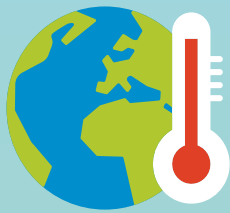


European Missions



Adaptation to Climate Change

Support at least 150 European regions and communities to become climate resilient by 2030

Implementation Plan

This is an internal working document of the European Commission. Therefore the budget figures mentioned are approximate and the document will be updated. It is made public for information only and does not bind the European Commission. The European Commission is not liable for any consequence stemming from the reuse of this document.

Climate Change Adaptation Mission

Implementation Plan

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Executive summary

In a nutshell

The objective of the Mission is to support **at least 150 European regions and communities to become climate resilient by 2030**.

The Mission on Adaptation to Climate Change contributes to a recent area of policymaking, where there is little experience globally and in Europe, but where the EU has taken a bold step with its new EU Adaptation Strategy in 2021. The Mission deploys the new impact oriented approaches of European research and innovation policy in support of European Green Deal objectives (e.g. climate change adaptation, disaster risk, biodiversity). It becomes a key implementation vector of the 2021 EU Adaptation Strategy and will trigger co-ordinated R&I efforts across Horizon Europe.

There is a firm expectation that the intended investment of ~1 billion EUR of Horizon Europe budget for the Mission will boost local adaptation efforts through **engagement of citizens and local authorities** and stimulate substantial additional **investments from public and private sources**.

This will lead by 2030 to a much better knowledge in our regions on what climate change impacts to prepare for and how to prepare for them. A great number of regions will have seized the opportunity to take concrete actions and demonstrate solutions, which will inspire others to follow.

This document lays out a plan on how to implement the Horizon Europe Mission on Climate Adaptation as advised in its scoping report by the Mission Board for Adaptation to Climate Change and Societal Transformations.

The objectives of the Mission

The overall objective of the Mission is to support at least 150 European regions and communities in becoming climate resilient by 2030.

In doing so, the Mission will engage local actors, notably in climate-vulnerable regions, as well as citizens by funding projects facilitating and requiring their involvement. Considering that the level of preparedness for climate impacts varies substantially between regions in Europe, this R&I support will be provided in different ways.

Specific objective 1: Preparing and planning for climate resilience

- provide general support to European regions and communities to better understand, prepare for and manage climate risks and opportunities

Specific objective 2: Accelerating transformations to climate resilience

- work with at least 150 regions and communities to accelerate their transformation to a climate resilient future, supporting them in the co-creation of innovation pathways and the testing of solutions

Specific objective 3: Demonstrating systemic transformations to climate resilience

- deliver at least 75 large-scale demonstrations of systemic transformations to climate resilience across European regions and communities.

The need for adaptation

The world has just concluded the hottest decade on record during which the record for the hottest year was beaten eight times. The climate impacts that are already occurring will continue for decades, even if global and European efforts to cut greenhouse gas emissions prove effective. The frequency and severity of climate and weather extremes is increasing. These extremes range from unprecedented forest fires and heatwaves right above the Arctic Circle to devastating droughts in the Mediterranean region; and from hurricanes ravaging EU outermost regions to forests decimated by unprecedented bark beetle outbreaks in Central and Eastern Europe. Slow onset events, such as desertification, deglaciation, loss of biodiversity, land and ecosystem degradation, ocean acidification or sea level rise are equally destructive over the long term.

Water shortages in the EU have affected economic activities as diverse as agriculture, aquaculture, tourism, power plant cooling, and cargo shipping on rivers. They affect not only the economy, but also the health and well-being of Europeans, who increasingly suffer from heat waves (globally, the deadliest disaster of 2019 was the European heatwave with 2500 deaths). Water scarcity associated with climate change also poses risks to food security, worsens existing social inequalities and threatens cultural heritage.

Economic losses from more frequent climate change related extreme events are increasing. In the EU, these losses already average over EUR 12 billion per year. Conservative, lower bound estimates show that exposing today's EU economy to global warming of 3°C above pre-industrial levels would result in an annual loss of at least EUR 170 billion (1.36% of EU GDP). These estimates do not account for the risks associated with tipping points and low-probability/high-impact events, the outcomes of which could be much more devastating.

Links between Mission and Adaptation strategy

The need to adapt to the impacts of climate change, has only recently attracted the necessary political attention. The 2021 EU Adaptation Strategy under the European Green Deal was developed in parallel to the Mission on Adaptation to Climate Change and integrates the Mission as an essential delivery mechanism. Indeed, many actions of the strategy require improved or new knowledge that the Mission will help to provide. At the same time the Mission will provide means to help adaptation actions reach every corner in Europe, and to enable local actors to take evidence-based decisions and to experiment with various ways of adapting to climate change. The Mission will thereby fulfil two key objectives of Horizon Europe, namely bringing research closer to the citizens and shortening the time to impact, i. e. the time required for new knowledge to contribute to innovation.

Timeline of the Mission

- a **build-up phase (2021-2023)**, during which the supporting system for the Mission will be set up and some 60-100 regions and communities will have started to be fully engaged in the Mission.

- a **deployment phase (2024-2027)**, during which the Mission will make any adjustments resulting from the evaluation, and will activate all other actions to unfold its full potential, further engaging another 50 to 100 regions and communities.
- a **consolidation phase (2028-2030)**, during which the Mission will develop its legacy and seek to sustain the momentum achieved in the drive towards climate resilience.

Budget of the Mission

The potential resources from Horizon Europe directly available to the Mission are estimated at approx. EUR 368 million for the building up phase (2021-2023).

In addition to the core Horizon Europe budget, the Mission will focus on mobilisation and improved articulation of funding and financing from various public and private sources at different levels (EU, national, regional and local). The fact that building resilience to climate change is increasingly an important objective under many EU programmes, including the Cohesion Policy, the Common Agricultural Policy, the LIFE Programme, the Digital Europe Programme, TEN-T/E/CEF, Invest EU and others, opens up opportunities for establishing synergies between the Mission and these programmes. With its systemic and bottom-up approach, the Mission is indeed ideally positioned to help accelerate the adoption of innovative approaches to climate adaptation within other EU instruments. At the same time, the Mission will also aim at nurturing the private sector's critical role in both delivering the necessary technology and solutions for adaptation, but also mobilizing and leveraging the capital required for climate resilient investments.

Overall, it is expected that the Mission could mobilise resources of around EUR 10 billion across its 3 objectives. More details on the Horizon Europe Mission budget are provided under chapter 4 on Budget and Financing strategy.

The type of R&I to be funded under these objectives will depend on the needs identified by the regions. The Mission will invite besides technical adaptation measures in particular also approaches favouring nature based solutions and social innovation. It is expected that much of the work will be concentrated in the areas of:

- risk assessment, modelling, early warning systems
- ecosystems and nature-based solutions
- land use and food systems
- water management
- protection and management of critical infrastructures
- health and human well-being
- behavioural research and research into effectiveness of policy measures

1. Introduction

This document lays out a plan how to implement a Mission on Climate Adaptation as advised by the Mission Board for Adaptation to Climate Change and Societal Transformations¹, and as envisaged by the European Green Deal: to help deliver large-scale changes by mobilising research, fostering innovation and bringing together a wide range of stakeholders, including regions, enterprises and citizens, in support of the green and digital transition to a sustainable future.

What are the objectives of the Mission?

The overall objective of the Mission is to foster at least 150 climate resilient regions and communities by 2030. Building up to this main objective, the Mission will, by 2030²:

- provide general support to European regions and communities to better understand, prepare for and manage climate risks and opportunities, by providing local and regional administrative units access to climate risk profiles, enhanced early warning systems, and guidance for the development of comprehensive risk management plans (*specific objective 1: Preparing and planning for climate resilience*);
- work with at least 150 regions and communities to accelerate their transformation to a climate resilient future, supporting them in the co-creation of transformative innovation pathways to climate resilience, and in the development and testing of solutions for safe transformative adaptation (*specific objective 2: Accelerating transformations to climate resilience*);
- deliver at least 75 large-scale demonstrations of systemic transformations to climate resilience across European regions and communities, by supporting regions and communities across the whole EU (*specific objective 3: Demonstrating systemic transformations to climate resilience*).

¹ Hedegaard C. et al. 2020, Scoping Report for a Proposed Mission: A Climate Resilient Europe. <https://op.europa.eu/en/web/eu-law-and-publications/publication-detail/-/publication/2bac8dae-fc85-11ea-b44f-01aa75ed71a1>

² The quantitative targets differ slightly compared to the Mission Board report to reflect a strategic focus on depth of the intervention over breadth of coverage. Still, the actual implementation may well surpass the Board report figures.



Figure 1: The objectives of the Mission

As climate impacts and adaptive capacities differ greatly across regions, tailor-made responses and measures, at the regional or local level, are required for positive and just societal transformations towards climate resilience must happen. The Mission has therefore a **place-based approach**, and will be based on regions and communities’ (i) intent/interest to engage in the Mission, (ii) level of climate vulnerability and preparedness, (iii) level of ambition, and (iv) need in terms of support. Furthermore, the Mission follows a **systemic approach**, focusing on several cross-cutting themes and areas of innovation (see figure 2 and box 1). Finally, the Mission encourages and facilitates an **inclusive approach** that brings together all relevant actors, such as public administrations, the private sector and civil society, and in particular citizens.

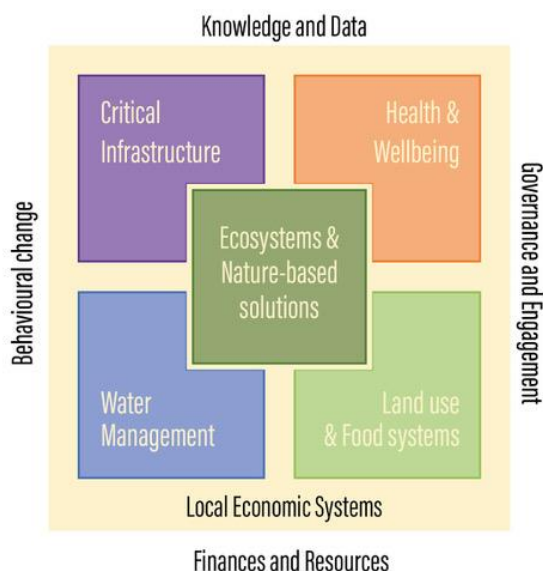


Figure 2: Key community systems and enabling conditions addressed by the Mission

The Mission will evolve along three different phases:

- **build-up (2021-2023)**, during which the supporting system for the Mission will be set up, including the Mission Implementation Platform, building upon the Mission-relevant projects selected for funding under Horizon 2020. During this phase, some 60-100 regions and communities will have started to be fully engaged in the Mission;
- **full deployment (2024-2027)**, during which the Mission will make any adjustments resulting from the evaluation, and will activate all other actions to unfold its full potential, further engaging another 100 regions and communities, and starting to provide results and recommendations regarding transformative policies;
- **consolidation (2028-2030)**, during which the Mission will consolidate the results obtained in the first two phases, while executing the projects contracted up to 2027. Beyond supporting the regions and communities, the Mission will seek to sustain the momentum and secure their continued engagement on climate resilience.

Box 1- Areas of Innovation and Transformation - *Key community systems*

The systems that the Mission will focus on predominantly are those that meet important basic needs and are increasingly impacted by climate change. Below is an overview of each of these systems.



Ecosystems and nature-based solutions providing the foundation of life and essential services to human wellbeing, with the Mission harnessing the power of nature for climate resilience by creating ecological connectivity, restoring nature and ecosystem services, and boosting nature-based solutions as a way to achieve climate resilience also in other key community systems.

Dauphiné (FR), FP7 AGROOF project

In the context of **land use and food systems**, which are amongst the sectors most severely impacted by climate change, the Mission will aim to revive landscapes with diversified and climate resilient practices, to foster climate resilience of secure and sustainable food systems. The Mission will support the transition to a climate resilient food system by increasing the understanding and prediction of the climate risks and vulnerabilities in the food system, developing and testing new business models, promoting the use of new technologies, digitalisation, the upskilling of actors across value chains and the shift to more sustainable diets.



Water management, both to ensure availability of freshwater in the context of water scarcity as well as to reduce water-related risks from droughts and floods, are to be addressed by the Mission for example by rethinking water allocation, innovation in water saving practices, restoration of free-flowing rivers, and innovative coastal protection.

Further, the Mission will work to protect **critical infrastructure** and ensure that infrastructure is climate-proof. The Mission will foster the development of grey and green infrastructures and hybrid nature-based solutions. It will also contribute to the development of common standards for climate-proofing.

