surf
Sustainable Rural Future

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CLIMATE CHANGE HANDBOOK FOR RURAL AREAS

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EN VERSION

WELCOME

Welcome to the Climate Change Handbook for Rural Areas for the SURF project. This guide is an integral part of our initiative aimed at increasing opportunities for rural areas amidst the green transition and climate change adaptation. Our concrete objectives are to:

- Improve knowledge about climate change.
- Foster social participation to involve the community in the decision-making process.
- Generate adult training in rural areas to contribute to sustainable rural development.
- Create a European Rural Network for promoting the exchange of information.

This guide serves as the introductory framework for the entire project, functioning as a handbook that will be gradually expanded throughout the project's duration and beyond its conclusion. It aims to lay the groundwork for developing the project and facilitate the effective adaptation of territories to climate change using practical tools.

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OBJECTIVE OF THE GUIDE

This Handbook serves as an essential resource designed to **enhance the understanding and engagement of climate change adaptation, particularly in rural settings**. The guide aims to educate and empower adult educators, community members, and stakeholders by providing essential knowledge, engaging resources, and interactive elements that foster community participation and dialogue. By enhancing understanding and involvement, the guide will serve as both a learning tool and a starting point for collaborative identification and addressing of local climate adaptation challenges.

This guide will encourage adult trainers and local and regional authorities to **facilitate discussions and enable citizen participation** in identifying problems and developing climate change adaptation strategies tailored to each community.

This document provides visual resources, such as videos, images, and infographics. These resources can be used independently or in conjunction with this guide to enrich the learning experience.

CLIMATE CHANGE ADAPTATION

CORE CONCEPTS

CLIMATE RISKS IN EUROPE

According to the first European Climate Risk Assessment (EUCRA) by the European Environment Agency (EEA), Europe faces rapidly increasing climate risks. The continent is the fastest-warming in the world, with 2023 being the warmest year on record.

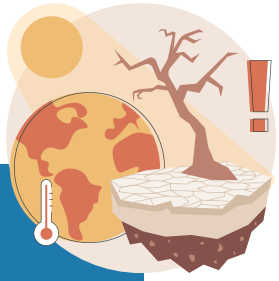
Extreme heat events are becoming more frequent, precipitation patterns are changing, and catastrophic floods have occurred. These climate changes pose substantial challenges to sectors such as agriculture, forestry, and water management, especially in rural areas.

Effective policies and urgent actions at both European and national levels are essential to address these risks. While it is vital to take steps to prevent further global warming, it is equally important to adapt to the current impacts of climate change. Fortunately, nature offers powerful solutions.

For more information, watch the video by The Nature Conservancy: What is Climate Adaptation?

