilization, plant protection, plant breeding, digitalization, biodiversity, climate adaptation, climate protection, education and advisory services, agriculture and society, and implementation support.

The strategy emphasizes the importance of integrating the latest scientific research and technological innovations to address the challenges faced by arable farming, such as climate change, environmental protection, and economic sustainability. It also highlights the need for continuous evaluation and adaptation of the strategy to ensure its effectiveness in the long term.

The Climate Action Program 2030 is a comprehensive plan developed by the German government to address climate change and reduce CO_2 emissions. It builds upon the existing Klimaschutzplan 2050 and aims to implement specific measures to achieve the necessary CO_2 reduction targets. The program encompasses a wide range of sector-specific and cross-sectoral measures to promote CO_2 reduction, energy efficiency, and the transition to renewable energy sources.

The program includes four key elements: promotion of CO_2 reduction through funding programs and incentives to ensure practical and economically feasible CO_2 reduction, implementation of CO_2 pricing to incentivize innovation and emission reduction in a cost-effective manner, redistribution of additional revenues from CO_2 pricing to support climate protection measures and provide relief

to citizens and the economy, and implementation of regulatory measures to strengthen CO2 reduction efforts by 2030.

The program also emphasizes the importance of international cooperation and aligns with the goals set in the Paris Agreement and EU climate regulations. It aims to ensure that the transformation towards climate-friendly options is accessible to everyone, including individuals, businesses, and local governments.

In terms of climate change adaptation, the program recognizes that effective climate protection policies must extend beyond mere emission reductions to encompass strategies that prepare society for the impacts of climate change. It emphasizes the necessity of fostering a collaborative approach among government, businesses, and communities to identify and respond to climate-related risks.

Furthermore, the program emphasizes the importance of continuous monitoring and evaluation of the implemented measures to assess their effectiveness and make adjustments as needed. It also highlights the significance of collaboration with local governments and regions to achieve overall success.

The Eighth National Communication and fifth Biennial Report of the Federal Republic of Germany under the United Nations Framework Convention on Climate Change is a comprehensive and detailed document that presents Germany's climate protection policies within the legislative, political, and socio-economic framework. It discusses the impacts of climate change, describes the policies and measures initiated to reduce greenhouse gas emissions, and outlines adaptation measures. The report also covers the effects of these measures, including both observed and projected impacts, and provides information on financial support, technology cooperation, education, training, and public awareness initiatives.

The report is structured into several sections, including national circumstances, information about greenhouse gas (GHG) inventory, policies and measures, projections and effects of measures, vulnerability, climate impacts, and adaptation measures, financial support and technology cooperation, research and systematic observation, and education and public awareness.

It provides key data on Germany's population, economic development, geography, land use, climate, energy consumption, electricity generation, energy prices, transport, industry, waste management, and wastewater treatment. Additionally, it discusses Germany's commitment to achieve greenhouse gas neutrality, its Climate Change Act, and the Climate Action Programme 2030.

The report also delves into Germany's international climate finance efforts, its adaptation policy, climate models, projections, and scenarios, climate impacts, vulnerabilities, and hazards, adaptation activities, research landscape, and international climate finance. It highlights Germany's

commitment to ambitious financial support for developing, emerging, and transition countries for reducing GHG emissions and adapting to climate change.

Furthermore, the report emphasizes the importance of protecting natural systems and resources to prevent domino effects and reduce climate risks through adaptation measures. It also outlines Germany's efforts in international climate finance, climate action, and climate adaptation in developing and emerging countries.

Germany's Recovery and Resilience Plan is a comprehensive strategy developed in response to the economic and social challenges posed by the COVID-19 pandemic. The plan aims to address the impact of the pandemic on the economy and society, while also focusing on sustainable and inclusive growth. It encompasses a wide range of measures and investments across various sectors, including decarbonization, climate-friendly mobility, digitalization, education, social inclusion, healthcare, and public administration.

The plan is closely aligned with the European Union's objectives, particularly those outlined in the Next Generation EU initiative, which seeks to mitigate the effects of the pandemic, promote sustainable and resilient recovery, and support the green and digital transitions. It emphasizes investments in climate action, digital infrastructure, and other areas crucial for addressing the challenges and opportunities presented by the green and digital transformations.

Furthermore, the plan is designed to complement the European Semester process and address the country-specific recommendations formulated within that framework. It also aims to contribute to the four pillars of the EU's annual sustainable growth strategy, focusing on ecological sustainability, productivity, fairness, and macroeconomic stability.

The Action Plan for the Dialogue and Work Process on the Middle Class, Climate Protection, and Transformation is a comprehensive strategy developed by the Federal Ministry for Economic Affairs and Climate Protection to support the middle class in navigating the challenges of climate change and transitioning towards sustainability. The plan emphasizes the crucial role of the middle class in driving the transformation towards a more sustainable and climate-friendly economy.

The plan addresses various key areas, including the need for competitive prices for climate-neutral energy sources, support for the transition to renewable energy, and the promotion of climate-friendly raw materials. It also focuses on specific challenges faced by different industries within the middle class, such as the role of the crafts sector and the support for socially oriented businesses.
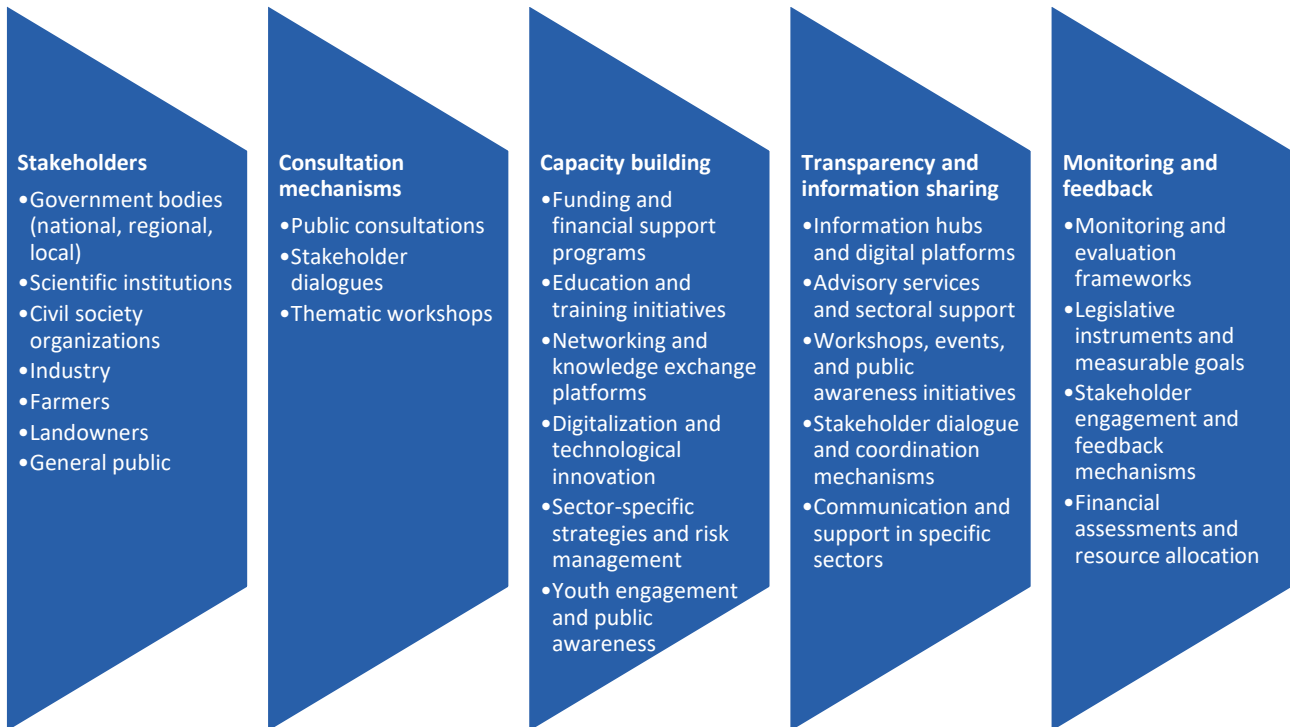
Furthermore, the plan outlines measures to streamline regulatory frameworks, accelerate approval processes, and reduce bureaucratic burdens for middle-class businesses. It also highlights the importance of tailored support for middle-class enterprises, including funding, expertise, and networking opportunities.

5.2.3 Content analysis

Below, different elements identified in the analysed policies are summarized (see Fig. 8).

Figure 8: German policies content analysis overview

Stakeholders
•Government bodies (national, regional, local)
•Scientific institutions
•Civil society organizations
•Industry
•Farmers
•Landowners
•General public

Consultation mechanisms
•Public consultations
•Stakeholder dialogues
•Thematic workshops

Capacity building
•Funding and financial support programs
•Education and training initiatives
•Networking and knowledge exchange platforms
•Digitalization and technological innovation
•Sector-specific strategies and risk management
•Youth engagement and public awareness

Transparency and information sharing
•Information hubs and digital platforms
•Advisory services and sectoral support
•Workshops, events, and public awareness initiatives
•Stakeholder dialogue and coordination mechanisms
•Communication and support in specific sectors

Monitoring and feedback
•Monitoring and evaluation frameworks
•Legislative instruments and measurable goals
•Stakeholder engagement and feedback mechanisms
•Financial assessments and resource allocation

Stakeholders

Key stakeholders engaged in these policies include government bodies at the federal, state, and local levels, as well as scientific institutions, civil society organizations, industry representatives, farmers, landowners, and the general public. This multi-stakeholder approach acknowledges the interconnectedness of climate issues and the need for collective action.

Participatory elements within these policies emphasize dialogue, consultation, and engagement with stakeholders to ensure that their perspectives, expertise, and concerns are considered in the development and implementation of climate strategies. This inclusive approach aims to build consensus, enhance transparency, and foster ownership of climate initiatives among stakeholders, ultimately leading to more effective and sustainable outcomes.

Moreover, these policies recognize the importance of collaboration across different sectors and levels of governance to address the complex challenges posed by climate change. Whether it is supporting local governments in implementing climate adaptation measures, engaging with industry stakeholders to promote sustainable practices, or involving the public in raising awareness and fostering behavioural change, these policies prioritize cooperation and partnership to achieve shared climate goals.

Consultation mechanisms

Central to the policies are consultation mechanisms designed to facilitate dialogue, information sharing, and collaboration among stakeholders. These mechanisms include public consultations, stakeholder dialogues, thematic workshops, and ongoing engagement processes. Through these consultation mechanisms, stakeholders ranging from government bodies and scientific institutions to civil society organizations and the general public are actively engaged in the development and implementation of policies.

The goal of these consultation mechanisms is to ensure that policies reflect the diverse perspectives, expertise, and interests of stakeholders, ultimately leading to more effective and sustainable outcomes. By fostering inclusive decision-making and collaboration, these policies aim to address complex challenges such as climate change adaptation, sustainable land use, biodiversity conservation, and economic resilience.

Furthermore, these policies recognize the interconnected nature of environmental, social, and economic issues, highlighting the importance of integrated approaches and cross-sectoral collaboration. Through consultation mechanisms, stakeholders are provided with opportunities to contribute to policy development, share knowledge and best practices, and participate in the implementation and evaluation of measures.