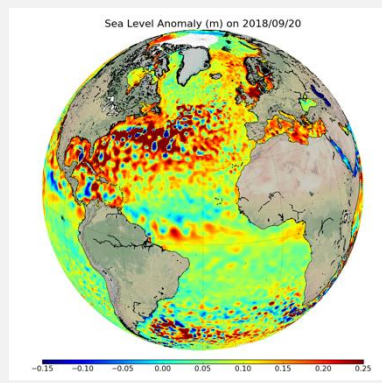
*Po Valley (IT) part of the H2020
OPERANDUM project*

In terms of protecting **health and human wellbeing**, the Mission will help communities to stay healthy in a changing climate, including with long-term healthcare related planning and early-warning and surveillance systems and solutions that help humans function in the warming world. The Mission will be focusing on resilience towards health risks caused by the effects of climate change, such as more intense extreme weather events (heat-waves, floods) and the increased occurrence of infectious diseases. The objective is the protection of vulnerable people at higher risk such as children, senior citizens, people with disabilities or chronic diseases, socially disadvantaged groups etc.

The Mission will also consider **local economic systems** that are underpinning the above provisioning systems with a view to increase their resilience in economic terms, including climate-resilient business models and value chains, and the re-skilling and up-skilling of professions that will have to undergo transitions.

Key enabling conditions

For the Mission to accelerate transformative change, it pays particular attention to generating conditions that enable such change to happen. The enabling conditions are understood to be areas of innovation and transformation, for which the Mission outlines possible targets, possible research and innovation actions, and relevant policy instruments, funding programmes and partners.



Information on sea level from satellite observations (Copernicus Climate Change Service)

The Mission will also facilitate the access to **knowledge and data** and digital services that are critical for better understanding and managing climate risks, enhancing adaptive capacities and supporting transformative innovations. This will be done for instance by contributing to and benefiting from a user-driven development of a Digital Twin on Climate Change Adaptation. Mission actions will aim to inform about and boost existing climate data services as well as making data accessible, reusable and interoperable for the development of local adaptation strategies.



Citizen assembly vote in Dublin, Ireland (Citizens Assembly/Maxwells)

In addition, it will promote the inclusive and deliberative **governance** through meaningful **engagement** and dialogue between citizens and stakeholders. This will be done by developing and testing of local citizens assemblies for bottom up deliberation or other forms to strengthen a culture of civic engagement. The Mission will also foster social innovation and citizen science, empowering individuals to take action in their own communities. It will promote innovative learning and teaching method,

integrate citizen science and social innovation in educational methods and enhance the visibility of existing programmes and initiatives for education.



Urban garden for environmental education
(Shutterstock)

The Mission will have a strong focus on **behavioural change**, both on individual as well as on systemic level, to enable regions to take leadership on transformative adaptation. The Mission will support participating regions and communities in better understanding and using potential social tipping points and systemic leverage points to accelerate transformative changes towards climate resilience.

Finally, the Mission will contribute to **mobilising sustainable finance and resources** towards adaptation at scale and closing climate protection gap. The Mission will help unlock the momentum for climate resilient investments, support the development of insurance products and risk-transfer mechanisms and the development of regional financial risk strategies against climate-related damages and losses.

Why is adaptation to climate change important?

Climate change is happening today, all over the world and increasingly in Europe, and with rising intensity. As announced by the European Green Deal Commitment, the European Commission adopted in 2021 a new Strategy for Adaptation to Climate change³. People, planet and prosperity are vulnerable to climate change, so we need to prevent the un-adaptable and adapt to the un-preventable. We must do it faster, in a smarter and more systemic way. The severe effects of the COVID-19 pandemic on our health and socio-economic wellbeing are a stark warning of the dangers of insufficient preparation.

Halting all greenhouse gas emissions would still not prevent the climate impacts that are already occurring. These will continue for decades, even if global and European efforts to cut greenhouse gas emissions prove effective. The frequency and severity of climate and weather extremes is increasing⁴. This has caused a surge in the number of, and damages from, disasters over the last two decades⁵. These extremes range from unprecedented forest fires and heatwaves right above the Arctic Circle to devastating droughts in the Mediterranean region; and from hurricanes ravaging EU outermost regions to forests decimated by unprecedented bark beetle outbreaks in Central and Eastern Europe. Slow onset events, such as desertification, loss of biodiversity, land and ecosystem degradation, ocean acidification or sea level rise are equally destructive over the long term. And economic losses from more frequent climate-related extreme events are increasing. In the EU, these losses already average over EUR 12 billion per year. Conservative, lower bound estimates show that exposing today's EU economy to global warming of 3°C above pre-industrial levels would result in an annual loss of at least

³ [Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of Regions: Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change: COM/2021/82 final](#)

⁴ <https://www.eea.europa.eu/highlights/soer2020-europes-environment-state-and-outlook-report>

⁵ <https://www.undrr.org/news/drrday-un-report-charts-huge-rise-climate-disasters>

EUR 170 billion (1.36% of EU GDP⁶). Losses are distributed unevenly, harming regions that may already face challenges like low growth or high youth unemployment.

What is the current level of climate change resilience in Europe?

There are regions and cities in Europe that are well prepared. The city of Rotterdam and its climate change adaptation strategy is for example highlighted as a positive example in the IPCC “Special report on global warming of 1,5°C”⁷. However, in 2018, the European Commission carried out an evaluation of the 2013 EU Adaptation Strategy⁸, which found that “progress on local adaptation strategies has been slow”. Among actions submitted to the Covenant of Mayors as of 2020, only 2% (almost 4,000 out of 175,120) are adaptation focused. Reasons for this slow up take include, among others, the lack of human and financial resources, especially in Southern Europe, whereas, in Northern Europe, uncertainty on climate change scenarios is seen as an important barrier, while in Eastern Europe, both the limited capacity and lack of political commitment were noteworthy.

Public financial support for adaptation is not sufficient for the challenges we are facing. Based on estimates of the investment needed to meet adaptation needs, it can be assumed that there is a sizeable unmet finance need for climate resilient investments in Europe. Competing policy and spending priorities, such as currently the COVID-19 response, and the unevenly distributed impacts of climate change and means across Member States, place a burden on the role of policy interventions and public finance to bridge the adaptation-finance gap.⁹

Why a Mission on adaptation to climate change?

Adaptation to climate change impacts is a crucial task for Europe, where input from R&I is essential, both for risk assessment, the societal transformation and the solutions. Investments from EU and the Member States in research and innovation for adaptation in the course of the past decades have already contributed to generate a portfolio of solutions which, when fully exploited, will contribute to increase resilience to climate change. For reference, Horizon 2020 supported more than 30 projects with more 200 million EUR. Support has also been allocated through the Horizon 2020 Green Deal call (for a total of 45 million EUR) to develop innovation packages and foster their application to the most climate-vulnerable regions¹⁰. This translated in a small group of “first mover“ regions as possible first Mission partners.

How does the Mission support the new EU Strategy on adaptation to climate change?

The Mission will support the Strategy across its main dimensions:

- Smarter adaptation: e.g., by
 - o Contributing to the comprehensive collection of climate adaptation data through regions and communities;

⁶ <https://ec.europa.eu/jrc/en/peseta-iv/economic-impacts>

⁷ <https://www.ipcc.ch/sr15/>

⁸ [Report from the Commission to the European Parliament and the Council on the implementation of the EU Strategy on adaptation to climate change. COM/2018/738 final](#)

⁹ [Commission staff working document impact assessment report accompanying the document Forging a climate-resilient Europe - The new EU Strategy on Adaptation to Climate Change. SWD/2021/25 final](#)

¹⁰ The projects will be operational right at the official planned start of the Mission. In addition to the development of innovation packages improving climate resilience, a Collaborative Support Action will foster their adoption and wide reapplication in at least 10 vulnerable and low-capacity regions. A CSA is already included in the Horizon Europe work programme 2021 to provide additional support to regional and local authorities to prepare in meeting Climate Law obligations.

- Boosting the centrality of the JRC Risk Data Hub to collect the data and by using Climate ADAPT as the knowledge sharing and monitoring platform of the Mission.
- More systemic adaptation: e.g., by
 - Supporting regions and communities in taking a systemic approach in developing their pathways, strategies and innovation agendas towards climate resilience;
 - Stimulating cooperation regionally and across borders through its projects, explicitly fostering collaboration between regions and cross-border demonstrations of solutions to climate resilience;
 - Promoting nature-based solutions as a central element of transformation towards climate resilience.
- Faster adaptation: e.g., by
 - Accelerating the rollout of adaptation solutions through support for the development, testing and up-scaling of innovative solutions;
 - Supporting demonstrations of successful systemic transformations towards climate resilience;
 - Developing a common framework for the assessment of climate change risks for European regions and communities to help reducing risks of climate-related impacts.

2. Intervention Logic

To achieve its goal and accelerate climate resilience, the Mission will deploy actions in **six steps** (see Fig. 4): Step 1 (Objective 1); Steps 2, 3, 4 (Objective 2), and Steps 5 and 6 (Objective 3). Each of these steps is described in further detail in the following sections of this chapter, as well as cross-cutting support and coordination activities facilitating the implementation of the Mission and a timeline reflecting the Mission’s approach to phasing and sequencing of its activities. Throughout all actions and steps funded by Horizon Europe, the Mission will actively steer the portfolios of projects in order to ensure its overall coherence.

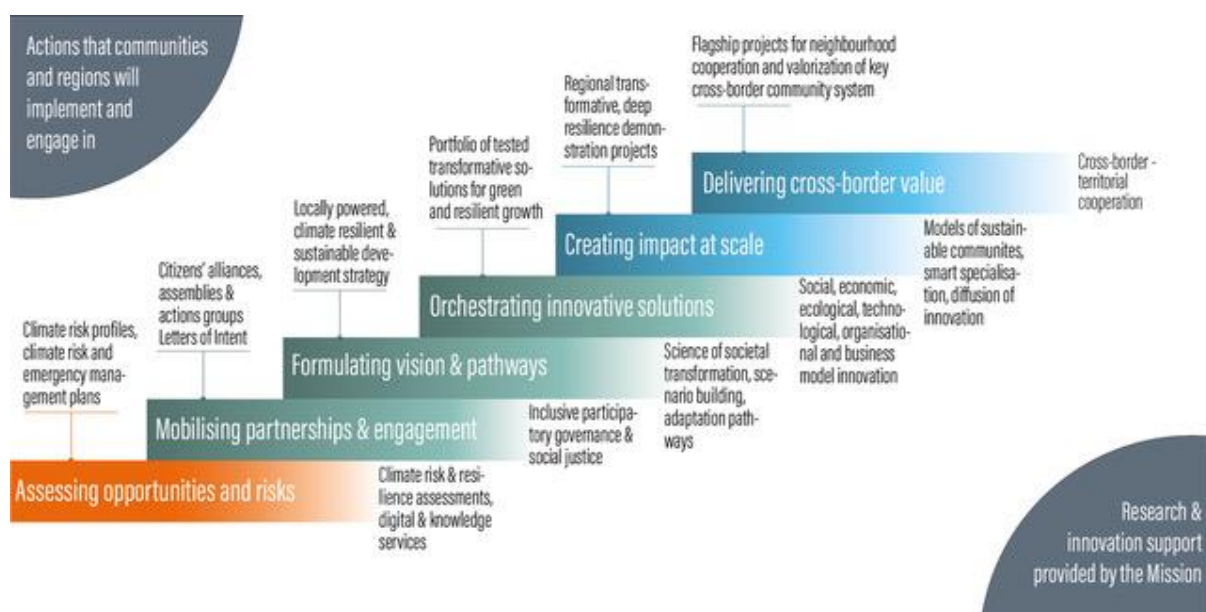


Figure 3 – Intervention Steps – Step 1 (Objective 1); Steps 2, 3, 4 (Objective 2), Steps 5, 6 (Objective 3)

Regions and communities wanting to enrol in the Mission may undertake the whole journey or a part of it, depending on their ambition and previous adaptation efforts. More advanced regions and communities with a well-defined vision may start from or move quickly towards higher steps. Particular efforts will be made to **support less developed regions that are more vulnerable to climate impacts and often have low adaptive capacity**. They will be supported in terms of capacity development and facilitation of services and processes, as well as through partnering and teaming in Mission activities with more advanced regions, in particular in the context of the regional projects further described in step 4.

The Mission will operate on a **coordinated bottom-up dynamic**. It is based on full openness principle, allowing the participation of the key actors in all European territories and where all actions will be open to all interested regions. The Horizon Europe Mission work programme excellence-based selection processes will apply in the achievement of the Mission goals. The selection criteria and the targeted objectives will be designed ensuring a full alignment with the Mission key principles of openness and inclusiveness prioritising actions where are most needed taking into account in particular the climate vulnerability (including high projected multi-sector losses), the innovation performance (laggards) and the capacity in terms of resources of the different geographical areas and economic sectors.