See Annex: Impacts of climate change

CLIMATE CHANGE STIMULI



GRADUAL CHANGES

Temperature changes, shifts in precipitation patterns

EXTREME EVENTS

Severe storms, floods, heatwaves, droughts

ENVIRONMENTAL IMPACTS

IMPACTS ON ECOSYSTEMS

Aquatic, terrestrial, cryosphere

IMPACTS ON ECOSYSTEM SERVICES

Provisioning, regulating, and cultural services

IMPACTS ON NATURAL RESOURCE EXTRACTION

Crops, fish, forest

SOCIO-ECONOMIC SECTOR IMPACTS

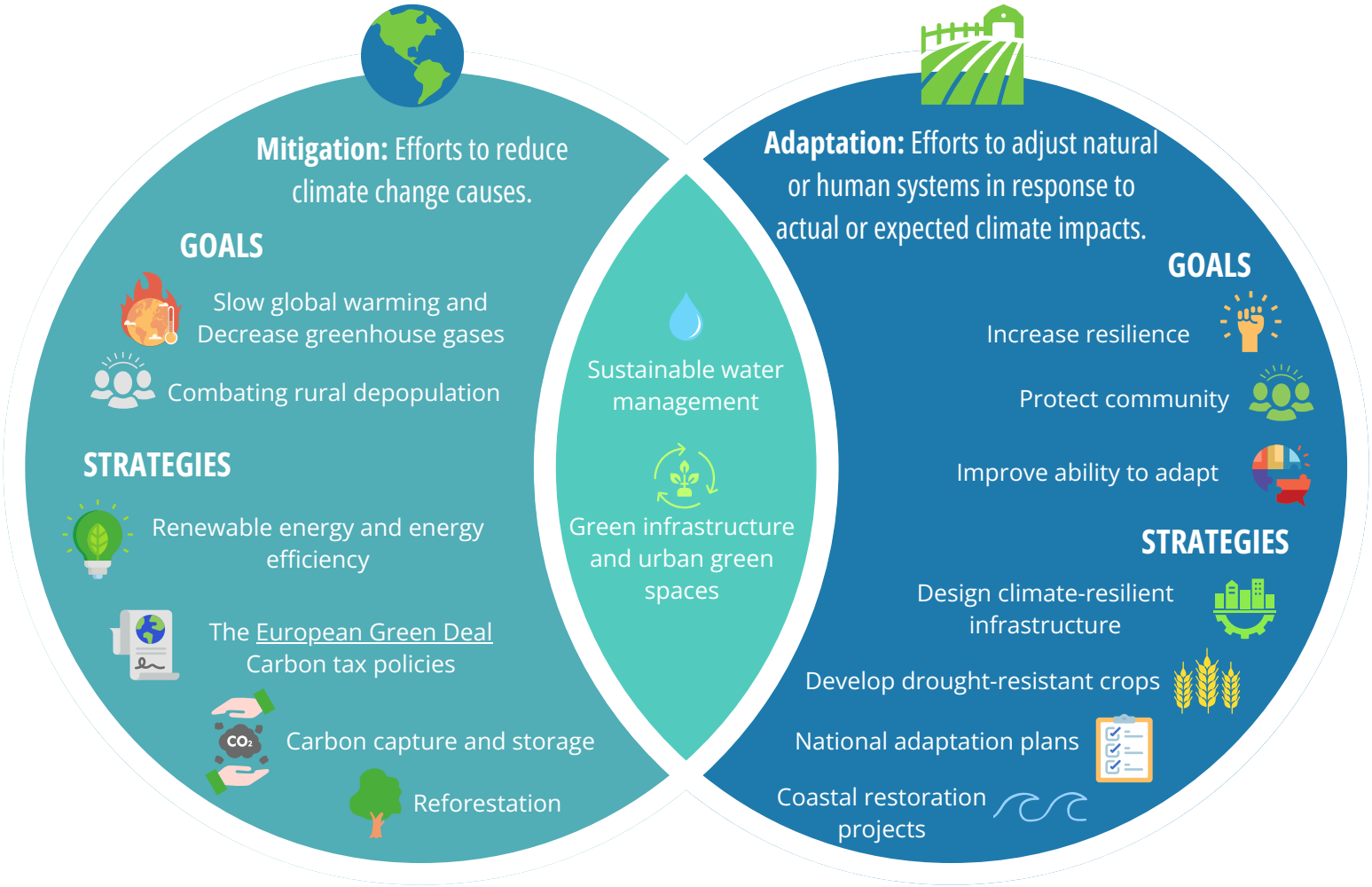
IMPACTS ON ECONOMIC SECTORS

Agriculture, fisheries, industry, tourism

IMPACTS ON PEOPLE

Health, food security, livelihoods

MITIGATION VS ADAPTATION



For more information, watch the following videos:

Adaptation and Mitigation | Climate Wisconsin

Mission on Adaptation to Climate Change | European Commission

PRINCIPLES OF EFFECTIVE ADAPTATION

Over time, and according to the Regional Adaptation Support Tool (RAST), certain principles of good adaptation have to be integrated to develop robust strategies and plans that effectively address the challenges posed by climate change in rural communities.

Sustainability

Sustainable across social, financial, and environmental dimensions. The goal is to decrease vulnerability and boost adaptive capacity, ensuring fair climate resilience. Efforts should not neglect vulnerable groups or areas and must align with climate mitigation goals to enhance policy coherence.

Evidence-Based Approach

Latest scientific research and data, including future risk projections. Initial steps should address the risks from past and current climate variability and extreme weather events, using data to inform all decisions.

Local Relevance

Customisation to the specific needs and conditions of each locality or region, addressing unique risks and vulnerabilities. It's also important to be aware of and coordinate with neighbouring authorities' adaptation efforts. Planning should consider the available resources and organisational structures.