Capacity building

In Germany's approach to climate adaptation, capacity building mechanisms are designed to enhance the abilities of local communities, municipalities, sectors such as agriculture, forestry, fisheries, aquaculture, and various stakeholders to adapt to climate change impacts effectively. These mechanisms span a broad spectrum, including funding and support for hiring climate adaptation managers, organizing specialized conferences like those on "Sponge Cities" for urban resilience, and establishing educational initiatives for training municipal staff.

Notably, there is a strong emphasis on information provision and consultation, featuring nationwide educational initiatives and efforts to raise public awareness about the climate crisis. Networking plays a pivotal role, with conferences and the creation of resources like databases for funding opportunities and thematic workshops to facilitate the exchange of best practices.

Sector-specific strategies, such as those for LULUCF, emphasize analysing vulnerabilities, developing digital tools for education and advisory purposes, and establishing networks of pilot farms with scientific support for iterative learning. These strategies also focus on diversifying production systems and strengthening risk and crisis management to better prepare for events like floods or droughts.

The Forest Strategy 2050 and the Federal Action Plan on Nature-Based Solutions for Climate and Biodiversity incorporate mechanisms like the development of qualification standards for forestry, digitalization across the forest and wood cluster, and the establishment of competence centres for

natural climate protection. These plans aim to support sustainable management, enhance societal awareness, and foster dialogue around the importance of forests and nature-based solutions.

Efforts also extend to the education sector and the digitalization of businesses, with initiatives like the Digital Innovation Hub for Climate and specific funds designed to engage youth in climate action. Furthermore, the Recovery and Resilience Plan underlines the digitalization of education and modernization of public administration as key capacity building areas, alongside investment in key technologies and support for the digital transformation of businesses.

Capacity building in the context of climate action is multifaceted, aiming not only at enhancing technical skills and knowledge but also at fostering a broader understanding and engagement among all stakeholders involved. This comprehensive approach seeks to empower communities, professionals, and organizations with the tools and knowledge necessary to navigate the challenges of climate change and contribute effectively to sustainability and resilience efforts.

Transparency and information sharing

A multifaceted approach to transparency and information sharing is evident, encompassing a range of instruments and initiatives. Central to these efforts is the establishment of hubs and centres designed to serve as primary sources of information, guidance, and support for stakeholders at various levels, including municipalities and local actors. These hubs play a pivotal role in facilitating access to resources, offering advice on climate adaptation, and promoting comprehensive, precautionary measures across the nation.

To further the agenda of climate adaptation, specialized advisory programs and communication measures are deployed to assist in the development and implementation of plans aimed at protecting communities and infrastructure from climate-related risks, such as heatwaves. These initiatives are geared towards advancing knowledge and understanding of integrated approaches to climate adaptation, particularly in urban settings.

Another key aspect involves organizing workshops and events in regions particularly vulnerable to climate change. These gatherings are intended to provide targeted information and foster dialogue on regional climate impacts and potential adaptation strategies, supporting action planning and preparation for effective response measures.

The introduction of thematic weeks or events serves to bring climate adaptation into the public eye, demonstrating tangible successes at the municipal level with minimal financial resources. Such initiatives aim to compress advisory and information services for a concentrated impact.

Networking conferences offer platforms for nationwide networking among all stakeholders in the field of climate adaptation. These conferences emphasize the importance of nature-based solutions and natural climate protection, facilitating the exchange of best practices and fostering collaboration.

Mentoring programs for climate adaptation managers represent another innovative approach, where experienced professionals impart practical knowledge to newcomers in the field, addressing the everyday challenges associated with climate adaptation management.

In the agricultural, forestry, fisheries, and aquaculture sectors, strengthening risk management through communication and support mechanisms, such as advising on creating climate-resilient mixed forests and developing digital learning tools, plays a crucial role. These efforts are complemented by the establishment of pilot farms and learning initiatives that directly engage stakeholders in adopting and implementing innovative adaptation measures.

The creation of digital platforms and national information portals ensures that comprehensive and specific information is readily accessible for implementing location-specific adaptation measures. These digital tools are instrumental in facilitating education, training, and advisory services related to climate change adaptation.

Dialogue and coordination with stakeholders, including through permanent working groups, ensure ongoing communication and collaboration across sectors. This allows for a continuous review and adjustment of policy frameworks to address the evolving challenges of climate adaptation effectively.

Monitoring and feedback

Germany's climate adaptation policies are characterized by a multi-faceted approach that encompasses comprehensive monitoring and evaluation of strategies across various sectors. These policies are anchored by the establishment of robust monitoring and evaluation frameworks, leveraging legislative instruments like the Climate Adaptation Act to set measurable goals and ensure the implementation of verifiable measures. Key to these efforts are proactive climate adaptation plans, working groups, and a strong emphasis on stakeholder engagement, including networking conferences, collaborations with industry associations, and the involvement of regional stakeholders to ensure that sector-specific needs and challenges are addressed effectively.

Financial assessments and the alignment of financing structures at both federal and state levels are crucial for allocating sufficient resources towards the effective realization of climate adaptation measures. Additionally, the policies highlight the importance of international collaboration, aligning with global standards and advocating for increased international support to tackle the worldwide challenge of climate change.

The role of research, digital initiatives, and knowledge transfer is prioritized to ensure that insights gained are applied practically, enhancing the effectiveness of climate adaptation strategies. Feedback mechanisms, including platforms like the Zentrum KlimaAnpassung (ZKA) and public consultations, offer stakeholders and the public opportunities to influence policy development and implementation. These forums facilitate ongoing dialogue, enabling the identification of evolving challenges and opportunities, thereby ensuring that policies remain adaptive and responsive.

Moreover, the integration of regular reports, monitoring systems, and evaluation frameworks underscores the commitment to assessing the effectiveness of climate adaptation measures, refining policies, and optimizing resource allocation based on evidence and stakeholder feedback. This holistic approach underscores a commitment to transparency, collaboration, and continuous improvement in the pursuit of achieving climate goals in Germany.

5.2.4 Arnstein's ladder of citizen participation

Below, elements identified in the German policies are discussed and allocated along the rungs of the Arnstein's ladder of citizen participation (see Fig. 9).

Figure 9: Overview of participatory elements in German policies
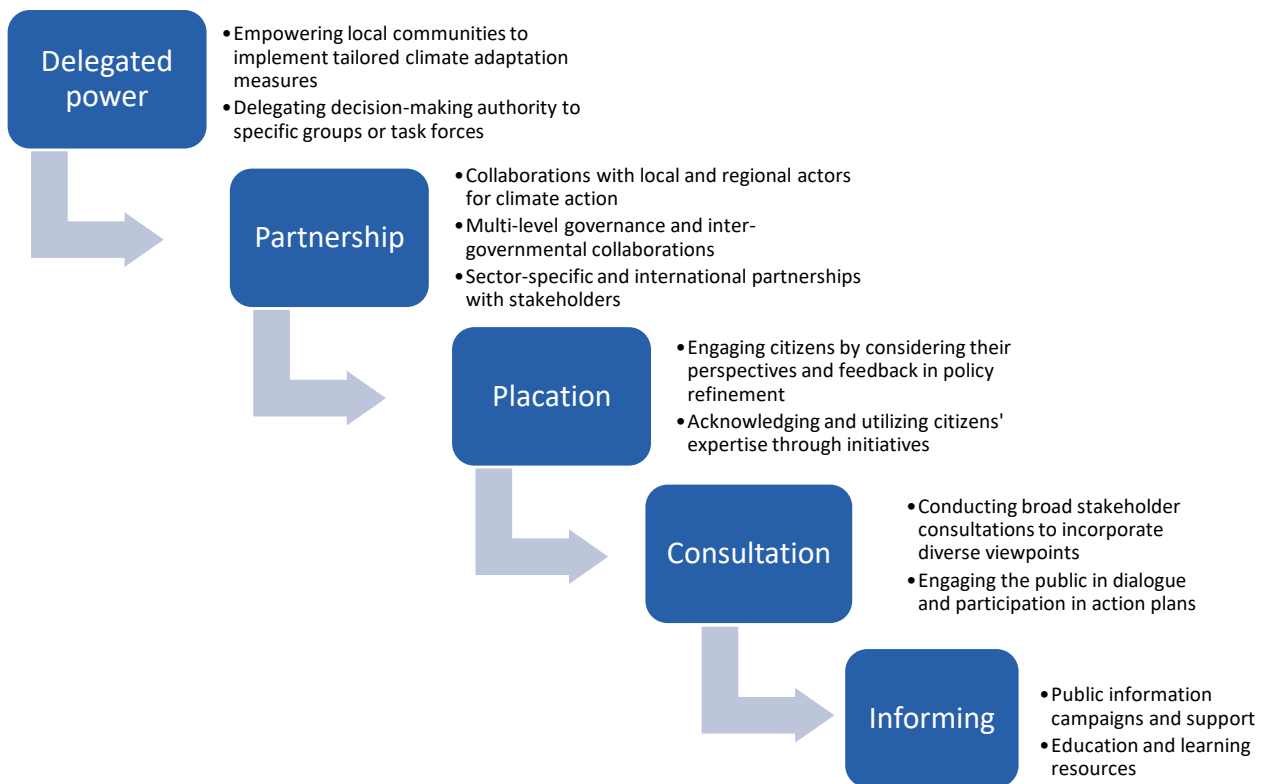
Delegated power

The delegation of power plays a significant role in empowering stakeholders and enhancing decision-making processes. For instance, establishing a network of lead farms tasked with implementing and demonstrating new measures reflects a higher level of participation where implementation is delegated to these farms. Similarly, the establishment of task forces for approval procedures indicates a degree of delegated power in decision-making processes.

Moreover, while not explicitly delegating decision-making power to citizens, there is an aim to empower local communities to implement tailored climate adaptation measures, reflecting a certain level of delegated power. This approach allows citizens to make decisions within the

boundaries set by higher authorities, thereby fostering local ownership and involvement in climate adaptation efforts.

Another example of delegated power from Germany is the "Volksentscheid" (referendum), where citizens have the power to decide over significant legislative changes. A recent instance is the "Volksentscheid Berlin 2030 klimaneutral", which took place on March 26, 2023. This referendum aimed to amend Berlin's climate protection laws to achieve climate neutrality by 2030, instead of the previously planned 2045. Although 50.9% of voters supported the initiative, it ultimately failed because it did not meet the required quorum of 25% of all eligible voters, with only 18.2% participating. The initiative was backed by various environmental groups and political parties, while it faced opposition from the Berlin Senate and several political organizations, which deemed the goals unrealistic and financially unfeasible.

Partnership

In various German climate change adaptation policies, partnerships play a crucial role in fostering collaboration and achieving common goals. For instance, the establishment of networks like "*Leitbetriebe Pflanzenbau*" involves cooperation between the government, research institutions, and agricultural enterprises, aiming to enhance climate adaptation in agriculture. Similarly, initiatives emphasizing local actor networks and supporting local adaptation efforts promote genuine partnership between the government and local communities, enhancing decision-making effectiveness at the grassroots level. Moreover, efforts to sensitize partner countries to nature-based solutions and develop joint pilot initiatives signify partnerships where citizens actively participate in decision-making, influencing concrete measures for ecosystem protection and restoration.

Furthermore, partnerships with various stakeholders, including governmental, non-governmental, and private forest owners, underscore collaboration's importance in achieving forest-related climate change adaptation goals. Collaboration with municipalities and federal states highlights the significance of local and regional partnerships for successful climate protection efforts, emphasizing cooperation with governmental bodies to reach shared objectives.