Horizon Europe actions (in line with its legal basis) will promote collaboration among different actors located in different European Member States and associated countries, to promote inter-regional collaborative actions. As demonstrating and scaling up effective solutions is a very critical success factor, the Mission will facilitate cross-fertilisation of European regions to identify and deploy common approaches and solutions to address their vulnerabilities. Specific priority will be given to the collaboration among **front-runner** regions in research performance and on climate adaptation for sharing knowledge with **the most vulnerable ones**, creating a common place to test the most suitable solutions and exchange best practices.

Horizon Europe flexibility will be used (in full respect of its legal framework) to promote the selection of the consortia that will carry out the Mission actions on a transparent, inclusive way based on objective criteria linked to excellence and impact and the optimisation of the Mission to tackle the most pressing climate pressures and the vulnerability of European regions. The consortia coming forward in **fully open competitive calls** addressing the Mission specific actions in a bottom-up approach should meet the call requirements, engaging a broad footprint of regions, fostering **twinning of most advanced with most vulnerable regions and communities**.

OBJECTIVE 1: Preparing and Planning for climate resilience

The first objective of the Mission is to assist regions and communities in better understanding, preparing for and managing climate risks such as heatwaves, forest fires, droughts, floods, storms, storm surges and diseases and impacts on food security and biodiversity. Accordingly, the activities undertaken in step 1 are organised in a way that its outputs, outcomes and impacts benefit **citizens, communities and regions across Europe in general**, in particular those that are most vulnerable, marginalised and more impacted. Research and innovation activities under this objective focus to a large extent on the provision of climate services, on modelling of climate risks and advancing early warning systems, with activities ranging from applied research and proof of concept (TRL 3-5), to demonstrations in operational environments at pre-commercial scale (TRL 6-7).

STEP 1: Better understanding of climate change related risks

During step 1 of the transformational journey, the Mission will support regions in accessing the wealth of knowledge on climate change impacts and risks and building locally-operated risk management capabilities.

The Mission will use the Climate ADAPT platform¹¹, already an established reference in European adaptation, as a central knowledge hub. It will be complemented with databases, functions and user interfaces that are necessary for the Mission. Other data and cloud computing hubs¹² may be connected or made accessible to citizens, communities and regions. The new data services of the Mission Portal on Climate-ADAPT will make it possible to access, combine, analyse and visualise data to generate comprehensive climate risk profiles and learn about climate adaptation/risk management systems at local, regional and national levels. As a part of the midterm review, a strategy will be elaborated to assimilate the Mission's knowledge output into Destination Earth and particularly its priority Digital Twin on climate change

¹¹ <https://climate-adapt.eea.europa.eu/>

¹² such as Risk Data Hub (JRC), European Climate and Health Observatory (EEA), Copernicus Climate Change Service (C3S), Copernicus Emergency Management Service (CEMS), ESPON Database, European Marine Observation and Data Network (EMODnet), and others

adaptation (scheduled to be operational in 2023), which differs from other initiatives in significantly increased precision thanks to high performance computing capacities and also in the possibility of full vulnerability assessment across all impact sectors.

To foster consistency of climate risk assessments across scales and levels of governance, the Mission will **first develop a climate risk and vulnerability assessment framework/template**, through Research and Innovation Actions (RIAs) building upon the PESETA studies, EEA assessment reports and the UNDRR Global Risk Assessment Framework (GRAF). Built upon the latest science and relevant CEN/ISO technical standards, the framework may eventually be more widely applied, including by supporting the implementation of the EU Adaptation Strategy or by incorporating it in the guidance and procedures of the Union Civil Protection Mechanism (UCPM) and the data and knowledge services embedded in the Climate ADAPT.

European regions would have access to an assessment of their risk and opportunities arising from accelerated climate actions. The Mission will fund research actions (RIAs), and harness the results of other Horizon Europe projects, to **support regions in using the climate assessment framework developed and conducting multi-hazard/risk assessments or upgrading/refining existing ones**, and making use of climate services. This generated knowledge will be public, thereby helping citizens, public institutions and businesses to understand and appreciate their risk exposure and possible implications of climate disruptions on social, economic and environmental processes and key community systems. The funded actions will also foster adjustments of existing community early warning systems to consider changing patterns of climate extremes and ensure rapid responses **protecting people at high risk such as children, senior citizens, people with chronic diseases and socially disadvantaged groups**. Development of inter-urban and regional risk knowledge hubs connected to Risk Data Hub, Climate ADAPT and European Climate and Health Observatory will be encouraged.

A new financial and advisory tool, the Policy Support Facility, will be established under the EU Covenant of Mayors in 2021. The aim is to collaborate with cities and support them in accelerating actions from the Sustainable Energy and Climate Action Plans and just resilience, mostly in vulnerable, small and medium-sized cities. The supported cities would share their knowledge, experience and lessons learnt. The Mission may contribute, in conjunction with the Cities Mission, to scaling up this initiative.

As **outputs** of the above activities:

- the Mission will develop a climate risk and vulnerability assessment framework and a knowledge hub which will allow citizens to access information and understand how the places in which they live are or will be affected by climate change and what has been done to address climate risks,
- the communities and regions will learn about how their key community systems (see box 1) can be affected by climate risks, and how existing risk management capabilities can be further improved to better cope with these risks.

The **expected outcomes** of activities undertaken in this step include

- empowered by an easy access to advanced climate risk assessments, local administrations and companies will develop or revise community-based emergency and risk management plans to ensure that critical infrastructure is safe and essential services operable and accessible under critical conditions.

OBJECTIVE 2: Accelerating transformations to climate resilience

The second objective of the Mission sets out to accelerate smart and systemic transformations to climate resilience in a just and fair way. By 2030, the Mission will support at least 150 European regions and communities in developing their vision of a climate-resilient future and innovation pathways to reach it, and in testing solutions and preparing the ground for deep-rooted systemic change. This objective is addressed by step 2 – the mobilisation of support and engagement, step 3 – the formulation of a vision and pathways, and step 4 – the orchestration of transformative solutions. This objective, step 4 in particular, represents the heart of the research and innovation activities of the Mission, aiming to develop, test and/or bring close to the market a whole range of transformative solutions, with activities ranging from applied research and proof of concept (TRL 3-5), to demonstrations in operational environments at pre-commercial scale (TRL 6-7) and of first of a kind commercial systems (TRL 8).

STEP 2: Mobilising support and engagement

In step 2, the Mission supports participating regions and communities to build upon and strengthen existing structures where they exist, or to establish new **local governance structures to steer the transformation** through inclusive and deliberative processes.

These local governance structures facilitate co-design, co-implementation and co-evaluation of the Mission “on the ground”, engaging stakeholders, from civil society, the business community, industry, research organisations, and citizens in every step of the transformational journey. They foster social learning and a culture of civic engagement, and provide mechanisms ensuring a just transition securing support for those that are most vulnerable to climate change, as well as those that may be most negatively affected by the transition.

Particular attention will be given to the engagement of citizens. To stimulate user-led innovation, citizens and stakeholders will be engaged in the co-production of data and knowledge (e.g., through citizen science or citizen observatories) and the co-design of digital climate services and innovative solutions. Together these tools and methods aim to create an action research platform at the intersection of science and profound social and organizational change. Regions and communities could set up dedicated mechanisms for the engagement of citizens (e.g., citizens assemblies) and other stakeholders, including specifically the alignment with the entrepreneurial discovery process that is at the heart of the governance of the smart specialisation strategies established under Cohesion Policy.

General guidance and online support (such as webinars) are provided to all interested regions through the Mission Portal to be established on Climate ADAPT.

The thematic projects dedicated to the topic of governance and engagement (see further detail below in Box 2) would further support the design, testing and monitoring of performance of experimental modes of participatory governance and environmental stewardship and the development of adequate strategies and mechanisms to manage structural changes and conflicts that may emerge during transformation. Moreover, the **European Climate Pact**¹³ would support the engagement of local communities, especially vulnerable and low-income groups, with activities adjusted to the local context, challenges and needs (for more detail see chapter 8 on citizen engagement and communication strategy).

¹³ https://europa.eu/climate-pact/index_en

As **output** of this step, it is expected that:

- at least 150 regions and communities have well-established governance structures steering the transformation to climate resilience, including mechanisms for a meaningful and continuous citizen and stakeholder engagement and for multilevel governance.

Expected **outcomes** include

- a culture of civic engagement and social learning, and mechanisms ensuring a just transition.

STEP 3: Formulating a vision and transformative pathways to climate resilience

At step 3 of the transformational journey the Mission supports participating regions in formulating their vision of a climate resilient future and the pathways to reach it, that take account of the priorities identified in the programmes and relevant smart specialisation strategies established under Cohesion Policy and other programmes under shared management. The regional strategies are embedded in national strategies that are regularly reported by Member States' correspondents providing contributions to Climate-ADAPT.

Further to be considered in this process are the conditions enabling transformation, including access to knowledge and data (and the EU's digital agenda), the facilitation of education and capacity building (and the EU's Skills Agenda), the establishment of mechanisms allowing for the governance of and engagement in the transition, and the mobilisation of funds and resources (and the Sustainable EU Investment Plan), as well as any other policy action that should be addressed to further remove existing barriers to disruptive innovations. Any action needed in this context should also be reflected in the transformation pathways or strategies. These strategies should entail clear plans and commitments that should guide and enable the innovation and policy actions that are to be addressed in step 4.

General guidance and online support (such as webinars) are provided to all interested regions through the Mission Portal to be established on Climate ADAPT. More direct and substantive support and capability building will be provided through dedicated Horizon Europe actions.

As **output** of this step, it is expected that:

- at least 150 regions and communities have formulated their specific vision of a climate resilient future and the transformative pathways to reach it. These strategies should entail clear plans and commitments that should guide and enable the innovation and policy actions that are to be addressed in step 4.

In terms of **outcomes**, it is expected

- that the vision and pathways to a climate resilient future are reflected in political commitments to prepare the ground for the large-scale diffusion of solutions, including policy actions promoting enabling conditions, addressing barriers and leveraging funds (fundamental for step 5).
- to further mobilise and inspire the engagement of citizens and other stakeholders in the transformative journey to climate resilience, as well as to provide a good understanding of cross-border interdependencies, risks and opportunities (that should be addressed in step 6).

STEP 4: Orchestrating innovations and testing transformative solutions

Step 4 of the journey to transformation is about testing transformative solutions. Guided by the output of step 3, the regional projects would develop and test solutions addressing challenges and policy objectives identified. These could include the following:

- the mapping of potential ecological corridors, plans for the restoration of ecosystems and testing of nature-based solutions;
- the development of incentive schemes fostering efficient use and allocation of water and solutions to reduce the vulnerability to water-related risks;
- solutions for a more climate resilient agriculture , fisheries, aquaculture and forestry, as well as climate resilient food systems (in close coordination with the Horizon Europe Soil Health Mission, including soil related aspects of climate mitigation);
- solutions for the climate-proofing of critical infrastructure and the regeneration of public spaces for climate resilient neighbourhoods;
- solutions for more climate-resilient health services and protecting the health of vulnerable and marginalised populations;
- the development of social mechanisms governing the trade-offs of the transformational changes and for increasing societal engagement;
- a demand-driven further development of the digital twins on climate change adaptation and other digital services facilitating adaptation to climate change;
- the re-skilling and up-skilling of the regional work force;
- solutions to close the protection gap insuring losses caused by climate impacts;
- solutions to increase social resilience in particular the most vulnerable groups.

This step of the Mission should also promote the transformation of more climate resilient regional economies, including by (i) developing research and innovation capacities and the uptake of advanced technologies; (ii) reaping the benefits of digitisation for citizens, companies, research organisations and public authorities; (iii) enhancing sustainable growth and competitiveness of SMEs and job creation in SMEs, including by productive investments; and (iv) developing skills for smart specialisation, industrial transition and entrepreneurship¹⁴. In this context, the Mission will be supported by smart specialisation strategies as a place-based innovation-driven policy where the development and deployment of innovative solutions will be matched with entrepreneurship, procurement, strategic infrastructures and skills development.

At the heart of this transformational step is the portfolio approach to innovation that is specific to the mission instrument of Horizon Europe. A central feature to this approach is the experimentation of a range of different innovations and solutions addressing an identified challenge. Solutions tested to induce systemic change should also depart significantly from current technologies and practices and represent a significant progress beyond state of the art, involving nature-based solutions, technological innovation, social innovation, business model innovation, financial innovations or policy innovation. Further, all innovation actions should be programmed and analysed as systemically interconnected to better understand possible synergies and negative feedback loops.