Moreover, involving citizens as equal partners through the establishment of permanent federal-state working groups and dialogue with associations reflects a partnership approach, ensuring ongoing collaboration and joint decision-making. Similarly, developing a participatory culture in climate action and involving municipalities, states, companies, and organizations in decision-making processes demonstrate partnerships where citizens and organizations collaborate with the government to drive climate adaptation initiatives.

Engagement with the middle class to identify challenges, develop specific measures, and emphasize ongoing collaboration and dialogue reflects a partnership approach where citizens are involved in decision-making processes, sharing power and responsibility. Lastly, collaborating between different levels of government and involving self-governing bodies showcases a multi-level

governance approach, fostering partnerships and shared decision-making in climate change adaptation efforts.

Placation

Placation strategies are employed to engage citizens while retaining decision-making power with the authorities. For instance, fostering societal consensus for sustainable arable farming indicates a move beyond mere consultation to involve the public more meaningfully.

Additionally, various perspectives and interests in climate protection governance are considered, along with assessing potential impacts of proposed measures. This reflects a willingness to address concerns and mitigate negative impacts through careful planning and assessment, although final decisions ultimately rest with the authorities.

Moreover, initiatives such as establishing networks of farmer-field schools demonstrate a level of placation, where citizens' expertise and experience are acknowledged. Similarly, provisions for central competence centres and regional agencies for natural climate protection indicate steps towards placation.

Furthermore, addressing implementation hurdles and adapting to local circumstances shows a willingness to address concerns, aligning with placation strategies where citizens' feedback is considered. Lastly, strategies aiming to placate stakeholders by considering their feedback for further refinement demonstrate a token representation of citizen input in decision-making processes.

Consultation

In German climate policies, the cornerstone of engaging stakeholders and weaving their perspectives into decision-making lies in the systematic use of consultation mechanisms. Through expert analyses, stakeholder consultations, and the solicitation of recommendations, these strategies underscore the value of incorporating diverse viewpoints into policy frameworks. This inclusive approach is manifested through collaborations with research institutions and the gathering of feedback on draft strategies from states, associations, and a wide range of stakeholders, including land and forest owners, which highlights the critical role of local expertise in shaping effective climate solutions.

The Action Plan, for instance, showcases the significant emphasis placed on fostering a wide-ranging public dialogue and participation, demonstrated by the substantial volume of written statements and individual comments it attracted. This level of engagement exemplifies the commitment to leveraging public opinion and expertise in the development and implementation of nature-based solutions.

Moreover, consultation processes extend to political actors across different levels, communities, and organizations, ensuring that the implementation of measures is informed by a broad spectrum

of insights. This is further evidenced in initiatives like the dialogue and working process with associations and companies, aimed at pinpointing critical areas for action based on collective input.

The strategies that emerge from these broad public processes, refined, and enriched by feedback, signify a deep commitment to participatory governance. Such an approach not only solicits the public's input but integrates it meaningfully into policy development, ensuring that the final outcomes reflect a wide array of societal needs and perspectives.

Furthermore, the active involvement of stakeholders and federal states in the execution of climate protection measures, illustrated by the establishment of partnerships like the "*Aktionsbündnis Klimaschutz*" exemplifies the depth of stakeholder consultation. This ensures that a diverse range of viewpoints is considered in the decision-making process, fostering policies that are both inclusive and representative of the community's needs.

Informing

Informing the public plays a crucial role in raising awareness, promoting transparency, and facilitating engagement. For example, elements such as providing information to citizens about the consequences of the climate crisis and offering consultation and support to local communities are included. Similarly, initiatives aim to inform citizens and stakeholders about nature-based solutions through various strategies.

This approach leverages digital platforms and tools to reach and engage a wide range of stakeholders, ensuring accessibility and inclusivity in information dissemination. Additionally, efforts to promote education for natural climate protection, including developing a comprehensive curriculum and providing digital learning resources, enhance public understanding and participation in climate initiatives.

Furthermore, informing the public about the challenges and goals of sustainable arable farming, while potentially a form of tokenism, still contributes to raising awareness and promoting dialogue on critical issues. Similarly, detailed information about climate change measures, such as the introduction of hydrogen strategy and research on short-lived climate pollutants, promotes transparency and accountability in governmental actions.

Moreover, public relations measures and information campaigns aimed at raising awareness about climate action and related issues demonstrate a commitment to informing citizens and fostering a culture of engagement. Providing detailed information about proposed reforms and investments ensures transparency and enables citizens to stay informed about government initiatives and their implications.

5.2.5 Identifying gaps

The German policies on climate change adaptation demonstrate a comprehensive approach to addressing the challenges posed by climate change. However, there are some gaps in terms of participation in climate change adaptation that have been identified in the policies (see Fig. 10).

Figure 10: German participation gaps
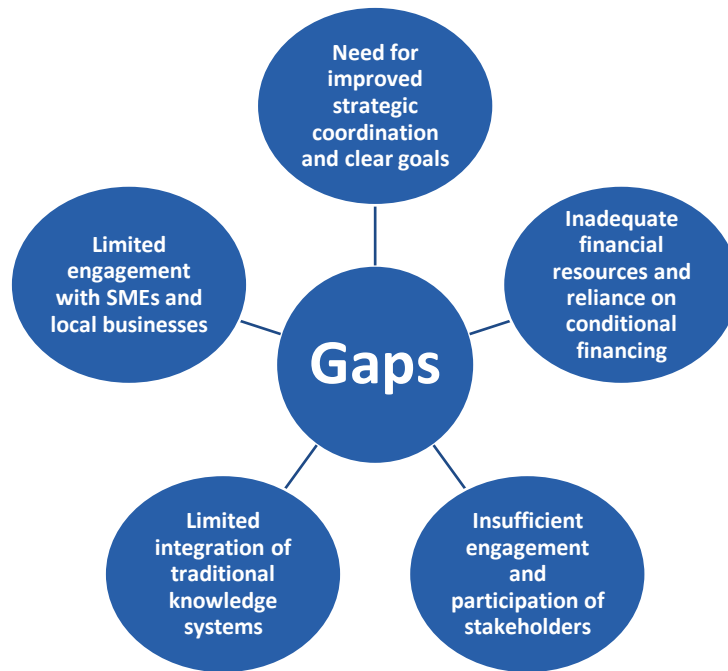
The evaluation of the policies highlights the need for strengthening the legal bases for climate change adaptation and expanding the federal government's financial activities in this regard.

The goals for climate change adaptation need to be clearer and more specific in the strategy documents. Some of the current goals, such as reducing vulnerability to climate change and increasing adaptation capacities, can be seen as unspecific. Formulating specific guiding principles or goal systems for climate change adaptation is recommended to provide a more forward-looking approach.

The participation of both state and non-state stakeholders is recognized as a crucial element in fostering broader societal acceptance of the need for climate change adaptation. Policies could be strengthened by placing greater focus on engaging citizens and businesses in the adaptation process, increasing awareness of their roles and responsibilities in climate change adaptation, and addressing vulnerabilities to the impacts of climate change

The policies emphasize that all measures are subject to the condition that they receive financing. This highlights the importance of securing the necessary financial resources for the implementation of adaptation measures. Ensuring adequate financing and budget negotiations are crucial for the successful implementation of climate change adaptation measures.

While the policies emphasize inclusivity, there may still be gaps in the representation of marginalized groups such as low-income populations and minority groups. Efforts could be made to ensure that these voices are adequately represented in decision-making processes to address their unique perspectives and needs related to climate change.

Despite the presence of consultation mechanisms such as public consultations and stakeholder dialogues, there may be barriers to participation for certain groups, such as language barriers. Ensuring that consultation mechanisms are accessible and inclusive of all stakeholders, including those with disabilities or limited resources, is crucial for meaningful engagement.

While youth engagement is mentioned in the context of education and training programs, there may be opportunities to further involve young people in policy development and decision-making processes related to climate change. Given that youth are disproportionately affected by climate change and will inherit its impacts, their perspectives and ideas should be actively solicited and integrated into policy initiatives.

The policies acknowledge the importance of collaboration with scientific institutions but may not fully integrate traditional knowledge systems into decision-making processes. Incorporating traditional ecological knowledge can enhance the effectiveness and cultural relevance of climate adaptation strategies, particularly in sectors such as land use and biodiversity conservation.

While industry representatives are mentioned as stakeholders, there may be room to further engage small and medium-sized enterprises and local businesses in climate action initiatives. Providing support and incentives for these businesses to adopt sustainable practices and contribute to climate adaptation efforts can help drive broader societal change and innovation.

Addressing these gaps in participation will be essential for enhancing the effectiveness and inclusivity of climate change adaptation efforts in Germany. By strengthening cooperation, clarifying action goals, promoting stakeholder participation, and ensuring adequate financial support, the policies can work towards a more comprehensive and inclusive approach to climate change adaptation.

5.3 Spain

5.3.1 Policy selection

Fig. 11 illustrates the identification and selection process of relevant climate change adaptation policies in Spain. After the elimination of non-relevant and outdated policies, six policies remained, which are Spain's Adaptation Communication, National Climate Change Adaptation Plan 2021-2030, Long Term Decarbonisation Strategy 2050, Law 7/2021 on Climate Change and Energy Transition, Spain's Integrated National Energy and Climate Plan for 2021-2030, and Spain's Recovery and Resilience Plan (see Table 5).
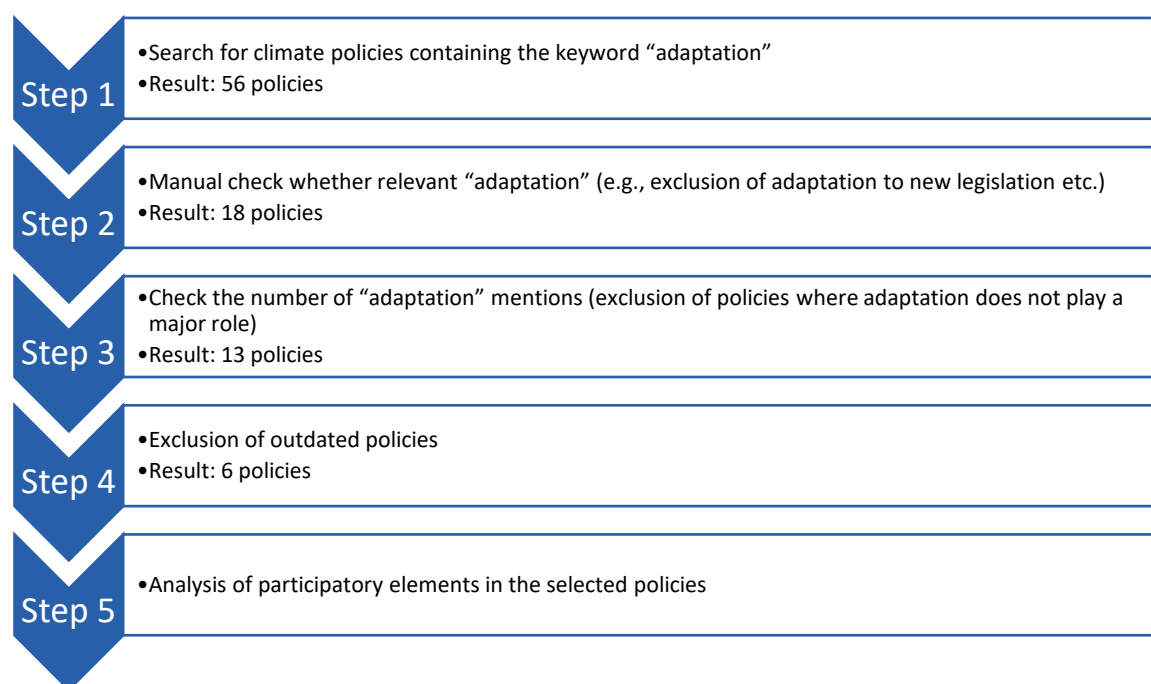
Figure 11: Spanish policy selection