The activities to reach this objective are resource intensive and require a bundling of efforts. Regions and communities will participate through ‘regional projects’ selected based on calls for proposals under Horizon Europe, i.e. excellence and impact driven.

¹⁴ European Regional Development Fund (ERDF) and the Cohesion Fund legal text, Article 2, Specific objectives, Paragraph 1(a), Policy Objective 1

These **regional projects** would support several (4 or more) regions, and within them at least 1 or 2 local communities, from various (3+) EU Member States working together and would take the form of Innovation Actions (IAs) that last for 3 up to 5 years. Each region participating in the project would be represented by one or more public authorities (i.e., administrations and subnational governments, or local authorities), one or more local research partners (i.e., universities, research centres, one or more civil society organisations, and innovation-oriented enterprises), and one or more local business partners (i.e., public and private enterprises, financial institutions, SMEs etc.). In addition, each consortium will need to gather a critical mass of skills and expertise. A single project should involve regions with different levels of preparedness and capability, thus creating conditions for twinning and knowledge transfer. It is expected that these projects will be of medium-large size (15-30 million Euro). Proposals need to make the case for the required support also in relation to the number and size of involved regions, their population, their climate vulnerabilities and the scope of the adaptation measures addressed. As part of the eligibility criteria, project proposals could be asked to complement Horizon Europe funds with a similar amount of funds from other funds such as ESIF (European Structural and Investment funds), the Recovery and Resilience Facility, own funds and/or from Member States and private sector. Over the course of the Horizon Europe programming period, about 20-25 regional projects (supporting at least 150 regions and communities) are envisaged to be implemented as part of the Mission.

The Mission Implementation Platform will support the regions in managing their portfolio of innovations, with the evaluation of their successfulness and possible adjustments and broad sharing of the knowledge generated through the Mission's portal to be established on Climate ADAPT.

The expected **output** of this step consists of:

- at least 150 regions and communities have been involved in development and testing of a whole range of transformative solutions that have been developed, tested and/or brought close to the market, ranging from applied research and proof of concept, to demonstrations in operational environments at pre-commercial scale and of first of a kind commercial systems.

In terms of **outcomes**, it is expected:

- that this would accelerate the access to transformative solutions that are ready to be deployed (in steps 5 and 6), and contribute to creating more competitive and smarter regional economies in general.

OBJECTIVE 3: Demonstrating systemic transformations to climate resilience

The third objective of the Mission is about scaling up and fostering large scale deployment of tested innovative solutions for climate resilience (technological innovation, but notably also nature-based solutions and social innovation), the enabling of their diffusion and the removal of barriers for their uptake. By 2030, the Mission would have generated at least 75 demonstrations of systemic transformations at regional and cross-regional level. The steps being addressed under this objective include step 5 – creating impact at scale, predominantly within regions, and step 6 – creating cross-border value and cooperation. The actions under this objective are expected to be at TRLs 6 and above and will be funded by a combination of R&I actions and other types of financial support including through financial institutions.

These demonstrations are examples of breakthrough innovations implemented in real life. They may include larger scale application of innovative solutions (e.g. large scale drought

resistant integrated farming, green or blue infrastructure including innovative large scale nature restoration, sustainable desalination) that have been previously tested in controlled or laboratory conditions, radical reorganisations of public health or wellbeing services, reconfiguration of social relations and practices, far-reaching reforms of environmental public policy, or sizeable modernisation of municipal and regional infrastructure. The demonstrators are closely connected to, or grounded in, the previously designed transformative vision and pathways.

With this objective being mainly about deployment of developed technologies and making innovations available on the market (TRL 8-9), a high leverage factor is expected under this objective. The contribution of Horizon Europe (through Innovation Actions and First of A Kind pilot demonstrations) will represent a small share, which should be complemented with other public and private resources. Complementarities with EU funding sources such as the Cohesion policy programmes (ESIF), Next Generation EU, LIFE, will be encouraged. In particular, Horizon Europe funds will be used for scaling up of innovative solutions (largely building on the outcome of the regional projects described in objective 2) and to provide guidance, support and technical assistance in creating critical mass, crowding in and leveraging other financial resources, and to coordinate the creation of cross-border value, as further detailed in steps 5 and 6.

STEP 5: Creating impact at scale

With step 5 on the transformational journey the Mission intends to stimulate the larger scale deployment of tested solutions for climate resilience and the transformation of key community systems and enabling conditions, to reach the goals set within the regions' vision for a climate resilient future. The Mission will support regions in accessing best available technologies and encourage the cooperation between more developed and less developed regions. This will be of particular importance given the challenges that the less developed and peripheral regions face in terms of climate change impacts and their capacity to adapt to them. Such goals could include

- the establishment of ecological corridors or other large scale Nature-based solutions;
- technological solutions like sustainable desalination at scale;
- the deployment of incentive schemes fostering efficient use and allocation of water and the building of structures to reduce the vulnerability to water-related risks;
- large scale deployment of a more climate resilient agriculture, forestry, and food value chains;
- the climate-proofing of critical infrastructure and the regeneration of public spaces for climate resilient neighbourhoods.

Amongst the other funds beyond Horizon Europe that could support the aims of this step of the Mission are the cohesion policy funds that aim to foster a greener and more resilient Europe by mobilising investments to promote climate change adaptation and disaster risk prevention and resilience; access to water and sustainable water management; the transition to a circular and resource efficient economy; and enhancing protection and preservation of nature, biodiversity and green infrastructure (ERDF and the Cohesion Fund legal text, Article 2, Specific objectives, Paragraph 1(b), Policy Objective 2).

Concerning the 2021-2027 period, twenty Member States received a recommendation to invest in disaster risk management and climate change adaptation. Other funds include the European agricultural fund for rural development (EAFRD) that can contribute to climate change adaptation, to the protection of biodiversity, enhancement of ecosystem services and

preservation of habitats and landscapes, or the sustainable development and efficient management of natural resources such as air, water and soils. This will depend on the priorities identified in the strategic plans of Member States. The EIP AGRI¹⁵ in particular can support the dissemination of practice-proven results on climate adaptation which are relevant to agri-food stakeholders in rural areas. Or the LIFE programme, which can support revenue-generating or cost-saving pilot projects promoting the preservation of natural capital, including climate change adaptation projects, through the Natural Capital Financing Facility (NCFE). Or the European Social Fund Plus (ESF+) that can support a greener, climate neutral Europe through the improvement of education and training systems necessary for the adaptation of skills and qualifications, the upskilling of all, including the labour force, the creation of new jobs in sectors related to the environment, climate and energy, and the bioeconomy. Of further interest are the Recovery and Resilience Facility, which is focused on public investment and reform for a green transition, the European Investment Bank (EIB), which can support investment in forestry, agriculture, urban environment, urban regeneration, and InvestEU, which is available to fund investment in the circular and blue economy, water, waste and other environmental infrastructures.

The development under this mission of new approaches to addressing climate adaptation challenges and transformative solutions for climate adaptation can help accelerate the uptake of best available technologies and encourage the development of new capabilities in public administration and the provision of new services. This is of particular relevance to less developed and peripheral regions which are less able to absorb new technologies and have less capacity to manage systemic transformation. There is therefore scope in many of these regions to scale up demonstrators with resources from cohesion policy in order to support the delivery of programme objectives. The Mission will therefore provide guidance, support and technical assistance for downstream synergies to help the regions scale up transformative solutions developed in demonstrators through Cohesion policy programmes. This will strengthen the impact of both cohesion policy and the Mission, in particular in less developed and peripheral regions, to help the regions achieve their objectives as regards the adaptation to climate change. Other Horizon Europe funds will be deployed, for example, to crowd in a critical mass of financing around a specific project to come to financial closure, top up advisory products by the EIB, or top up specific EIB products (for more information see Chapter 4 on Budget and Financing Strategy).

The expected **outputs** of this step are:

- at least 75 demonstrations of systemic transformations contributing to the overall climate resilience of regions.

In terms of **outcomes**, it is expected that

- the large-scale deployment of transformative solutions will eventually lead to high impact and visibility projects contributing to climate resilience in a high number of European regions.

STEP 6: Creating cross-border value

This final step 6 sets out to foster an additional set of cross-border demonstration projects of climate resilience across European regions and communities.

¹⁵ <https://ec.europa.eu/eip/agriculture/en/node>

The large-scale demonstration projects and cross-border projects will first reconcile visions and adaptation pathways across several participating regions from different EU Member States and Horizon Europe associated countries. The partner regions will implement shared and jointly developed transformative solutions especially where unilateral actions are not appropriate or effective (e.g., water abstraction/allocation in the transboundary river basins, protection and connectivity of transboundary protected areas, water and air pollution control and soil protection), or where climate adaptation on one side of the border may amplify risks on the other side of the border (e.g., structural flood risk protection, etc.). Furthermore, the regions will develop and implement common strategies for cross-border cooperation in civil protection and emergency management, health and social services, smart industrial specialisation and other areas.

Cross-cutting support and coordination

Support cutting across all three objectives and the 6 steps will be provided in form of:

- **Thematic research and support activities** that mobilise the relevant communities of practice; and
- **A Mission Implementation Platform** to support the Commission to coordinate the broad range of activities and actors, to facilitate and support regions, and to provide horizontal services across objectives and steps.

Thematic research and innovation activities

The Mission will mobilise relevant communities of R&I practice through a number of thematic research and support activities in support of regions by:

- providing state of the art knowledge and data regarding climate impacts and risks in their respective fields;
- bringing together experts, practitioners, business and industry, organisations and networks in the respective fields from across Europe and beyond where needed to work with local partners;
- sharing best practices regarding existing and emerging innovations and solutions, stimulating broad dissemination and reapplication of R&I results related to their respective field;
- undertaking research and providing services and know-how in support of the co-design and testing of transformative solutions and enabling conditions (see Box 2 for examples);
- supporting effective and efficient deployment of solutions at large scale; and
- underpinning inter-regional demonstration projects.

For 2022, it is foreseen to launch RIAs and Coordination and Support Actions (CSAs) to address thematic research on solutions, services and know-how across the 10 Mission's innovation areas that will feed into the portfolio of innovations at the service of the regions (e.g. on social and behavioural sciences related to the transformational change), including work on portfolio coordination and identification of remaining gaps across the areas of innovation and transformation to support participating regions. An outline of possible R&I actions to be addressed in the areas of transformation is shown in Box 2.

Box 2 – Examples of R&I actions to be addressed in the Areas of Transformation

Ecosystems and nature-based solutions (NBS): potential R&I activities include demonstrating nature-based solutions to address the multiple hazards and cascading effects of climate change. The Mission will support research to improve the understanding of the role of biodiversity in nature-based solutions. It will also support the research and innovation on performance and protocol development for different types of NBS, including their resilience to changes in climatic patterns and extreme weather events. Innovation actions include the support of first of a kind demonstrators for NBS for coastal resilience, wind protection, landslide prevention and erosion control, prioritisation of ‘green’ over ‘grey’ infrastructure. The Mission will also facilitate and support the increase of use of public procurement for NBS. Innovative business, governance and financing models as well as economic evaluation methods will be developed in the context of the Mission.

Land use and food systems: the Mission will also use R&I activities to develop, test and monitor climate resilient business models across food systems. The Mission’s research and innovation activities will focus on supporting the design of adaptation strategies that overcome cultural, technological, market and regulatory barriers to the uptake of climate resilient practices in our food systems. Actions will also harness the potential of digitalisation and cutting edge technologies such as artificial intelligence to accelerate the investment and uptake of innovative solutions such as precision technologies and robotisation and their role on the transition to a more climate resilient and sustainable food system.

Water management: R&I activities aiming to tackle water scarcity will help to understand the water needs of natural ecosystems, to the develop innovative water distribution models and tools, including financial tools and underlying governance systems. Innovation actions will also contribute to enhance the water-retention capacity of landscapes and build solutions to reduce the water needs of key economic sectors. On resilience to water-risks, R&I activities will help develop innovative risk reducing solutions, including the restoration of ecosystems, using NBS and developing and deploying intelligent forecasting and warning systems.

Critical infrastructure: R&I activities will help develop climate resilient management measures (such as changing maintenance schedules or implementing remote and smart monitoring and maintenance tools). The Missions’ R&I actions will also accelerate the uptake of resilient structural solutions (retrofitting existing infrastructure and ensuring that climate resilience is adequately addressed in the construction of new structures). On innovative regulation, the Mission will also contribute to develop standards for infrastructure and buildings that are straightforward and can be applied consistently while taking into account context-specific climate risks.

Health and human wellbeing: R&I activities will promote the integration of climate risks into prevention, health preparedness systems and considerations in climate policies. Research actions will focus on improving insights into short and long-term health effects of climate change, the interactions between climate change, ecosystems’ health and human health, forecast and decision making models and developing and improving early warning systems.

Local economic systems: R&I activities will be implemented that will support the participating regions with increasing the innovation and employment dynamics in their local industrial ecosystems, creating new local jobs that deliver climate resilient solutions, products and services, all in the context of their smart specialisation strategy. The R&I actions will explore innovative business models that are adapted to expected climate impacts, analyse

potential needs for upskilling and reskilling and for strategic infrastructure, and will study and advise on favourable conditions for just economic transitions at local and regional scale.

Knowledge and data: R&I activities will contribute to developing European Climate Risk Assessment Framework, providing assessment services to regions applying this framework, providing modelling and scenario analysis services, making climate resilience data accessible, reusable and interoperable and fostering knowledge sharing of key insights and solutions across the EU. R&I activities in this area of innovation will also further explore opportunities of citizen engagement in the generation of knowledge and data as well as in the design of digital knowledge services that are to empower societal actors to meaningfully contribute to climate resilience.

Governance and engagement: In this area of innovation R&I activities will be implemented to support the regions in the development of adequate mechanisms to meaningfully engage citizens and a broad range of stakeholders in the transformative processes facilitated by the Mission. Throughout the duration of the Mission, these R&I activities further study the Mission-related engagement and governance mechanisms to further understand their success factors and to explore and experiment with new innovative ways of engaging citizens and stakeholders in transformative processes such as the missions.

Behavioural change: Implemented R&I activities will both inform regions on state of the art knowledge regarding behavioural change and transformations, and use the Mission as a whole as an opportunity to study the role and interplay of behavioural change and systemic change in the context of the region's transformative journeys towards climate resilience. Aimed at better understanding the dynamics of transformations, these actions are to further explore, for example, relevant social tipping points or leverage points that would trigger transformations towards climate resilience.

Finances and resources: R&I activities in this area of innovation will contribute to a better understanding of the participating regions of the costs of climate impacts as well as the financial needs for adaptation measures and the development of financial design for resilience portfolios, including the exploration of innovative finance solutions. This will entail an improved understanding of the macroeconomic impacts of climate change risks and their integration into models and tools used to design macro fiscal policies. These R&I activities will also explore mechanisms that would accelerate the transformation of the financial sector to internalise and reward climate resilient investment, and that would contribute to closing the climate protection gap.

Mission Implementation Platform

An overarching coordination and support structure is needed to provide central services to the general operation of the Mission, to coordinate the broad range of activities and actors (including relationships with other Missions), to facilitate and support the regions along their climate resilience journeys.

A Mission Implementation Platform (MIP), will be established to fulfil the following main functions:

- **Coordination and management:** A MIP will support the Commission in the coordination of the different activities and actors across the various dimensions of the Mission, and help maintain quality and efficiency in the Mission's intervention-logic. A MIP will facilitate coordination and exchanges:

- **amongst the regions and communities** with a view to strengthen inter-regional cooperation and development, e.g. in the context of the inter-regional climate resilience demonstration projects, and knowledge transfer between the regions e.g. through peer reviews, building upon the experience under the Union Civil Protection Mechanism, and twinning schemes enabling citizens, communities and regions from across Europe to interact with and learn from others.
 - **between the regions and communities, national authorities and the European Commission** to allow for an effective implementation of the Mission, including facilitating the operations of its governance structures.
 - **amongst the portfolio of funded projects**, focusing on synergies and interdependencies between the projects. It will keep track of how funded projects co-produce and share knowledge.
- **Support and development**: The MIP will support and assist with capacity building the regions and communities to take leadership on transformative adaptation, focusing in particular on Europe's most vulnerable and exposed with the goal to create a lasting climate resilience. It will also support those already leading such processes in sharing their experiences. Training, leadership support or technical assistance are therefore based on a model of having regional counterpart organisations that can build their own capability to be local support mechanisms.
 - **Monitoring, learning and evaluation**: The MIP, in close collaboration with the EEA and JRC and building on existing monitoring frameworks, will assist the Commission with the evaluation of the Mission. The MIP will provide regions with the know-how to develop a baseline, using established monitoring tools and agreed KPIs to measure and communicate progress towards regional goals and objectives. The MIP will assess progress made towards achieving the objectives of the Mission. Climate ADAPT, managed by the European Environment Agency (EEA), will play a key role to support and monitor the implementation of the Mission. The MIP will also design and oversee data quality and knowledge management. Further reference to the monitoring framework is included in chapter 7.

The MIP will also stimulate exchanges of lessons learnt across the funded projects and the Mission as a whole. This will allow to introduce corrective measures to the Mission implementation plan leading to an adaptive management of the Mission itself. On the other hand, this generates recommendations to address regulatory barriers that may exist at local, regional and/or European level.

Broader citizen engagement, communication, dissemination and exploitation: The MIP will assist the Commission with the overall communication on the Mission. It will manage the central knowledge hub of the Mission to be established within the Climate ADAPT structures, in line with the EU Adaptation Strategy goal of making Climate ADAPT the authoritative European platform for adaptation. The MIP will also help to create synergies and add value to communication, dissemination and exploitation activities of individual projects of the Mission's portfolio, and by doing so boost scientific, societal and economic impacts.

Given their current role, responsibilities and experience, it is advisable that the Mission Implementation Platform will closely connect to/collaborate with the activities of:

- the **European Environment Agency (EEA)** because of its role and experience in managing Climate ADAPT, which will be the Mission's central knowledge platform; Particularly relevant its experience and infrastructure related to monitoring and

reporting, and its networks, especially the European Environment Information and Observation Network (EIONET);

- the **European Commission Joint Research Centre (JRC)** because of its central role and experience in supporting regions with regard to their smart specialisation strategies, and with regard to the monitoring and analysis of policy developments and its policy learning system;
- the **European Investment Bank (EIB)** because of its central role in the Innovation Finance Advisory service that will be operated as a part of the InvestEU Advisory Hub;
- the **European Institute of Innovation and Technology (EIT)’s Climate-Knowledge and Innovation Community (Climate-KIC)** because of its experience in promoting climate innovations across Europe and its approach to systems innovation, as well as its network of innovation hubs within each Member State and its track record of working with regions on designing adaptation pathways and activating adaptation portfolios.

3. Timing and sequencing of activities

In the first, **building-up phase** (2021-2023), a supporting and governance system for the Mission will be set up including an Implementation Platform, building upon the Mission-related projects selected for funding under the Green Deal Horizon 2020 call and Climate-ADAPT. During the first year, the financial support system through the EIB will be defined. In addition, the first Mission Forum will be organised, which will allow to receive input from regions, including on intentions by regions to participate in the Mission, expressed for example through letters of intent. The first Mission Forum will also allow to make links between Member States’ intentions on Climate Adaptation measures and the use of EU funds under shared management.

As a Climate change Risk Assessment approach gets developed, regions will start receiving support towards developing their assessment under objective 1. **Regions benefiting from Horizon Europe support** to develop their pathways towards climate resilience and to demonstrate the needed transformative solutions under objectives 2 **will take part in consortia responding to competitive calls** starting by the end of 2021, with the first grants being signed in 2022. Also, the thematic research and coordination projects will be set up during the first phase. Assuming a linear distribution of the Mission funds over 2021-2027, about 50 regions will be selected by actions implemented in this phase; by 2024 the Mission will reach the capacity of ca. 70 regions implementing the steps 2 and 3 of the transformative journeys (objective 2) at the same time. (this will include those regions that are part of the Green Deal H2020 call). In addition, the first large scale demonstrators addressing objective 3 will be kicked-off in this first phase, with the expectation that about 10 regions will be already involved in the objective 3 of the Mission by the end of the building-up phase.

In the second, **full-deployment** phase (2024-2027), the Mission will activate all other actions under the objective 1 and continue engaging the communities and regions under objective 2 and 3. The capacity of ca. 70 regions implementing the step 4 of the transformative journey will be reached in 2025. Between 2025 and 2027 the Mission will manage the transformative

processes in 140 regions at the same time (70 regions at steps 2-3 and 70 regions at step 4 or higher).

In the third, **consolidation** phase (2028-2030), the Mission will consolidate the results obtained in the first two phases and will draw the final conclusions and lessons learnt to inform the Mission participants and the policy process on possible next steps. During this phase the portfolio of projects contracted up to 2027 will be fully executed. Beyond supporting the regions and communities, the Mission will work on a strategy to preserve the legacy of its achievements.

Climate Adaptation Mission – work plan and supporting actions

Year	Horizon Europe							Next MFF ¹⁶			
	'21	'22	'23	'24	'25	'26	'27	'28	'29	'30	
Phases	Building up										
				Full-deployment							
								Consolidation			
Review			Mid Term							Final	
(1) Preparing and Planning for climate resilience											
Exploiting and further developing knowledge infrastructures and platforms											
Advancing local knowledge on climate risks and access to it of local authorities											
Developing innovation on practices, business models, technologies, value chains, policies											
Definition of climate risk profiles and enhanced early warning systems for all relevant risks										150 regions	
(2) Accelerating transformations to climate resilience											
Citizen and stakeholder engagement: Setting up and running annual regional policy fora	Set-up: create political and citizens support			Rolling plan: Annual fora							
Mobilising support and engagement: well-established governance structures steering the transformation to climate resilience, including mechanisms for multilevel governance							150 regions				
Developing a transformative pathways to climate resilience: well formulated regional transformational plans, including analysis of innovation needs and portfolio of projects planned				Additional Annual Cohorts						150 regions	
Orchestrating innovations and testing transformative solutions: development and testing of relevant climate resilient solutions that have been developed, tested and/or brought close to the market				Additional Annual Cohorts						150 regions	
(3) Demonstrating systemic transformations to climate resilience											
Creating impact at scale: Demonstration of systemic transformations contributing to the overall climate resilience of regions.				Additional Annual Cohorts						75 regions	
Creating cross border value: Reapplication of successful solutions identified to broad regions sharing similar challenges and expanding across national borders											
Cross-cutting activities											
Setting-up and running of support structures, complementing existing support structures progressively	Establish Mission Implementation Platform			Consolidate structures into Implementation Platform				prepare legacy			
Building business cases for climate resilience investment, provide financial advisory services,											

¹⁶ Multiannual Financial Framework of the European Union (MFF)

development of models for blended finance (with the EIB)										
Developing harmonised monitoring and reporting framework for climate resilience at EU and MS level (with the EEA)										

4. Budget and Financing strategy

The economic case for investing in climate adaptation is powerful, with cost-benefit ratios ranging from 1:2 to 1:10 whereas early action on adaptation brings a “triple dividend” of avoided losses, economic and socio-environmental benefits¹⁷. Yet, adaptation investments face multiple barriers that include large upfront costs, difficulties with internalising benefits and insufficient incentives to attract private investors under the existing market architecture where short-term mind-set makes investing for the future difficult. As a result, investments in adaptation and resilience building continue to fall short of the needs, including in Europe.

Private funding needs to be incentivised, and complemented where needed by public financing. Governments will play an essential role by creating the right set of incentives, financial instruments, metrics and enabling conditions in general for scaling-up private sector engagement in adaptation and resilience financing. They can also create impact by acting as an investor of the first resort through strategic use of public funds to de-risk innovative solutions, to build scale and to create new economic opportunities and by raising awareness on the market about the importance of climate-related resilience. Member States’ and the EU budget will also continue to play a crucial role in addressing long-term investment needs for adaptation where there is limited scope for the private sector to intervene.

Therefore, the Mission’s financing strategy will stimulate the mobilisation and improved articulation of funding and financing from various public and private sources at different levels (EU, national, regional and local). Notably, the Mission will aim at synergies with the investments, financial instruments and other measures planned under various post-COVID recovery programmes that offer opportunities for reinforcing resilience.

The potential resources from Horizon Europe directly available to the Mission are estimated at approx. EUR 368 million for the building up phase (2021-2023). These “Mission specific” funds will provide the basis for both the Mission’s research and innovation activities as well as for its supporting components, and have the potential to make a critical difference in accelerating adaptation action on the ground in line with the ambitions of the EU Adaptation Strategy based on its orchestration capacity. However, while significant, these resources are not sufficient for achieving the Mission’s objectives, in particular for Objective 3. The Horizon Europe core Mission budget will therefore be deployed as “seed funding” aimed at catalysing and unlocking additional financing from other sources, both public and private. Figure 5 provides an overview of how the Horizon Europe Mission budget could potentially be distributed across the 3 objectives of the Mission. It also intends to give a rough representation of the shares of budget from other potential sources of funding.