Step 1
- Search for climate policies containing the keyword "adaptation"
- Result: 56 policies

Step 2
- Manual check whether relevant "adaptation" (e.g., exclusion of adaptation to new legislation etc.)
- Result: 18 policies

Step 3
- Check the number of "adaptation" mentions (exclusion of policies where adaptation does not play a major role)
- Result: 13 policies

Step 4
- Exclusion of outdated policies
- Result: 6 policies

Step 5
- Analysis of participatory elements in the selected policies

Table 5: Selected Spanish climate change adaptation policies

English title	Spanish title	Year
Spain's Adaptation Communication	Comunicación de Adaptación de España	2021
National Climate Change Adaptation Plan 2021-2030	Plan Nacional de Adaptación al Cambio Climático 2021-2030	2020
Long Term Decarbonisation Strategy 2050	Estrategia de Descarbonización a Largo Plazo 2050	2020
Law 7/2021 on Climate Change and Energy Transition	Ley 7/2021 de Cambio Climático y Transición Energética	2021
Spain's Integrated National Energy and Climate Plan for 2021-2030	Plan Nacional Integrado de Energía y Clima 2021-2030	2020
Spain's Recovery and Resilience Plan	Plan de Recuperación, Transformación y Resiliencia	2021

5.3.2 Synopsis of selected policies

A summary of the identified policies is provided below.

Spain's Adaptation Communication provides a comprehensive overview of the country's efforts and strategies to address climate change adaptation. It covers a wide range of topics, including national circumstances, institutional frameworks, legal frameworks, impacts, risks, vulnerabilities, priorities,

strategies, policies, plans, objectives, actions, support for developing countries, implementation of adaptation measures, co-benefits of mitigation, contributions to international frameworks, gender perspective, traditional knowledge, and local knowledge systems related to adaptation.

The policy outlines Spain's geographical and biophysical characteristics, emphasizing the importance of adaptation in the face of climate change. It also discusses national strategies, policies, and plans for adaptation, highlighting the priorities and objectives set by the government. Additionally, it addresses the challenges, gaps, and obstacles related to the implementation of adaptation measures and provides examples of Spain's support for adaptation in developing countries through its cooperation programs.

Furthermore, the policy emphasizes the importance of access to information, communication, and capacity building in the context of adaptation. It also highlights Spain's efforts to promote adaptation at various levels, including subnational, national, macroregional, and international levels.

The National Climate Change Adaptation Plan 2021-2030 is a comprehensive and strategic framework designed to address the increasing needs for adaptation to climate change in Spain. It aims to promote a more resilient development in the face of climate change over the next decade, ultimately contributing to building a safer and more inclusive country.

The plan encompasses various components and strategic areas of action, including the generation of knowledge, integration of adaptation into sectoral plans and regulations, mobilization of stakeholders, and monitoring and evaluation. It also emphasizes the importance of considering social and territorial equity, science and knowledge, transversality and integration in public management, attention to undesired effects, and coordinated, transparent, and effective action.

Furthermore, the plan outlines specific objectives for different areas of work, such as climate and climate scenarios, human health, water and water resources, natural heritage and biodiversity, forestry, desertification, urban planning, and more. It also emphasizes the need to promote efficient water management, biodiversity, green infrastructure in urban areas, and reduction of pollution for economic reactivation.

The plan is developed in alignment with international and European policies and commitments, including the Paris Agreement and the EU Adaptation Strategy. It also emphasizes the importance of planning at the national level and promoting the coordination of actions between different public administrations, as well as the active involvement of Spanish society and key actors in developing adaptive responses to climate change.

The Long Term Decarbonization Strategy 2050 is a comprehensive and forward-looking plan aimed at achieving carbon neutrality in Spain by 2050. This strategy is in line with the commitments made by Spain as a member of the European Union and a party to the Paris Agreement. It outlines a roadmap for transitioning to a low-carbon economy and society.

In addition to focusing on emissions reduction, the strategy addresses the need for a transition to renewable energy sources in different sectors of the economy. It emphasizes the importance of increasing the share of renewables in final energy use with a particular emphasis on electric and thermal renewable energy. The strategy also highlights the importance of enhancing energy efficiency and reducing the overall energy demand across various sectors.

Furthermore, the strategy acknowledges the importance of aligning with European regulations and initiatives, such as the European Commission's long-term strategic vision for a climate-neutral economy by 2050. It also emphasizes the need for continuous monitoring, reporting, and updating of progress reports to ensure the effectiveness of the measures outlined in the strategy.

The section on climate change adaptation underscores its critical role in addressing the vulnerabilities faced by Spain due to climate change. It stresses that adaptation and mitigation are complementary strategies; without effective mitigation, adaptation efforts may be overwhelmed by the ongoing impacts of climate change. The strategy outlines the necessity of enhancing adaptive capacities across various sectors, such as agriculture, water management, and urban planning, to ensure resilience against climate-related risks. It advocates for a proactive approach to adaptation, which includes the conservation of ecosystems, sustainable water management, and the integration of climate considerations into local governance and planning processes. The overarching goal is to prevent the exacerbation of social and territorial inequalities while fostering a sustainable and equitable transition in response to the climate crisis.

The Law 7/2021 on Climate Change and Energy Transition reinforces Spain's commitment to the Paris Agreement and promotes green growth as a pillar of COVID-19 recovery plans. The law aims to ensure that Spain becomes carbon-neutral by 2050 and more resilient to the impacts of climate change. It also seeks to transform the country's financial sector, both public and private, towards a carbon-neutral and resilient model. Additionally, the law includes the adoption of an International Climate Finance Strategy to ensure that actions taken are consistent with the Climate Agenda and the Sustainable Development Goals, reinforcing support for climate change adaptation based on the priorities of developing countries.

The law also establishes a framework to realign public budgets with the Multiannual Financial Framework, green procurement, and sustainable investments, while regulating mandatory learning and transparency tools to help perceive and evaluate risks and opportunities and improve investment decisions at both the public and private levels. The law also addresses the need to improve energy literacy and transparency of information on the energy system to engage citizens in the energy transition. It establishes a Just Transition Strategy to guide the adaptation of companies and individuals in sectors affected by the energy transition, and it creates a Committee of Climate Change and Energy Transition Experts to evaluate and make recommendations on energy and climate policies.

In addition, the law introduces and emphasizes the importance of the National Plan for Adaptation to Climate Change (PNACC) as a fundamental planning tool to coordinate and implement adaptation strategies across Spain. The PNACC aims to enhance resilience against climate impacts by identifying vulnerabilities in various sectors and ecosystems, developing specific objectives, and outlining actionable measures to mitigate these vulnerabilities. It also prioritizes ecosystem-based adaptation approaches, recognizing the role of natural systems in enhancing resilience. The law mandates the collection and dissemination of data on climate vulnerability and adaptation, ensuring that all stakeholders, including public administrations and civil society, are engaged in the adaptation process.

Spain's Integrated National Energy and Climate Plan (INECP) for 2021-2030 is a comprehensive strategy that aims to address the challenges and opportunities within the five dimensions of the Energy Union: decarbonization, energy efficiency, energy security, the internal energy market, and research, innovation, and competitiveness. The plan is designed to provide regulatory certainty and create favourable conditions for making the necessary investments to achieve the targets set by the European Union for 2030.

The INECP outlines specific national objectives and targets for each dimension, such as reducing greenhouse gas emissions, increasing the share of renewable energy in total energy consumption, improving energy efficiency, and enhancing electricity interconnection between Member States to meet the EU's binding targets.

Furthermore, the plan includes a range of policies and measures to promote decarbonization, energy efficiency, and renewable energy, as well as to ensure energy security and foster research, innovation, and competitiveness. It also addresses the need for inter-administrative coordination to align various policies across different sectors.

In addition to its focus on energy and climate, the plan incorporates a Just Transition Strategy, which aims to anticipate and manage the impact on regions and individuals affected by the transition to a more sustainable energy system.

The Spain's Recovery and Resilience Plan focuses on key areas such as supporting the ecological transition, driving digital transformation, fostering sustainable and inclusive growth, strengthening social and territorial cohesion, and enhancing resilience in the face of future crises. It incorporates a significant agenda of investments and structural reforms, with the overarching goal of making Spain greener, more digital, socially as well as territorially cohesive, and more equal.

In addition to substantial investments, the plan emphasizes the importance of implementing structural reforms in areas such as education, ecological transition, public administration modernization, justice, science, labour market, energy, and entrepreneurship. These reforms are intended to have a lasting impact on Spain's potential growth, productivity, and employment creation.
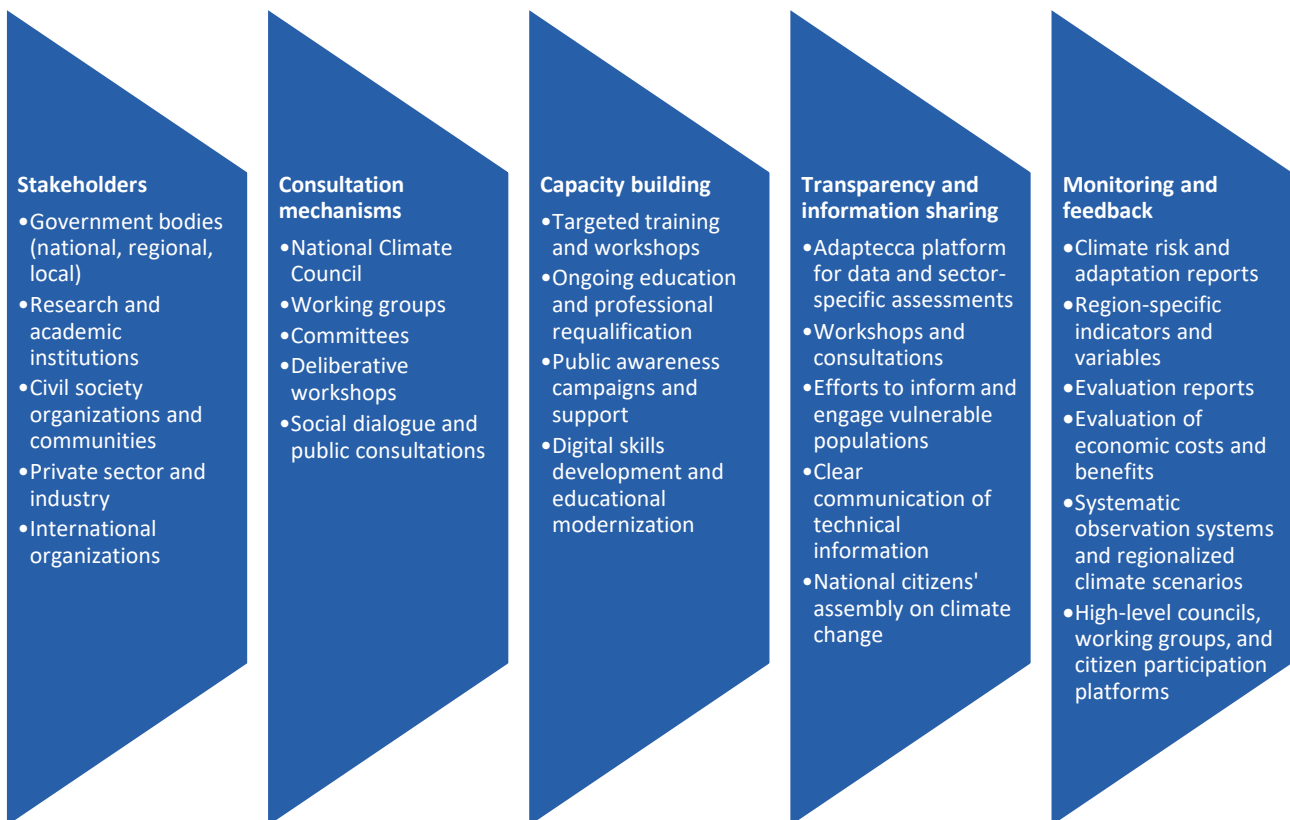
The plan also places a strong emphasis on addressing the specific recommendations of European institutions and aligning with the priorities of Next Generation EU. It outlines a coherent agenda of structural reforms that respond to shared diagnoses by European institutions, the Spanish government, and key economic and social stakeholders.