¹⁷ After Global Center on Adaptation <https://gca.org/programs/climate-finance/>



Figure 4: Tentative representation of the intensity and distribution of the budget from Horizon Europe and other potential sources of funding across the 3 Mission's objectives. It is expected that the Mission will mobilise a multiple of its core budget to be able to deliver on its objectives¹⁸

The early stage of the Mission's conception process implies that obtaining firm financing commitments is challenging, in particular given the local nature of the Mission, which means that buy-in from regional and local stakeholders will be critical for securing additional resources for implementation. The following table presents an overview of potential sources of financing for the Mission, highlighting opportunities for synergies with other EU and national programmes. Where available, historical data is used on what has been spent in the last Multiannual Financial Framework on climate change adaptation and disaster risk prevention, which is meant to demonstrate an order of magnitude of the potential investment that could be linked to the Mission during the period 2021-2027. As regards EU level programmes, it is to be understood that not all resources identified in the table and subject to climate earmarking will be available for the Mission given their specificities and constraints. For those under shared management, Member States and regions will have an important say.

	Type	Name	Budgets expected to be mobilised for the objectives of the Mission or where synergies could be realised 2021-2027 (estimates)
Objective 1 : « Preparing and Planning for climate resilience »	Horizon Europe	Mission specific budget	€ 100 M
		Other parts of HE	€ 100 M
	Other EU funding	Digital Europe Programme (DEP)	€ 150 M are earmarked under DEP Work Programme 2021-2023 for implementation of Phase I of DestinE. Funding for further phases will be established in the subsequent DEP work programmes
		Relevant parts of the ESIF	N/A
		Union Civil Protection Mechanism (UCPM)	€ 30 M

¹⁸ It is estimated that up to EUR 10 B would be necessary to deliver on the Mission's Objectives

	National/ Regional		N/A	
	Private sources		direct leverage of private R&D for basic research is estimated at 1: 0.1/0.15 ¹⁹	
Objective 2: « Accelerating transformations to climate resilience »	Horizon Europe	Mission specific	€ 600 M	
		Other parts of HE (Pillar 2 Clusters, EIC)	€ 400 M ²⁰	
	Other EU funding	European Regional Development Fund(ERDF) (mainly Policy Objective 1 “Smarter Europe” ²¹)	The contribution will depend on the priorities identified within operational programmes and smart specialisation, in the regions selected for participation	
		European Social Fund Plus (ESF+)	N/A	
		Erasmus+ youth	Unknown (€ 47 M spent on climate related projects over 2014-2020)	
		European Solidarity Corps	Unknown (€ 25 M spent on climate related projects over 2017-2020)	
		European Institute of Innovation and Technology (EIT)	~€ 600 M will be dedicated to climate related activities over 2021-2027	
	National/ Regional		€ 250 M ²²	
Private sources		N/A		
Objective 3 : « Demonstrating systemic transformations to climate resilience”	Horizon Europe	Mission specific	€ 200 M	
		Other parts of HE	€ 100 M	
	Other EU funding	Regional Development and Cohesion Policy programmes (ESIF, including EAFRD, ERDF, Cohesion Fund, ESF and EMFF) ²³	The use of ESIF during the period 2014-2020 for climate change adaptation and risk prevention amounted to € 41.4 B (€ 29.8 B EU + € 12.6 B national co-funding ²⁴). The contribution for 2021-2027 will depend on the priorities identified within operational programmes and smart specialisation, in the regions selected for participation.	
		Just Transition Fund	The contribution will depend on the priorities identified within Territorial Just Transition Plans in the regions selected for participation	
		LIFE	EU budget 2021-2027 foresees €5.4 B, 61 % of which should be climate-related	
		CEF Connecting Europe Facility (CEF)	Includes requirements related to improving transport infrastructure resilience, in particular to climate change and natural disasters. It is expected that at least 60% of CEF’s budget will support climate objectives	
		Union Civil Protection Mechanism	€30 M	
		Recovery and Resilience Facility (RRF)	Each recovery and resilience plan has to include a minimum of 37% of expenditure related to climate. Total envelope: €672.5 billion Adaptation relevant investments identified in the preliminary analysis account for ~€4 B	

²⁰ It is assumed that on average 80M€ could be available per innovation area over the period 2021-2027

²¹ ‘Smarter Europe’ deals with R&I, digitalisation, SMEs and training for smart specialisation

²² Based on the max. 70% co-funding rate of Innovation Actions under Horizon Europe. Part of this could come from private sources

²³ Note that ESF (European Social Fund), and the EMFF (European Maritime and Fisheries Fund) do not track contribution to the theme “climate change adaptation and risk prevention”. The Mission will nevertheless explore possible synergies in these areas.

²⁴ <https://cohesiondata.ec.europa.eu/overview>

		EIB	The EIB is currently preparing a specific plan to enhance its support dedicated to adaptation (In 2020, the EIB has provided 2.4 B \$ in adaptation-related financing, both inside and outside the EU)
		InvestEU	At least 30% of the investments under InvestEU will contribute to meeting Union objectives on climate action. At least 60% of the investments under the SI window shall contribute to meeting the Union objectives on climate and environment. SI Window guarantee: EUR 9.9 B RID Window guarantee : EUR 6.6 B
	National/ Regional		Unknown ²⁵
	Private sources		Unknown ²⁶

With the 30% target for climate mainstreaming for the total amount of expenditure across all EU programmes and Next Generation EU, the budget from other EU programmes will play a key role in financing not only mitigation but also adaptation investments. Building resilience to climate is indeed increasingly an important objective under many EU programmes, including the Cohesion Policy, the Common Agricultural Policy, the LIFE Programme, the Digital Europe Programme, TEN-T/E/CEF, Invest EU and others based on more coherent approach to adaptation that builds on, inter alia, climate and sustainability proofing provisions.

Also, national and regional budgets will play a critical role whereas the place-based approach to the mission should ensure good buy-in from national, regional and community level. The Mission will facilitate dialogue with competent national and local authorities to both mobilise additional investments from national sources and explore synergies with nationally controlled adaptation activities such as those financed from the Recovery and Resilience Facility, but also funds under shared management, notably the EU structural and cohesion funds. It will aim at capitalising on the cohesion policy well beyond funding, by building on its strong governance structures at the regional level, as a way to mobilise the essential partners within the regions as well as across borders.

To inform its activities, the Mission will analyse, map and monitor the contents of key national level strategies with resilience contents (such as National Adaptation Strategies and National Adaptation Plans as foreseen under the Energy Union Governance). The national Recovery and Resilience Plans (RRPs) under the Next Generation EU are particularly important in this context given their transformational potential with strong emphasis on resilience-building in the post-COVID recovery phase.

Finally, it is of equal importance to mobilise private sector finance. The private sector also plays a critical role in investing in climate change adaptation, especially in the current context, when public budgets are constrained by urgent spending on post COVID-19 recovery, health care and social programmes. Banks, pension funds, insurance companies, corporations, impact investors, and other private actors can contribute by providing debt finance for adaptation and

²⁵ The leverage effect assumed for InvestEU is 1:14, equally spread between public and private sector.

²⁶ Idem

resilience-building projects. While private sector engagement in adaptation is growing, much more needs to be done: of the total US\$30 billion spent globally on adaptation in 2017–2018, only roughly US\$500 million (1.6 percent) came from private adaptation spending²⁷. The main barriers include low perceived or actual returns on investment, large upfront disbursements before reaping medium- and longer-term benefits, the public good nature of investments with no incentives for the private sector, but also lack of adequate information on climate risks and vulnerabilities. This gap opens up an important opportunity for adaptation innovation investments as they can boost competitiveness and EU leadership in a growing market whereas the global adaptation industry was estimated at ~EUR 280 billion in 2016, growing at 6% per year, including sectors such as health, infrastructure, water and finance²⁸.

The Mission will work at multiple levels to facilitate unlocking private capital and attracting private investors. This will include working on creating an enabling environment for scaling up adaptation finance. The Mission will aim to contribute to building the capacity of the private sector to better understand climate-related risks and vulnerabilities, while taking into consideration the opportunities created by the EU Taxonomy for sustainable finance and its delegated act on adaptation to climate change.

As a next step, the Mission will work on strengthening the incentives for private sector participation in the Mission’s demonstration projects, through targeted advisory services (both upstream and downstream) and financing instruments. This will be carried out in close cooperation with the European Investment Bank (EIB) and will aim at mobilising other multilateral financial institutions such as the European Bank for Reconstruction and Developments (EBRD), but also National Promotional Banks, which are the key drivers to leverage private finance at national/local level. Mobilisation of the full range of Horizon Europe instruments including R&I grants, public procurement²⁹ and financial instruments is envisaged.

Identifying, mobilising and combining various financing sources requires specific legal, technical and financial know-how. It is one of the most common barriers for regional and local communities to address when developing their investment strategies. It is often essential to include resilient features early in the project design process and therefore advisory services can be most effectively deployed upstream (at local government level for the public sector and at corporate strategic level in the private sector), duly complemented by more downstream advisory services when projects come to seek external sources of financing. Helping Mission partners navigate this complex landscape will therefore be a priority in view of unlocking additional financing opportunities. EIB and the InvestEU Fund and Advisory Hub can be mobilised to provide tailor-made support for the Mission. The **EIB** is currently developing an updated approach towards adaptation that is expected to include new financing strategies and products targeting climate resilience.

The following activities are currently foreseen to help mobilising additional financing sources:

- **EIB upstream advisory service (Innovation Finance Advisory) for all Missions in the Horizon Europe work programme**

The service, to be delivered as part of the InvestEU Advisory Hub, is intended to provide upstream advice to the Missions on how to finance their respective activities, including identification of the financing sources, instruments and models that are most suitable for each Mission to secure their financial viability. It also includes outreach and engagement

²⁷ ENABLING PRIVATE INVESTMENT IN CLIMATE ADAPTATION & RESILIENCE, World Bank and DFDRR, 2021

²⁸ Climate KIC Study

with potential investors and financial advisory to individual flagship/demonstration/pilot projects and other funding-intensive mission activities. It currently covers only the first year of the Mission, but the intention would be to extend the service into the rest of Horizon Europe once there is clarity on which Missions move into the implementation stage.

- **Developing the financial aspects of nature-based solutions (NBS), including for resilience purposes:** The Mission will explore options for developing tailor-made approaches to NBS financing given NBS specificity as regards bankability and revenue streams, which makes it particularly challenging for these projects to attract private finance.

The example below provides an illustration of an EIB financed project that is directly relevant to Mission Adaptation and could be replicated in the future:

Project title:	FLANDERS SUSTAINABLE WASTEWATER TREATMENT (AQF)
Country:	Belgium
Year of signature:	2019
EIB financing:	€ 200,000,000 (Investment Loan)
Total financing:	€ 425,500,000
Project Description:	
Identified material physical climate risks are increasing annual average rainfall, extreme rainfall events (flooding), storm surge and storm tide and sea level rise. The project comprises the construction of sewage collectors, storm water overflow systems, small and medium-sized wastewater treatment plants, as well as the upgrade of existing wastewater treatment plants for tertiary treatment in the Flemish Region.	
Adaptive measures include:	
<ul style="list-style-type: none"> - Storm/Surface water infrastructure adapted to climate change or the replacement of not sustainably adaptable storm water infrastructure - Optimization measures aiming at: <ul style="list-style-type: none"> o a reduction of untreated discharges from combined sewer overflows; o the replacement of a combined sewer system by a separate sewer system; and o the extension or upgrade of pumping stations. - Reduction of untreated discharges from combined sewer overflows. - Replacement of a combined sewer system by a separate sewer system. - Extension and/or upgrade of pumping stations etc. 	

5. Mission specific governance

The Mission will follow the overall governance set up for Missions laid out in Horizon Europe, with additional Mission specific governance elements foreseen. The governance structure may be amended/expanded in subsequent implementation phases.

The **European Commission** is responsible for the management and overarching policy steering of the Mission, represented by the Mission Manager and Mission Deputy Manager, and supported by the Mission Secretariat. Coordination of the European Commission services in support of the Mission's implementation is enabled through the Mission Owners Group. The

implementation of the Mission will be supported by the European Climate, Infrastructure and Environment Executive Agency (CINEA) and a Mission Implementation Platform (MIP).

Participating regions and communities will engage directly with the relevant Mission projects and consortia, the MIP, and the Commission's Mission Secretariat. As concerns Horizon Europe funding, beneficiary regions will engage with the mission by taking part in project consortia selected on the basis of excellence and impact. The Committee of Regions, as well as existing regional partnerships relevant for climate resilience (e.g. EU Covenant of Mayors) will be key partners in engaging with regions and wider communities.

Member States could develop or strengthen existing governance structures, such as the networks established for Climate-ADAPT or the Working Group 6 of the EU Climate Change Committee, supporting the implementation of the Mission at national level and ensuring peer exchanges. Such structures could help to align funding activities with the Mission's objectives, and ensure an efficient and effective governance and implementation of the Mission within the specific country (e.g. along the lines of plans outlined by the Austrian Federal Ministry for Education, Science and Research). A suitable Coordination and Support Action is already being set up to foster transnational cooperation on the mission approach and implementation modalities at national level and to support the establishment of appropriate national mechanisms to facilitate the multi-level deployment and up-scaling of missions at national level (HORIZON-MISS-2021-DEPL-01-01).

A **Mission Implementation Platform** will provide central services to the general operation of the Mission, coordinating the broad range of activities and actors and facilitating and supporting the regions along their climate resilience journeys. It will support monitoring and reporting on progress made, and on communication and broader engagement in the Mission. As part of its coordinating function, the Mission Implementation Platform will also organise and facilitate the coordination and advisory mechanisms.

A **Mission Forum** will be organised once a year to allow for exchange of views on the direction of the Mission from a broad range of relevant actors. The forum will invite members of the European Parliament, members of the Committee of Regions, members of the European Economic and Social Committee, members of the Covenant of Mayors, bodies representing research organisations and non-governmental organisations, as well as the industrial and financial sectors to allow for their feedback and advice regarding the Mission's continued development.

6. Synergies with existing instruments

Synergies with other EU Programmes

There are different programmes and projects that are being run by Commission services and agencies, specifically focussed on climate adaptation or broadly relevant to the scope of the Mission. A large number of European regions have already engaged in such actions, making synergetic development a concrete possibility.

In particular, on knowledge generation and repository, while **Climate ADAPT** portal is identified by the EU Climate Adaptation Strategy as the primary repository on resilience and adaptation in Europe, there are numerous platforms which also provide with ample room to foster synergies with the Mission. On topics as future climate regional approaches, climate impacts, vulnerabilities and risks in regions, adaptation policies, adaptation options, regional specific tools, adaptation tools in practice and monitoring, reporting and evaluation, there are

about 30 online platforms. Horizon 2020 promoted the exchanges between these platforms and helped to create common ground. Synergies with **EIT Knowledge Innovation Centers**, particularly with the **Climate-KIC**, will be fostered. The large scale projects supported by Climate-KIC under its **Deep Demonstrators** programme would provide pilot cases to test the Mission ‘systemic innovations’, supported by the nurturing framework, the innovative technical and entrepreneurial and financial expertise provided by the Climate-KIC services. The **Innovation Hubs**, supported by the **Innovation Communities KIC**, would provide a network enabling national and cross-border EU collaboration and opportunities for joint projects in joint facilities. Activities of the KIC on Food and the KIC on Urban Mobility will be relevant assets to build upon for the research that the Mission will develop around the areas of transformation on land use and food systems, critical infrastructure, ecosystems and nature-based solutions.

There are important synergies with a number of the envisioned Horizon Europe **Partnerships**, which will accelerate research and innovation on Europe’s most pressing challenges, bringing together the European Commission and private and/or public partners through concerted research and innovation initiatives. They will help to align investments, avoid duplication and contribute to reducing the fragmentation of the research and innovation. In particular the **European Partnership for rescuing biodiversity**, which will set up a European network of harmonised observatories for biodiversity monitoring, and implement a broad range of activities to increase the relevance, impact and visibility of EU research and innovation in tackling the biodiversity crisis in line with the EU Biodiversity Strategy for 2030. The **European Partnership Water4All**, which intends to achieve reduced water stress, increased protection of water resources and ecosystems, which will provide valuable contribution to rethinking the water management system for better resilience, contributing to the definition of innovative solutions for freshwater supply and for managing water-related risks, including extreme weather events such as droughts, river and coastal floods.

The **European Partnership Accelerating farming system transition**, with its network of living labs and research infrastructures accelerating the transition towards agroecology throughout Europe, will provide spaces for long-term, site-specific, multi-stakeholder and real-life experimentation of innovative sustainable food systems, better suitable for climate change. They will also provide a means to deliver ready-to adopt practices in support to farmers, in understanding and implementing new practices at the scale needed for positive economic, environmental and social impacts. The **European Partnership for Safe and Sustainable Food Systems**, particularly in its dimension related to climate, will support EU leadership in transforming the food system transformation towards better resilience. Synergies in promoting use of digital and data technologies in environmental observation exist with the **European Partnership Agriculture of data**, which intends to combine with data technologies EU-wide geospatial and Earth Observation datasets into information packages specifically addressing the agricultural sector allowing for more efficient and strengthened monitoring. The people-centric sustainable built environment **Built4People European Partnership**, driving transition to high quality, low carbon, energy and resource efficient built environments, in its user-centric approach and with its strong societal focus, will promote behavioural change towards sustainable living; the holistic innovation (scientific, economic, societal) that the partnership will generate will significantly also accelerate the societal transformation towards a more resilient one.

Strong opportunities exist for the Mission to leverage cross border collaboration efforts established by the **Joint Programme Initiative Climate (JPI Climate)**, which already connects European Member States and associated members national research programmes, funding transnational research activities and facilitating cross border collaboration between top

scientists. The JPI Climate Strategic Research and Innovation Agenda, leading to interdisciplinary research efforts of high quality and relevance and connecting different disciplinary approaches in natural and social sciences, will produce key knowledge for the Mission to build on its intent to support the Regions with a portfolio of solutions. Opportunities exist for the Mission to also engage into JPI Climate flagship actions for international collaboration. In addition, the Mission will cooperate with the **Research and Innovation Partnership on Climate Change and Sustainable Energy (CCSE)** established under the AU-EU High Level Policy Dialogue on Science, Technology and Innovation, in fostering regular exchanges on climate change research and innovation with Africa, specifically on lessons learnt on building climate resilience and on solutions that can be broadly reapplied.

Numerous **networks** have been already established by the Commission, federating key stakeholders in a specific field. The Mission will build on them and complement their activities in a synergic way. Particularly worth mentioning are the Assembly of European Regions (AER), the Association of European Border Regions (AEBR), the Climate Action Network (CAN) Europe, the European Environment and Sustainable Development Advisory Councils Network (EEAC), ICLEI Europe, RegionsAdapt.

There are numerous European Commission **knowledge & competence centres**, the activities of which are very relevant to the Mission. Joint actions and avenues to leverage their assistance could be discussed as the work plan of the Mission develops in details towards the specific areas. Namely, they are:

- o Disaster Risk Management Knowledge Centre,
- o Knowledge Centre for Territorial Policies,
- o Knowledge Centre for Biodiversity,
- o Knowledge Centre on Earth Observation,
- o Competence Centre on Composite Indicators and Scoreboards,
- o Competence centre on foresight,
- o Competence Centre on Microeconomic Evaluation,
- o Competence Centre on Modelling, and
- o Competence Centre on Behavioural Insights

Opportunities have been identified to encourage the development of new capabilities in public administration and to provide new services that can help accelerate the uptake of best available technologies. This is of particular relevance to less developed and peripheral regions which are less able to absorb new technologies and have less capacity to manage systemic transformation. This could be fostered working with **ESPON 2020** and its following programmes, co-financed by the European Regional Development Funds, which aims at promoting and fostering a European territorial dimension in development and cooperation by providing evidence, knowledge transfer and policy learning to public authorities and other policy actors at all levels. Synergetic opportunities might also emerge as the Mission footprint gets larger, linking with **ECRAN** (Environment and Climate Regional Accession Network) and its successors, financed by EU and managed by the European Commission, which assists the beneficiaries in exchange of information and experience related to preparation for accession, with a specific action stream on climate adaptation.

In addition to exploiting the results of projects funded under previous Framework programmes as well as national and regional RDI funds, the Mission will establish links with the different actions and initiatives under Horizon Europe (in particular the **European Innovation Council** and the **Marie Skłodowska-Curie Programme**) and with the **LIFE Programme**, in particular with its Climate Change Mitigation and Adaptation Sub-programme, to assure that lessons

learnt in projects financed by those programmes are reapplied across the regions engaged in the Mission. In addition, the Mission will explore synergies with the other EU and national programmes, in particular the **Just Transition Fund**, the **Recovery and Resilience plans**, **Invest EU**, in terms of promoting investments towards climate resilience development in general and more specifically in supporting exchanges of lessons learnt, for example in promoting development of climate resilient infrastructure and projects relating to the green and digital transitions and the need for enhanced resilience.

Synergies with other Horizon Europe Missions

All five Horizon Europe Missions will work together to collaborate and share best practices during their implementation on cross-cutting issues such as processes, governance structures, citizen engagement, knowledge management, monitoring and evaluation and communication and outreach activities. Close cooperation, in particular through the support of the Mission Implementation Platform fostering exchanges with its equivalents from the other Missions, will also ensure that synergies are built across missions. This will notably be relevant in activities such as the engagement of the local communities and cities and the provision of support services to them in the definition of the local transitional agenda for climate resilience, which will ideally be developed in sync with the development of their plans for climate neutrality.

In particular, for the purpose of assuring good coordination and avoid duplication in the support provided to the local communities by the Climate Adaptation and the Cities Missions, two actions will be jointly explored:

- the possible scale-up of the Policy Support Facility under the EU Adaptation Strategy which will be hosted by the Covenant of Mayors;
- the top-up of the European Climate Pact for citizen engagement.

On thematic synergies, the four Green Deal Missions (Ocean, seas and waters, Soils health and food, Climate Adaptation and Climate Neutral Cities) will develop common solutions on specific issues. It will be considered to develop **joint demonstrations** and to issue **cross-mission thematic or area based calls**, to maximise their impact across Europe and help accelerate the delivery of the European Green Deal objectives.

An example of a cross-mission activity could be the development of a **visual map of Europe by 2050**, showcasing how Europe will adapt to climate and biodiversity risks by using nature-based solutions. The map could be a helpful tool for regions and communities to build a forward looking and optimistic **vision for their climate resilience future**. In addition, all four Green Deal Missions envisage large scale place-based actions such as demonstrators, lighthouses or living labs. **Green Deal missions could launch a cross-mission demonstrator exploring synergies between Missions at a large scale.**

Box 3. Example of a cross mission large scale demonstrator: resilience of coastal areas

A cross-mission lighthouse or large-scale demonstrator could target, for example, a set of geographically diverse **Atlantic coastal areas** particularly vulnerable to the risks of sea level rise that urgently **need to adapt** to ensure their population remains safe and their infrastructure is climate proof and weather resilient.

Sea level rise is also likely to negatively **impact the coastal biodiversity**, through the salinisation of natural areas and groundwater, ecosystem destruction and increased pollution. The impacts also include jobs and income losses, forced displacement, pollution-related health issues and the risk of destruction of critical infrastructure. The demonstrator would develop **innovative solutions reducing these risks**, with **emphasis on nature-based solutions for restoration of key ecosystems** such as oyster reefs, kelp forests, wetlands and salt marshes within the area of those cities.

These solutions should create multiple and cross-sectorial ecosystems services such as CO₂ storage, buffering acidification and deoxygenation and boosting adaptation capacities of these ecosystems and their associated functions to environmental changes, as well as trigger new economic development from a carbon-neutral bio-economy and sustainable tourism.

The cross-mission lighthouse could be relevant to the following Missions and their objectives by addressing specific areas such as (to be agreed with the various mission):

- **Mission Ocean, seas and waters:** protecting and restoring aquatic ecosystems, reduction of pollution and making the Blue economy climate neutral.
- **Mission Soil:** prevention of agriculture pollution and salinisation of groundwater
- **Mission Climate adaptation:** coastal flood management, nature based solutions, climate proofing of critical infrastructure.
- **Mission Cities:** Focus on coastal cities, use of nature based solutions that also act as carbon sinks will contribute to the cities' carbon neutrality goals.