Furthermore, the plan is structured around four transversal axes: ecological transition, digital transformation, social and territorial cohesion, and gender equality. It includes ten pivotal policies that are expected to have a significant impact on economic recovery and long-term transformation, with a focus on creating opportunities for future generations and addressing the challenges faced by young people.

5.3.3 Content analysis

Below, different elements identified in the analysed policies are summarized (see Fig. 12).

Figure 12: Spanish policies content analysis overview

Stakeholders
- Government bodies (national, regional, local)
- Research and academic institutions
- Civil society organizations and communities
- Private sector and industry
- International organizations

Consultation mechanisms
- National Climate Council
- Working groups
- Committees
- Deliberative workshops
- Social dialogue and public consultations

Capacity building
- Targeted training and workshops
- Ongoing education and professional requalification
- Public awareness campaigns and support
- Digital skills development and educational modernization

Transparency and information sharing
- Adaptecca platform for data and sector-specific assessments
- Workshops and consultations
- Efforts to inform and engage vulnerable populations
- Clear communication of technical information
- National citizens' assembly on climate change

Monitoring and feedback
- Climate risk and adaptation reports
- Region-specific indicators and variables
- Evaluation reports
- Evaluation of economic costs and benefits
- Systematic observation systems and regionalized climate scenarios
- High-level councils, working groups, and citizen participation platforms

Stakeholders

The policies highlight a diverse array of stakeholders involved in various facets of climate change adaptation in Spain. The stakeholders encompass a broad spectrum, from governmental bodies at different levels to research institutions, civil society organizations, private sectors, communities,

international organizations, financial institutions, energy system operators, societal groups like rural and aging populations, and local entities across different sectors.

These stakeholders play critical roles in shaping policies, strategies, and actions addressing climate change, sustainable development, financial alignment, energy system transitions, and the implementation of recovery and resilience plans. Engaging with such a wide range of stakeholders reflects a commitment to inclusivity, collaboration, and recognizing the diverse needs, perspectives, and contributions of various entities toward achieving common goals.

The efforts emphasize not only the need for engagement but also the necessity to tailor strategies, policies, and initiatives according to the specific needs and contexts of these stakeholders. Whether it is aligning financial strategies, integrating climate adaptation into insurance policies, promoting sustainable investments, involving regional and local entities, or fostering social dialogue, the focus remains on creating a participatory framework that encourages contributions from all involved sectors and communities. This inclusive approach helps ensure that plans and strategies are comprehensive, effective, and responsive to the multifaceted challenges posed by climate change and sustainability transitions.

Consultation mechanisms

Consultation mechanisms, as highlighted in different policies, reflect a multifaceted approach to engaging stakeholders and fostering participatory decision-making processes.

Within the realm of climate change adaptation in Spain, the National Climate Council serves as a cornerstone, convening representatives from diverse sectors including government departments, research institutions, local administrations, NGOs, and social actors. It acts as a platform for proposing and recommending policies across critical areas such as climate science, adaptation strategies, and emission reduction initiatives. The Working Group on Impacts and Adaptation to Climate Change further amplifies this effort by coordinating national and regional adaptation strategies. Its technical groups, focusing on coastal adaptation and port strategies, exemplify a targeted approach to address specific challenges.

Expanding the scope of participation, the Committee on Impacts, Risks, and Adaptation demonstrates a more inclusive structure by integrating expertise from academia, businesses, and smaller enterprises. This diverse representation aims to provide nuanced advice and recommendations specific to Spain's adaptation efforts, thereby enhancing the overall effectiveness of climate change policies.

The development of the National Plan for Climate Change Adaptation incorporates deliberative workshops, expert contributions through online platforms, and engagement mechanisms that actively involve stakeholders. These inclusive sessions ensure that a broad spectrum of opinions, insights, and recommendations are gathered, fostering a more comprehensive and collaborative approach to policy development.

Moreover, measures addressing bureaucratic hurdles and emphasizing training and capacity-building programs for local energy communities showcase a commitment to empowering diverse stakeholders. Information dissemination actions, employing innovative methodologies like participatory research, gamification, and design thinking, further reinforce the inclusivity and effectiveness of these mechanisms.

In the broader context of societal reforms, consultation mechanisms extend to social dialogue with trade unions and employer organizations, collaboration with regional and local entities, sectorial consultations, expressions of interest, public consultations on reforms, and parliamentary hearings.

Capacity building

Capacity building initiatives play a pivotal role in empowering stakeholders with knowledge, skills, and awareness across diverse sectors. In the realm of climate change adaptation, targeted training programs and workshops equip professionals with essential insights into climate risks and adaptation strategies, enhancing decision-making frameworks. This extends to the renewable energy sector, where continuous learning ensures adaptability to industry changes, integrating climate neutrality topics into formal education to prepare individuals for evolving energy landscapes.

In various sectors such as construction, initiatives focus on identifying necessary qualifications and providing subsidies for professional requalification, underlining the importance of ongoing skill development. Cross-sectoral integration remains crucial, emphasizing the integration of climate goals into normative frameworks and planning processes to ensure coherence and effectiveness.

Renewable energy projects and energy efficiency initiatives employ a range of mechanisms, from annual tenders encouraging new projects to public awareness campaigns and streamlined administrative processes. Legislative measures and public support programs further reinforce energy efficiency mandates and provide financial backing. The Recovery, Transformation, and Resilience Plan prioritizes education, aiming to enhance human capital by developing digital skills and modernizing educational systems to meet the demands of a digital era. These multifaceted approaches underscore the importance of ongoing education and skill enhancement to meet evolving challenges across sectors.

Transparency and information sharing

In Spain, stakeholders are informed and engaged in climate change adaptation through various channels like the AdapteCCa platform, workshops, consultations, and public feedback sessions. AdapteCCa, led by the Spanish Office for Climate Change and the Biodiversity Foundation, serves as a crucial hub connecting government, scientists, planners, and stakeholders. It provides tools, data, and sector-specific assessments, ensuring open access while organizing workshops and consultations for input.

Efforts to inform vulnerable populations are ongoing, aiming to make climate adaptation information accessible to all, especially recognizing the importance of AdapteCCa. The National Adaptation Plan emphasizes clear communication, translating technical information into understandable language and integrating gender perspectives for tailored strategies, involving diverse stakeholders in workshops. Initiatives like the National Citizens' Assembly on Climate Change ensure structured citizen participation, fostering engagement and contribution to climate resilience efforts.

Monitoring and feedback

In Spain, the Monitoring, Reporting, and Evaluation (MRE) methodology is employed to ensure the effective implementation of climate adaptation policies. This structured approach is designed to provide detailed insights, track progress, and assess the effectiveness of adaptation measures by evaluating impacts, vulnerabilities, risks, and the progress of adaptive capacities.

The MRE system includes a variety of tools and processes specifically aimed at effective monitoring and evaluation of adaptation actions. These include climate risk and adaptation reports that are published at least every five years, offering crucial insights by synthesizing significant climate risks, impacts, policies, and measures to enhance resilience and reduce vulnerability.

Different regions in Spain, such as Catalonia, Murcia, Valencia, Basque Country, and Extremadura, have developed specific indicators and variables to monitor and assess adaptation progress. For instance, Catalonia uses the Global Adaptation Indicator for Climate Change Impacts, which incorporates over 40 sector-specific indicators.

Evaluation reports are another component, with regions like Extremadura utilizing indicators to gauge compliance with their adaptation plan objectives. These reports provide comprehensive assessments of the implementation progress of adaptation measures.

The National Climate Change Adaptation Plan (PNACC) plays a crucial role in monitoring and assessing vulnerabilities across different territories and social groups, ensuring a nuanced understanding of vulnerability to climate change impacts. It also emphasizes evaluating cross-border impacts and fosters coordination with neighbouring countries to address transboundary climate effects.

The PNACC integrates gender perspectives into adaptation policies and evaluates measures to prevent maladaptation and eliminate counterproductive incentives. It also focuses on the economic costs and benefits of adaptation measures, emphasizing practical actions and solutions.

Furthermore, the PNACC supports systematic observation systems, regionalized climate scenarios, and a knowledge management platform for adaptation, enhancing coordination among sectors and policies. High-level councils and working groups, citizen participation platforms, and innovation labs also contribute to the policy development process by involving government departments, the private sector, social agents, civil society, and stakeholders.

5.3.4 Arnstein's ladder of citizen participation

Below, elements identified in the Spanish policies are discussed and allocated along the rungs of the Arnstein's ladder of citizen participation (see Fig. 13).