7. Monitoring and Evaluation

Monitoring, reporting and evaluation (MRE) mechanism of the Mission is vital for tracing progress made, assessing what has been accomplished, and communicating the outputs, outcomes and impacts of transformative processes initiated in the communities and regions that will participate in the Mission. The ultimate goal of MRE is to foster learning and use lessons learned to drive continuous improvement of the Mission. The specific objectives will include

- to provide feedback on whether the goals and targets have been achieved or are achievable, whether existing efforts are sufficient to this end, and how the

transformative journeys contribute to reducing risks, accelerating adaptation and assisting those most vulnerable, marginalised and at risk of exclusion;

- to contribute to improving the knowledge and helping to identify new challenges, opportunities and persisting barriers;
- to contribute to fostering policy coherence and synergies across economic, social and environmental policy actions areas, including the cross-border and long-term impacts of the Mission's activities.

The Mission approach will build upon existing programs, including (i) Adaptation preparedness scoreboard³⁰ developed by the DG Climate Action, (ii) long-standing MRE programme of the European Environment Agency³¹, (iii) Covenant of Mayors' database of the Sustainable Energy and Climate Action Plans, (iv) Smart Specialisation Platform³² developed and maintained by Joint Research Centre to assist Member States and regions to develop, implement and review their research and innovation strategies for smart specialisation, and (v) peer review of disaster risk management capabilities under the Union Civil Protection Mechanism³³, providing countries and regions an opportunity to reflect on their readiness to cope with natural and man-made disasters. **Data sharing for monitoring and evaluation** across the above and other reporting purposes³⁴ will ensure that the monitoring data and results are collected efficiently, effectively and in a timely manner.

In line with the Horizon Europe monitoring and evaluation system, the Mission's MRE mechanism will define **impact pathways** and **key impact pathway indicators** used to track on progress in short, medium and long terms and addressing three complementary impact categories:

- scientific impacts, measured in terms of new knowledge, skills, technologies and transformative solutions to climate change;
- societal impacts, measured in terms of progress throughout local and regional transformative journeys and tangible achievements within the ten areas of innovation of the Mission;
- economic impact, related to all forms of innovation and their deployment.

The Mission's MRE mechanism will consist of:

- continuous monitoring of Mission projects' management and implementation data, which will inform executive decisions;
- periodic in-depth assessments for mid-term and ex-post assessment.

The MRE mechanism will include a Mission observatory embedded in the Climate ADAPT. An operational framework for measuring just resilience and a set of (proxy) indicators measuring outcomes, outputs and impacts will be developed.

³⁰ [Commission staff working document Adaptation preparedness scoreboard: Country fiches Accompanying the document REPORT on the implementation of the EU Strategy on adaptation to climate change SWD/2018/460 final](#)

³¹ <https://climate-adapt.eea.europa.eu/knowledge/mre> and the European Climate and Health observatory <https://climate-adapt.eea.europa.eu/observatory>

³² <https://ec.europa.eu/jrc/en/research-topic/smart-specialisation>

³³ https://ec.europa.eu/echo/what-we-do/civil-protection/peer-review_en

³⁴ Including the Global Stocktake under the Paris Agreement on Climate Change, the monitoring of progress under the Sendai Framework for Disaster Risk Reduction 2015-2030 and the UN Sustainable Development Goals.

Table 1 Examples of potential key impact pathway indicators

Mission objective	Target 2023	Target 2030
1. Preparing and planning for climate resilience	<ul style="list-style-type: none"> • Climate risk profile - service prototype ready to implement • [Guidance to comprehensive climate risk management ready] 	<ul style="list-style-type: none"> • regions will have access to climate risk profiles and will have developed/updated comprehensive climate management plans
2. Accelerating transformations to climate resilience	<ul style="list-style-type: none"> • [xx] Blueprints to climate resilience defined • [x] Accelerators launched [x] regions began the journey 	<ul style="list-style-type: none"> • [150] Resilience plans enacted • [xx] transformative actionable solutions positively tested
3. Demonstrating systemic transformations to resilience	<ul style="list-style-type: none"> • [x] Demonstration projects focusing on large scale deployment and • [x] Demonstrations focusing at cross-border value launched [and implementing] 	<ul style="list-style-type: none"> • [75] Deep demonstrations successfully completed • Mission legacy strategy defined and implemented • [150] Regions and communities climate-resilient

Table 2 Examples of potential output and outcome indicators by transformative steps

Transformative steps	Outputs	Outcomes
Objective 1. Preparing and planning for climate resilience		
Better understanding of climate risk exposure	<ul style="list-style-type: none"> • in depth review of climate risks affecting the key community systems • access to climate risk profiles and enhanced EWS 	<ul style="list-style-type: none"> • comprehensive climate risk management plans, ensuring that community infrastructure and services are safe and operable and accessible under critical conditions
Objective 2. Accelerating transformations to climate resilience		
Mobilising support and engagement	<ul style="list-style-type: none"> • governance structures steering the transformation to resilience 	<ul style="list-style-type: none"> • open and inclusive governance processes for a just transition and resilience
Formulating a vision and transformative pathways	<ul style="list-style-type: none"> • vision of a climate resilient future and the transformative pathways 	<ul style="list-style-type: none"> • smart specialisation strategy for sustainability • resilience contract
Orchestrating innovations and testing transformative solutions	<ul style="list-style-type: none"> • transformative solutions developed, tested and/or brought closer to the market 	<ul style="list-style-type: none"> • creating conditions for more competitive and smarter regional economies

Objective 3. Demonstrating systemic transformations to climate resilience

Creating impact at scale

• 75 demonstrations of systemic transformations

• 150 Resilient regions and communities

8. Citizen engagement and communication strategy

Communication objectives

Overall purpose:

- To communicate about climate change and climate action on adaptation using concrete examples to a large and varied European audience, using as a vehicle the Climate Pact.
- To communicate about the Mission on Adaptation, which accelerates the transformation to a climate prepared and resilient Europe, and its impact and benefits on people's lives. The mission will collaborate and partner with existing citizens organizations and initiatives.
- To inspire, encourage and engage authorities, policy makers, organisations and individuals to become part of the green movement and responsibility and to accelerating the necessary transitions in European communities and regions.

Specific aims to engage with communities and regions that are part of the Mission:

1. **To learn from existing citizen led initiatives;**
2. *Give people “a pencil to draw a common resilient future”*, engage the community in designing its own future and, be part of the transformation “of my region/my place becoming a safe and better place”;
3. Transmit the **sense of purpose, hope and urgency** to accelerate the societal transformation and to become resilient throughout the EU;
4. Build understanding on climate change and its impacts. Showing that we can turn the climate challenge into an **opportunity to improve our daily lives and future**. Powerful narratives, tailored to different ‘societal’ ecosystems: i.e. ‘Let’s work together’: we can only succeed together; valorising existing and emerging knowledge and initiatives, facilitating sharing and cooperation to spark new action;
5. To foster strong relationships between the local partners. E.g. **collaboration** with national, local and regional authorities, managing authorities and intermediate bodies of Cohesion Policy, stakeholders of Smart Specialization Strategy, Commission Representations, Europe Direct Information Centres, Climate-KIC regional offices, EU Covenant of Mayors Office, Global Covenant of Mayors Secretariat and other partners, e.g. high-level/celebrity/youth/citizen ambassadors and influencers;
6. Support the Mission **communication and outreach strategy via the European Climate Pact**.

Citizens engagement and community building in partnership

Mission setting must find its way to the centre of the political priority-making process and involve citizens in a continuous way (accessible communication, co-creation, multi-linguism). It will support:

- A. **Citizens Assemblies** as integral part of the process, on:
 - Defining the mission within their community/city/region;
 - Creating a **shared purpose** and facilitating **joint development**;
 - **Building a multi-local (hard and social) infrastructure** lasting beyond the mission;
 - Exploit citizens’ science tools (i.e. collection of data, experimenting (e.g. sensors in gardens));
 - Connecting of different stakeholders’ groups to work collectively on a particular project and co-creation of prototypes. **Connectivity is productivity**;

- **Dialogues:** a library of conversations about climate adaptation and societal transformation.
- B. **High level regional groups**, network of regional authorities, which would enable:
- Bottom-up approach to connect and create networks at regional level;
 - Scale up of the mission engagement and peer learning.
- C. **Climate Action Hubs**
- catalyse and scale societal renewal through local engagement, connection & activation;
 - engage citizens and grassroots initiatives to take local climate action;
 - support the launch of decentralized prototypes;
 - tests the methodology of citizen engagement and community building;
 - provide citizens with access to basic tools and methods that will allow them to host local hubs;
 - apply social technologies to move participants from reflection and intention-setting towards climate action.

Climate pact pledges and initiatives from citizens and stakeholders

The European Climate Pact is an EU-wide initiative inviting people, communities and organisations to participate in climate action and build a greener Europe. It aims to better grasp thinking patterns, behaviours and values as key enablers to accelerate bottom-up and top-down action. Building consensus that a 'just transition' is necessary, possible and beneficial and that everyone has a role to play. Achieving the purpose of the Mission must be a process inspired by informed citizens and with their full involvement.

The Climate Pact invites people, communities and organisations to:

- **Connect** and **share** knowledge
- **Learn** about climate change
- Develop, implement and scale up **solutions**

It stimulates the outreach and fosters the engagement of citizens and stakeholders, including the youth. By mapping and collaborating with the multipliers, it could enhance the visibility of the Mission's objectives and outcomes while building a strong community of actors.

ANNEX

Glossary

Adaptation- In human systems, it is the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. In natural systems, it is the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate and its effects.

Areas of Innovation and Transformation- The set of key community systems and key enabling conditions, there are the areas the Mission will focus on. For each of these interdependent areas, the Mission outlines possible targets, potential research and innovation actions, relevant policy instruments, funding programmes and partners.

Climate Change- Climate change refers to a change in the state of the climate that can be identified (e.g. by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcing such as modulations of the solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or in land use.

Communities of practice- Communities of practice are typically informal groups formed by people who share a concern or passion and engage in a process of collective learning.

Demonstration of systemic climate resilience- The large-scale deployment of innovative solutions that have been previously tested at smaller scale. These solutions must be of systemic nature, meaning they should address several areas of innovation and transformation and have the potential to create impact at scale and across a wide set of European regions and communities. This is the third and most ambitious objective of the Mission.

Disaster- Severe alterations in the normal functioning of a community or a society due to hazardous physical events interacting with vulnerable social conditions, leading to widespread adverse human, material, economic, or environmental effects that require immediate emergency response to satisfy critical human needs and that may require external support for recovery.

Extreme weather event- An extreme weather event is an event that is rare at a particular place and time of year. When a pattern of extreme weather persists for some time, such as a season, it may be classed as an extreme climate event, especially if it yields an average or total that is itself extreme (e.g. drought or heavy rainfall over a season).

Impacts- The consequences of realized risks on natural and human systems, where risks result from the interactions of climate-related hazards (including extreme weather and climate events), exposure, and vulnerability. Impacts generally refer to effects on lives, livelihoods, health and wellbeing, ecosystems and species, economic, social and cultural assets, services (including ecosystem services), and infrastructure. Impacts may be referred to as consequences or outcomes, and can be adverse or beneficial.

Key community system- A system that meets important basic societal needs but that is increasingly impacted by climate change. A key community system is an area of innovation and transformation for the Mission, part of a larger interdependent system.

Key enabling condition- A condition for the Mission to be able to accelerate transformative change. A key enabling condition is an area of innovation and transformation for the Mission, part of a larger interdependent system.

Portfolio management- The process of curating and overseeing a set of key thematic projects or investments to deliver on a given overarching strategic priority.

Risk- The potential for adverse consequences where something of value is at stake and where the occurrence and degree of an outcome is uncertain. In the context of the assessment of climate impacts, the term risk is often used to refer to the potential for adverse consequences of a climate-related hazard, or of adaptation or mitigation responses to such a hazard, on lives, livelihoods, health and wellbeing, ecosystems and species, economic, social and cultural assets, services (including ecosystem services), and infrastructure. Risk results from the interaction of vulnerability (of the affected system), its exposure over time (to the hazard), as well as the (climate-related) hazard and the likelihood of its occurrence.

Regions and communities- Following the definition of Regions in the Nomenclature of Territorial Units for Statistics (NUTS) classification³⁵, regions are considered to be the territories at NUTS 2 level. For practical implementation purposes, the concept of ‘communities’ has been added as groupings of people with social ties, shared values or interests, engaged in joint action. Communities can be of different size and are not always geographically confined.

Systemic change- Refers to change in any system (global food system, local sewage system, etc) and is required when attempts to change one aspect of a system fail to fix the problem.

Transformative change- Transformative change is about doing things differently—not just a little more or less of something that is already being done.

Vulnerability - The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.

³⁵ For more information on Regions in the Nomenclature of Territorial Units for Statistics (NUTS) classification: <https://ec.europa.eu/eurostat/web/nuts/background>