Figure 13: Overview of participatory elements in Spanish policies
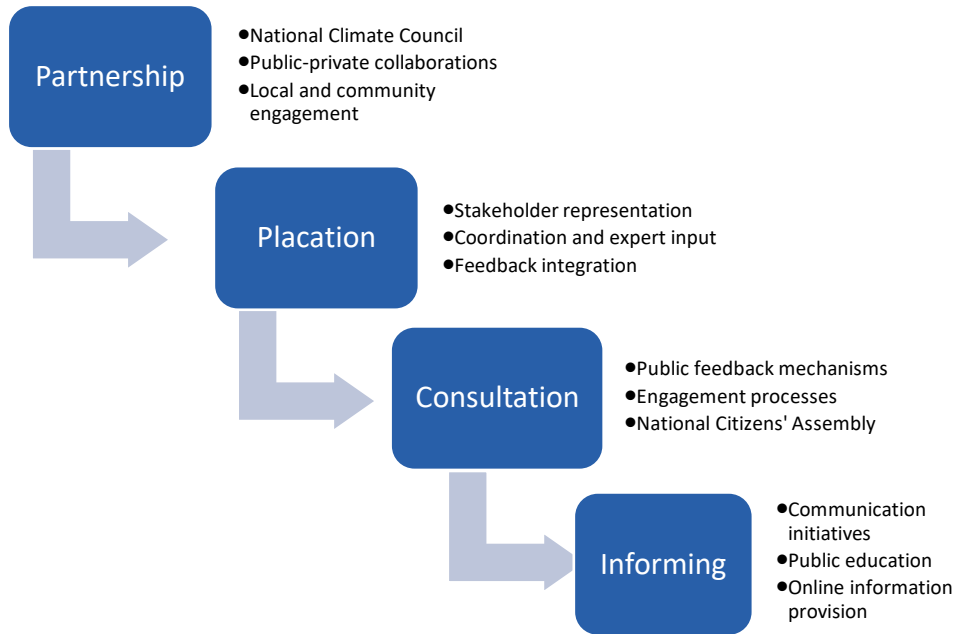
Partnership

The policies underscore the significance of partnerships involving various organizations and stakeholders in shaping and implementing adaptation measures. For instance, the National Climate Council brings together departments of the National Administration, Autonomous Communities, the Spanish Federation of Municipalities and Provinces, representatives from research institutions, social actors, and non-governmental organizations. This council is tasked with developing proposals and recommendations for policies combating climate change, covering areas such as climate science, impacts, adaptation strategies, and greenhouse gas emissions reduction strategies.

Additionally, the policy highlights collaborations between different levels of administration and the private sector, alongside the establishment of new collaboration mechanisms. There is a notable shift towards a more collaborative approach to decision-making, including adaptations to the legal framework for public-private collaboration.

Moreover, the policy stresses the importance of engaging diverse stakeholders, including communities, local entities, and businesses, in achieving climate transition objectives. Citizen participation is encouraged, with measures such as promoting local energy communities to empower citizens in the energy transition. By involving citizens in renewable energy generation and consumption, the policy fosters partnerships and acknowledges citizens as active participants in the low-carbon economy transition.

Sectoral and inter-sectoral discussion forums, as well as collaboration agreements between public and private organizations, are promoted to establish partnerships and shared decision-making. An example is the Impacts and Adaptation Working Group, which coordinates strategies and plans for climate change adaptation between the Central Administration and Autonomous Communities.

Furthermore, the policies emphasize partnerships between municipalities and citizen groups. They outline mechanisms to support diverse actors and participatory projects, as well as fostering collaboration between clusters, researchers, and entrepreneurs in social innovation for climate action. These initiatives reflect a partnership approach, aiming to collaborate with citizens, communities, and stakeholders.

Placation

The policies underscore the importance of placating various actors, including local and regional governments, in the management process. This approach aims to address concerns and interests of stakeholders, providing them with a voice in decision-making. For instance, local entities participate in the governance process through their representative body, the Spanish Federation of Municipalities and Provinces, given Spain's extensive network of over 8000 local entities, making the role of the federation crucial as an intermediary.

Furthermore, the policies emphasize coordination with stakeholders and consider their input, reflecting placation by stressing societal involvement in diagnosis, goal definition, and resilience evaluation in previous crises or risk situations. They also highlight the importance of incorporating knowledge generated by research centres and systematically evaluating progress in research and innovation. For instance, the Impacts, Risks, and Adaptation Committee involves individuals from academia, non-governmental organizations, public management, and businesses, contributing ideas and recommendations for the advancement of the PNACC and providing expert opinions on adaptation in Spain.

Moreover, citizens are given influence at a certain level, although ultimate decision-making authority rests with the government. The establishment of the Committee of Expert Persons on Climate Change and Energy Transition indicates a move towards placation, tasked with evaluating and making recommendations on energy and climate policies. The government's requirement to publish its position regarding the committee's reports prior to debate in Congress further suggests citizen influence.

Lastly, the policies surpass mere consultation, demonstrating efforts to placate citizens and stakeholders by considering and integrating their feedback. For example, ensuring that opinions expressed during public consultations are taken into account illustrates a commitment to valuing stakeholder input and incorporating it into decision-making processes.

Consultation

The policies incorporate consultation by utilizing innovative instruments such as "*manifestaciones de interés*" (calls for interest), allowing economic actors to propose transformative projects. While seeking input and feedback from stakeholders, the final decision-making power may still rest with the government. Sectorial consultations further involve discussing different components with relevant stakeholders.

Furthermore, the policies describe an extensive participatory process in developing the National Adaptation Plan for Climate Change 2021-2030, with over 1500 comments received from 182 organizations and individuals. This reflects a consultative approach, demonstrating a high level of interest and commitment from stakeholders.

Additionally, the policies reflect a significant level of consultation with citizens and stakeholders by publicly displaying drafts of key documents such as the Integrated National Energy and Climate Plan, the Climate Change and Energy Transition Law, and the Just Transition Strategy for public feedback. The receipt of 1175 comments from 159 different agents, including associations, companies, individuals, public administrations, NGOs, and the scientific-academic field, underscores a consultative approach to involving stakeholders in the planning process.

Moreover, consultation extends to various forms of engagement, including public consultations, meetings with business entities, social and environmental organizations, and public events involving diverse stakeholders. Deliberative workshops allow attendees to communicate, debate key aspects, and prioritize proposals, indicating a higher level of citizen participation beyond mere information sharing.

Lastly, the policies mention the establishment of a National Citizens' Assembly on Climate Change, aiming to involve citizens in decision-making. The assembly's composition, organization, and functioning developed through a Ministerial Order signals a step towards consulting citizens and seeking their input on climate change-related decisions.

Informing

The policies incorporate informing by implementing various communication initiatives to educate the public about climate change adaptation. For instance, they mention organizing exhibitions, video interviews, and informational breakfasts for journalists. These activities aim to provide information and raise awareness about the importance of adapting to climate change.

Furthermore, the policies stress the importance of informing citizens about the goals, progress, and challenges of transitioning towards a climate-neutral economy. Transparency is highlighted, including providing information on carbon footprints and promoting sustainable lifestyles, aligning with the informing level of citizen participation.

Additionally, the policies include provisions for transparency and access to information, stating compliance with the Law on Access to Information, Public Participation, and Access to Justice in Environmental Matters. The Ministry for Ecological Transition and the Demographic Challenge, in

collaboration with other ministerial departments, develops and maintains an updated website facilitating citizen access to climate change and energy transition-related information.

Moreover, the policies encompass extensive efforts to inform and educate citizens about energy-related issues, emphasizing improving energy literacy and transparency of information on the energy system. They also mention promoting actions for awareness and sensitization aimed at fostering habits and attitudes in line with efficiency, sustainability, co-responsibility, and cooperation, showcasing a commitment to informing citizens about energy matters.

Lastly, measures are included to provide clear information to citizens about participation opportunities, requirements, and fund management to ensure transparency and increase public awareness.

5.3.5 Identifying gaps

After analysing the policies, it is evident that Spain has made significant efforts to involve various stakeholders in the development and implementation of climate change adaptation policies. The analysed policies go from tokenism to citizen power, but mostly have the tokenistic elements of placation, consultation, and informing. However, it is essential to consider that the effectiveness of engagement is greatly influenced by the actual implementation and practical application. Moreover, there are still some gaps in the participatory elements of these policies (see Fig. 14).

Figure 14: Spanish participation gaps

One of the identified gaps is the need for more comprehensive and effective mechanisms to engage and involve the general public, including local communities, in the adaptation planning process. While there are mentions of promoting the participation of all interested actors, including different

levels of administration, the private sector, social organizations, and citizens as a whole, there is a need for more specific details on how this participation will be facilitated and integrated into the decision-making processes.

While the policies outline the consultation processes, it would be beneficial to clearly articulate how feedback from stakeholders is incorporated into decision-making. Establishing transparent feedback mechanisms and demonstrating how stakeholder input has influenced policy decisions can enhance trust and participation.

The policies do not indicate the existence of a systematic study of gaps and barriers to stakeholder participation. While they mention evaluations and workshops to gather assessments and proposals, they do not provide detailed insights into the specific gaps identified through these processes.

Furthermore, there is a gap in the explicit mention of mechanisms to ensure the representation of vulnerable and marginalized communities in the adaptation planning and decision-making processes. It is crucial to ensure that the voices of these communities are heard and considered in the development of adaptation policies, and this aspect could be further emphasized in the existing policies. While the policies touch upon the integration of gender perspectives and consideration of social and demographic factors, there could be further exploration of intersectional approaches that consider the interconnected nature of various forms of inequality and how they intersect with energy, climate, and economic policies.

There appears to be limited mention of specific mechanisms or initiatives targeting youth participation in climate change adaptation and sustainable development efforts. Given that youth are vital stakeholders and often highly engaged in climate activism, integrating their perspectives, and empowering them to contribute to policy formulation and implementation would be beneficial.

While efforts are made to communicate climate adaptation information through platforms like AdapteCCa and workshops, there could be gaps in ensuring accessibility for all, especially those with limited digital literacy or language barriers. Ensuring information is available in multiple languages and formats, including formats accessible to individuals with disabilities, can enhance inclusivity.

While civil society organizations are mentioned, there could be more emphasis on fostering partnerships with grassroots organizations and community-based initiatives. These entities often have intimate knowledge of local challenges and innovative solutions, making their inclusion critical for effective policy design and implementation.

While the policies mention mechanisms like consultations, workshops, and citizen participation platforms, there could be gaps in ensuring sustained engagement beyond the initial phases of policy development. Establishing long-term mechanisms for ongoing dialogue and feedback loops can ensure continuous stakeholder involvement and adaptation to evolving needs and challenges.

5.4 Citizen attitude to climate change adaptation activities

As described in the Methodology section, a survey was conducted to see the attitude of citizens to different climate change adaptation activities. This can help decision-makers tailor their strategies to the needs of citizens and improve citizen participation. In other words, it allows covering both sides of the medal – the policy analysis from the side of decision-makers and the survey from the side of citizens.

Table 6 presents the mean and standard deviation of the respondents' ratings for various climate adaptation policies, which aim to reduce the negative impacts of climate change. The adaptation policies that received the highest ratings were: establishing comprehensive flood forecasting and early warning systems across the country, along with regional systems for other weather-related risks (M=4.29, SD=0.67), encouraging communities to develop their own climate action plans that address local vulnerabilities and adaptation strategies (M=4.18, SD=0.70), and creating tools and frameworks to assess and evaluate climate risks at various scales (M=4.16, SD=0.81). These results suggest that the respondents were more supportive of adaptation policies that enhance resilience and preparedness for climate change.

Table 6: How much do you support the following climate policy?

Adaptation policies	Mean	Std. Deviation
7. Establishing comprehensive flood forecasting and early warning systems across the country, along with regional systems for other weather-related risks	4.29	0.67
2. Encouraging communities to develop their own climate action plans that address local vulnerabilities and adaptation strategies	4.18	0.70
19. Creating tools and frameworks to assess and evaluate climate risks at various scales	4.16	0.81
6. Ensuring transparent communication and public awareness regarding areas at high risk of floods or mudslides	4.13	0.86
18. Enhancing the collection, accessibility, and dissemination of climate data for decision-making purposes	4.08	0.93
14. Encouraging policymakers and planners to incorporate climate information into decision-making processes	4.06	0.47
16. Encouraging the use of green infrastructure, such as urban parks and green roofs, to enhance climate resilience	4.05	0.99
25. Implementing building codes and standards that require new buildings to be designed and constructed to be more resilient to climate change impacts	3.99	0.90
12. Developing funding mechanisms and improving knowledge and information on climate impacts	3.94	0.82
21. Restoring degraded ecosystems, promoting sustainable land use practices, and protecting biodiversity	3.94	1.00

13. Allocating funds for research projects and innovation to support climate change adaptation efforts	3.93	0.90
20. Encouraging the use of mobile apps and other tools to alert citizens to weather-related risks	3.91	1.00
15. Supporting the development and adoption of climate-resilient technologies and infrastructure	3.86	0.71
3. Involving citizens in data collection and monitoring of climate-related impacts, such as tracking changes in local ecosystems or weather patterns	3.83	0.83
24. Implementing measures to improve the resilience of transportation infrastructure to climate change impacts, such as promoting electric vehicles and enhancing the resilience of roads and railways to extreme weather events	3.81	0.67
9. Constructing underground retention basins below roads to mitigate flooding and manage stormwater	3.80	1.14
17. Investing in the development of climate services that provide essential information for climate change adaptation	3.77	0.96
10. Redirecting government subsidies away from the fossil fuel industry towards renewable energy and climate adaptation initiatives	3.75	0.89
23. Promoting sustainable farming practices and implementing measures to improve resilience to climate change impacts such as droughts and floods	3.74	1.11
4. Promoting community-based governance and interventions for renewable resource development	3.73	0.77
22. Implementing measures to enhance the resilience of coastal areas and urban infrastructure to climate change impacts	3.72	1.13
1. Promoting climate literacy and awareness through educational campaigns, workshops, and community events	3.57	0.49
8. Providing subsidies for installing flood doors and implementing measures to enhance flood defences and water efficiency	3.49	1.01
5. Implementing stricter building restrictions and regulations in areas prone to land subsidence	3.48	1.04
11. Providing tax subsidies to houses and businesses that use solar and wind energy	3.48	0.90

Table 7 presents data on individuals' willingness to support climate policies. Most respondents expressed a strong desire to engage in climate policies, with a mean score of 3.89. Similarly, the intention to vote for climate policies aimed at addressing the climate crisis also garnered substantial support, with a mean score of 3.74. While there is still notable willingness to actively participate in climate policies, as seen in the scores of 3.50 and 3.48, these figures suggest slightly lower enthusiasm for more direct involvement.

Table 7: Intention to support policies

Intention items	Mean	Std. Deviation
1. I would like to engage in climate policies.	3.89	.60
2. I will vote for a climate policy that fights against the climate crisis.	3.74	.55
3. I would try to participate in climate policies.	3.50	.71
4. I would plan to participate in climate policies.	3.48	.84

As shown in Table 8, only 24 respondents (14.9%) indicated that they would like to pay for the support of climate policies.

Table 8: Would you pay for a climate program?

Would you pay for a climate program?	Frequency	Percent
Yes	24	14.9
No	48	29.8
I don't know	89	55.3
Total	161	100

As shown in Table 9, the respondents had a moderate to high willingness to participate in government incentive programs for climate change adaptation, with an average rating of 3.72 out of 5 (SD=0.55). This means that most of the respondents were somewhat or likely to join such programs, but not extremely so.

The respondents had a moderate agreement (M=3.39) that government regulations make it more difficult to adapt to the risks posed by climate change, with an average rating of 3.38 out of 5 (SD=0.48). This means that most of the respondents were neither strongly in favour nor strongly against the statement, but rather had a mixed or neutral opinion.

Table 9: Descriptive statistics of intention to participate in government incentive and difficulty

	N	Minimum	Maximum	Mean	Std. Deviation
Participate in government incentive [a]	159	3.00	5.00	3.72	.55
Difficulty [b]	159	3.00	4.00	3.38	.48
a. Would you participate in government incentive programs for climate change adaptation?					
b. Do government regulations make it more difficult to adapt to the risks posed by climate change?					

Based on the information provided, it is evident that there is a significant level of support for climate change adaptation initiatives among the respondents. The survey results indicate that the respondents expressed a high level of confidence in their community's ability to collaborate and work together to reduce the negative effects of climate change and to adapt to it. This suggests a willingness and readiness to participate in climate change adaptation initiatives at the community level.

Furthermore, the respondents also indicated a strong belief in the need for environmental awareness and the severity of climate change. This environmental awareness and acknowledgment of the seriousness of climate change are essential factors that can drive participation in adaptation initiatives. The high level of support for adaptation policies, such as establishing comprehensive forecasting and early warning systems, developing climate action plans at the local level, and creating tools to assess climate risks, further underscores the willingness of the respondents to actively engage in climate change adaptation efforts.

Additionally, the respondents' moderate to high willingness to participate in government incentive programs for climate change adaptation, as well as their agreement that government regulations do not necessarily make it more difficult to adapt to the risks posed by climate change, indicates a positive attitude towards engaging with government-led initiatives.

In conclusion, the survey results suggest that there is a strong inclination and readiness among the respondents to participate in climate change adaptation initiatives, both at the community level and through government-led programs. This bodes well for the potential success of climate change adaptation efforts, as it indicates a supportive and engaged public that is willing to actively contribute to addressing the challenges posed by climate change.

5.5 Citizen perspective on climate change and its impacts

Results from the survey conducted in the Catalonia region of Spain showed that the majority of respondents believe in climate change, feel they are poorly or moderately informed on adaptation policies, have a low to neutral trust in authorities regarding climate change adaptation measures, and are open to participating in adaptation initiatives. Many of the respondents stated that they do not currently participate in adaptation efforts while some stated they actively participate in associations, committees, or volunteer regularly. One major aspect of the survey results showed that most respondents felt climate adaptation policies were ineffective.

The findings from this survey display the need for enhanced education on climate change, its impacts, and current adaptation policies and initiatives. The results also illustrate the need for relationship-building between citizens and climate adaptation authorities. Strengthening the relationship between citizens and authorities can provide greater insight for adaptation policies and initiatives that will benefit both citizens and decision-makers.

At the time of this report, the results are still being analysed to determine the links and relationship between the willingness to participate in decision-making processes, as well as co-design, co-creation and co-implementation of climate adaptation strategies and plans.

5.6 Policy gaps

The policy gaps identified in the analysis of the participatory elements in the EU, German, and Spanish climate change adaptation policies were grouped into five major clusters: accessibility and representation, communication and education, feedback mechanisms, financial and resources as well as engagement duration and integration. A co-creation workshop was conducted with the aim to discuss gaps within each of the identified clusters and to collect ideas for solving these gaps.

Zaragoza co-creation workshop

The co-creation workshop was held in January 2024 at the AGORA General Assembly in Zaragoza. Around 15 members of the AGORA consortium participated in the workshop. First, the clusters were presented to the participants, and they were asked to identify policy gaps for each of the clusters. Next, the participants were asked to suggest solutions to solve the identified policy gaps.

Figure 15: Co-creation workshop (Zaragoza, January 2024)

Accessibility and representation

Participants identified several policy gaps within the accessibility and representation cluster and highlighted the need for an intersectional and inclusive approach. The gaps in policy formulation include a lack of minority representation and diversity, a poor understanding of fair adaptation actions, and unclear definitions of vulnerability. There is also a shortfall in addressing and engaging vulnerable groups, technical barriers that prevent access to information for some demographics, and insufficient processes for involving civil society and activist groups. Additionally, there is limited public dissemination and involvement in policy development

Communication and education

In the communication and education policy gap cluster, participants identified several key issues that need to be addressed. Challenges in climate change communication and education include the use of inaccessible language and jargon, limited knowledge among educators on the subject, and the absence of mandatory climate change topics in educational curricula. Communication strategies often fail due to top-down approaches and outputs not tailored to specific audiences. There is also a lack of recognition for local knowledge in government strategies, insufficient proactive scientific communication, and a general shortfall in the inclusion of climate change topics in educational programs. Additionally, there are few targeted intellectual programs on climate change, a need for simpler communication styles, and limited public awareness and participation in policy processes.

Feedback mechanisms

In the feedback mechanisms policy gap cluster, several critical gaps were identified by participants. Challenges in feedback mechanisms include their unavailability or inaccessibility, the absence of whistle-blower channels for reporting misconduct, and a lack of accountability within existing systems. There is an overreliance on online platforms and communication in a single national language, which often neglects local decision-making processes. Additionally, there is a general lack

of established feedback channels, a disconnect between stakeholders and relevant parties, and an absence of incentives or requirements to actively establish these channels.

Financial and resources

In the financial and resources policy gap cluster, several key challenges were identified. Outdated cost-benefit analyses hinder effective decision-making, and there is a lack of accountability within the financial systems. Excessive bureaucracy obstructs efficient resource allocation, and there is often insufficient funding for sustaining or upgrading products from completed projects. Funding for climate change-related participatory and deliberative processes is inadequate, and resources for capacity building within governments are limited. Discussions on funding for small-scale projects are challenging, and there is a lack of social support for resource allocation and utilization. There is also confusion about how large financial figures translate to local adaptation projects, and overlapping activities between projects at various levels lead to resource misuse and inefficiency.

Engagement duration and integration

In the engagement duration and integration policy gap cluster, participants pinpointed several critical issues. There is a lack of continuity in engagement efforts after project completion, often driven by rigid political timelines and lack of funding. Engagement strategies frequently lack applicability at local or regional levels, and there is a shortage of expertise in knowledge brokering to support effective engagement. Goals and intended outcomes for engagement activities are often unclear, with inadequate efforts to continue engagement and ambiguous reasons for disengagement. There is a failure to recognize the importance of long-term engagement for achieving desired outcomes, and policy timelines are inflexible, which hampers effective engagement. Additionally, engagement processes are insufficiently integrated into decision-making, resulting in unclear follow-up actions by decision-makers and outputs that are too general for direct use in policymaking or implementation. Moreover, short-term thinking in non-climate sectors presents challenges for realistically implementing adaptation plans.

Solutions

The solutions discussed encompass various aspects aimed at improving citizen engagement, accountability, resource management, communication strategies, and continuity of projects.

Education and simplification: Simplify the language of policy documents and integrate climate and policy education into school curriculums across various educational stages, making it accessible to different linguistic groups.

Feedback mechanisms and continual engagement: Implement whistle-blower channels, conduct regular engagement meetings, and develop clear follow-up plans for engagement outcomes, ensuring these processes are accessible in both physical and digital formats.

Financial accountability and sustainability: Require regular publication and auditing of financial reports, establish funding mechanisms for project sustainability, and ensure the longevity and usefulness of project outputs through dedicated maintenance.

Decision-making integration and inclusivity: Involve decision-makers throughout the engagement processes, shift to a horizontal policymaking approach that includes all stakeholders, and adjust recruitment criteria for government officials to foster inclusivity.

Resource allocation and capacity building: Invest in training and mentoring for government officials, promote peer learning, and showcase best practices.

Tailored communication strategies: Develop communication strategies for different target groups, utilizing multiple platforms including social media and local media channels.

Accountability through oversight: Mandate the appointment of champions or responsible individuals for overseeing policy aspects at both national and local levels.

Database for policy implementation: Establish a platform for countries to share information about policy implementation, report issues, and hold each other accountable, inspired by existing databases like those for food safety within the European Union.

By adopting these comprehensive solutions, governments can significantly enhance the efficacy of their policies and projects, thereby fostering a more engaged and informed citizenry. Simplifying policy language and integrating policy education into school curriculums will demystify governance and empower citizens from diverse linguistic backgrounds. Robust feedback mechanisms and continual engagement strategies will ensure that citizen voices are heard and acted upon, while transparent financial accountability measures will build trust in government operations. Inclusive decision-making processes and targeted resource allocation for capacity building will create a more equitable and effective public service. Tailored communication strategies will enhance outreach and public awareness, and stringent oversight through designated champions will ensure accountability at all levels. Furthermore, the establishment of an international database for policy implementation will promote global collaboration and shared learning, reinforcing the commitment to effective governance and sustainable development. Together, these measures will create a resilient and responsive governance framework that meets the needs and aspirations of all citizens.

6. Policy recommendations

The current participation in climate adaptation across the EU, Germany, and Spain demonstrates a promising yet uneven landscape. All three regions have frameworks in place to engage citizens and stakeholders, but the empirical data shows several gaps in effectively reaching and involving broader segments of the population.

In each region, participatory frameworks often adopt a top-down approach, with limited localized or context-specific outreach efforts. This highlights the need for more specific instruments at the subnational level, particularly within the multi-level governance structures prominent in the chosen cases. Participation remains voluntary in many instances, which, while useful in some contexts, lacks the necessary structure to ensure equitable engagement, particularly among vulnerable populations. There are gaps in the accessibility, transparency, and follow-up of these participatory processes, as outlined in previous sections of the analysis.

Given this situation, the recommendations (see Fig. 16) focus on filling these gaps by enhancing accessibility, improving feedback loops, and fostering long-term engagement drawn directly from the findings of the report.

Figure 16: Recommendations on enhancing participation in climate change adaptation
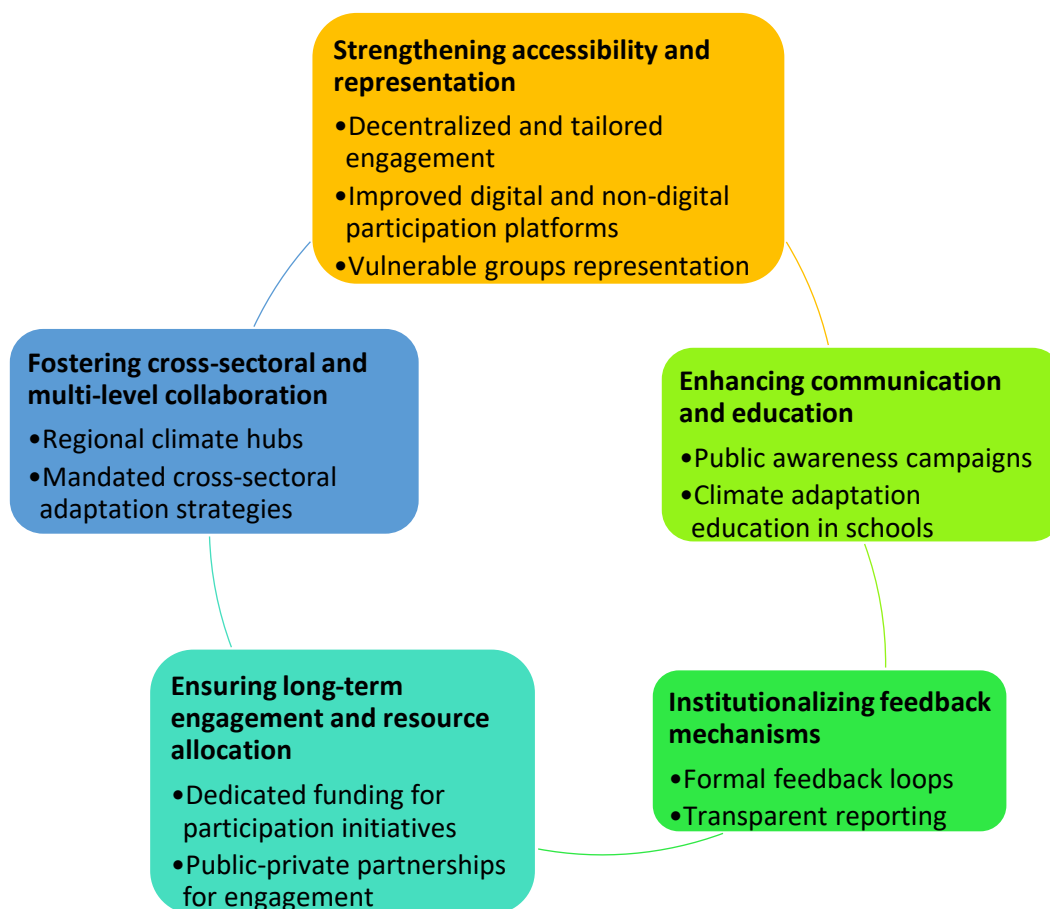
Strengthening accessibility and representation

The analysis highlights that accessibility to participation mechanisms is a major gap across all regions. Participation tools should be designed to be inclusive, engaging underrepresented groups and ensuring equitable access to all stakeholders.

Decentralized and tailored engagement: Establishing regional and local councils for climate adaptation would enable more localized participation, especially in rural and high-risk areas. Countries could leverage such mechanisms to bridge the rural-urban divide that limits climate engagement in smaller, more vulnerable communities. Tailoring engagement efforts to local contexts – accounting for linguistic, cultural, and technological differences – ensures that participation frameworks resonate with and are accessible to all citizens.

Improved digital and non-digital participation platforms: While digital tools have been useful, they exclude individuals with limited access to technology or digital literacy. Policies should incorporate non-digital alternatives, such as mobile units that can travel to remote communities, or traditional communication channels (e.g., local radio, print materials) to reach a broader audience.

Vulnerable groups representation: The policies should mandate that climate adaptation plans explicitly include input from vulnerable communities. Engaging these groups through targeted outreach and ensuring their representation on participatory bodies would align with EU goals of inclusivity.

Enhancing communication and education

Surveys revealed that many citizens feel ill-equipped to engage in climate adaptation efforts due to limited knowledge or a lack of accessible information.

Public awareness campaigns: National and regional governments should invest in public education campaigns that use plain, relatable language to communicate climate adaptation strategies. This will require a concerted effort to simplify technical jargon and focus on the local impacts of climate change, as well as specific actions that citizens can take to engage. Countries could benefit from region-specific campaigns, particularly in areas prone to flooding or drought.

Climate adaptation education in schools: Integrating climate adaptation concepts into school curricula across all regions is crucial. Such education would help cultivate long-term citizen engagement and ensure that future generations are equipped to participate in adaptation efforts.

Institutionalizing feedback mechanisms

Feedback mechanisms in current participatory frameworks are often non-existent or weak. Citizens and stakeholders lack the means to provide real-time input on climate adaptation policies or see how their input is utilized.

Formal feedback loops: Establish formal, recurring feedback systems that allow citizens to participate in periodic reviews of climate adaptation policies. Countries could create public consultations or citizen review panels to assess ongoing adaptation measures.

Transparent reporting: To build trust, governments should publicly report how feedback is integrated into policy changes. Reports should be accessible and easily understandable, allowing the public to see direct links between their input and subsequent government action.

Ensuring long-term engagement and resource allocation

The analysis points out that many current participation efforts are short-lived, ending once a policy has been created or an initial consultation has taken place. This undermines the long-term engagement needed to build resilient communities.

Dedicated funding for participation initiatives: Governments should establish long-term funding for participation initiatives, ensuring that engagement mechanisms are sustained beyond the initial stages. This could be part of broader climate adaptation financing, allowing regions to allocate a portion of their budgets specifically to foster continued citizen engagement.

Public-private partnerships for engagement: Private-sector involvement in adaptation efforts, particularly through funding and co-designing engagement strategies, can help alleviate public sector funding constraints. Governments should encourage private businesses to sponsor climate adaptation projects that incorporate stakeholder participation.

Fostering cross-sectoral and multi-level collaboration

The report stresses that adaptation efforts should be integrated across sectors, with cross-sector collaboration being essential for tackling the multifaceted challenges of climate change.

Regional climate hubs: Establish multi-sectoral regional climate hubs where stakeholders from different sectors (e.g., agriculture, public health, and infrastructure) can collaborate with local governments and citizens. Countries could benefit from extending their municipal climate adaptation strategies to incorporate more diverse sectoral representation.

Mandated cross-sectoral adaptation strategies: National governments should mandate that all sectors – including transport, agriculture, health, and education – develop integrated climate adaptation strategies. This would ensure that adaptation is not siloed but rather embedded across all areas of governance.

7. Conclusion

This report underscores the pivotal role that participatory elements play in enhancing the effectiveness of climate adaptation policies at the EU, national, and regional levels. Through the analysis of climate adaptation policies in the EU, Germany, and Spain, it becomes evident that participatory processes, involving citizens and a diverse range of stakeholders, are crucial for ensuring inclusive and democratic decision-making. The participatory mechanisms discussed

throughout this report highlight the importance of incorporating multiple perspectives, particularly those from vulnerable and marginalized communities, to address the varying needs and vulnerabilities of different populations. This inclusivity is a key factor in fostering climate adaptation policies that are not only effective but also equitable.

The report further emphasizes the need for an integrated approach to climate adaptation across sectors such as agriculture, water management, infrastructure, and urban planning. This holistic integration ensures that adaptation policies are not siloed but are embedded across various domains, making them more responsive to the multifaceted challenges posed by climate change.

Moreover, the importance of capacity building, transparency, and continuous stakeholder engagement cannot be overstated. By fostering an environment where stakeholders – including citizens, local authorities, the private sector, and civil society – can actively participate in decision-making processes, the report reveals that these policies can better reflect the local realities and needs. Building the capacities of these stakeholders through education, training, and financial support will be instrumental in empowering them to contribute meaningfully to the development and implementation of climate adaptation measures.

The report highlights the need to strengthen the involvement of underrepresented groups, including local communities, youth, and future generations, whose voices are essential in crafting long-lasting climate adaptation strategies. Additionally, more work is needed to foster greater cross-sectoral collaboration, ensuring that sectors such as health, education, and infrastructure are all working toward a unified goal of climate resilience.

This report also draws attention to the critical need for improved monitoring and evaluation mechanisms. Regular feedback loops, stakeholder consultations, and data-driven assessments of adaptation efforts will be vital to ensuring that policies are adaptive and able to respond to the evolving nature of climate risks. The role of digital tools and technologies, as highlighted in the report, offers promising avenues for enhancing the transparency and inclusivity of climate governance.

The recommendations outlined in this report provide a pathway for policymakers to address the identified gaps and enhance the overall responsiveness of climate adaptation policies. These recommendations call for the strengthening of participatory frameworks, the enhancement of cross-sectoral integration, and the development of robust mechanisms for monitoring, reporting, and feedback.

Ultimately, this report contributes to the broader European goal of fostering climate resilience through community-centred adaptation strategies. By prioritizing citizen engagement, transparent governance, and equitable policy frameworks, these strategies will be better equipped to respond to the pressing challenges of climate change. The findings of this report serve as a foundation for future work in the realm of climate adaptation, driving forward transformative change that can protect communities, ecosystems, and economies in the face of a rapidly changing climate. Through

continued commitment to inclusive and adaptive policymaking, Europe can chart a path toward a more resilient and sustainable future for all its citizens.

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