Inclusive and Equitable

Involvement of a broad spectrum of stakeholders, including public administrations, civil society, and various sectors, working together across governance levels. Engaging citizens, especially those from vulnerable groups, is crucial for developing inclusive and accepted adaptation plans. Efforts should aim for just resilience, addressing systemic inequalities and ensuring that adaptation benefits vulnerable populations.

Monitoring and Continuous Improvement

Continuous evaluation enables reflection, learning, and ongoing enhancement. Regular monitoring using clear, well-defined indicators is essential to track progress and assess the effectiveness of adaptation strategies. These indicators should be credible, robust, and developed in collaboration with beneficiaries and key stakeholders.

Flexibility and Adaptability

Adaptation planning should be flexible to address uncertainties related to future climate and socio-economic conditions. Plans should be easily adjustable based on new information and experiences, allowing for timely updates to maintain resilience and effectiveness as circumstances change.

Ask a scientist - Adapting to climate change | United Nations

Adaptation measures should avoid ***MALADAPTATION****, where actions in one area negatively impact another.*
The IPCC defines maladaptation as "actions that may lead to increased risk of adverse climate-related outcomes, including via increased greenhouse gas emissions, increased or shifted vulnerability to climate change, more inequitable outcomes, or diminished welfare, now or in the future".

Climate change is a complex problem that requires a smarter, faster and more systemic approach, involving all stakeholders and considering the principles outlined above.

See the ***Self-assessment Tool*** *to spot risks of maladaptation | REGILIENCE*

PREPARING THE GROUND FOR ADAPTATION

Effective climate adaptation requires a thorough understanding of the current and future climate landscape. Before implementing adaptation measures, it is crucial to establish a solid foundation. This preparatory phase ensures that adaptation efforts are well-informed, targeted, and sustainable.

The following points outline how to prepare the ground for successful climate adaptation.

GATHERING SCIENTIFIC-BASED DATA

The foundation of effective climate adaptation begins with gathering robust, scientific-based data. This includes:

- **Evidence on Past Weather and Climate Extremes:** Historical data on weather patterns and extreme climate events.
- **Data on Current and Potential Future Climate Impacts:** Projections and models predicting future climate scenarios and their potential impacts on specific sectors and regions.

Essential Resources for Gathering Data

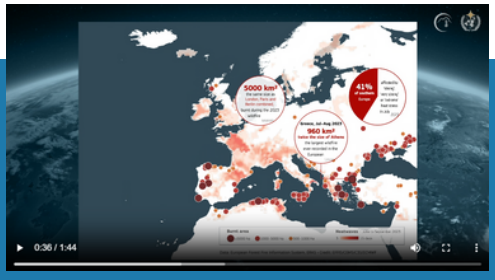
Below is a list of valuable resources to consult for comprehensive data, scientific insights, and practical guidance on climate adaptation:

DATA PROVIDERS IN YOUR COUNTRY AND EU PLATFORMS

EUROPEAN EXTREME EVENTS CLIMATE INDEX

The E^3CI Index provides statistics based on Copernicus ERA5 data regarding the frequency and intensity of extreme meteorological events in recent decades. This is invaluable for identifying trends and making forecasts on national, regional, and provincial levels.

EUROPEAN STATE OF THE CLIMATE 2023
COPERNICUS CLIMATE CHANGE SERVICE



Click to see Summary video or Summary Presentation PDF

SCIENTIFIC MONOGRAPH | UNIVERZA V LJUBLJANI

Focused on Environmental Change and the Role of People in a Changing Environment from Different Perspectives, with a focus on the Slovenian landscape.

KNOWING THE POLITICAL FRAMEWORK

Understanding the political landscape is essential for integrating climate adaptation into local strategies.

- **Reviewing Ongoing and Planned Adaptation Actions:** Identifying current and upcoming adaptation initiatives within the region.
- **Examining Good Practice Adaptation Examples:** Learning from successful adaptation practices both locally and from other regions to apply effective strategies.

Key EU policies supporting climate adaptation

EU's Strategy on Adaptation to Climate Change
European Climate Law
Other relevant policies and initiatives

FIND YOUR NATIONAL ADAPTATION POLICY

COLLECTING PERCEPTIONS

Engaging with the community to collect insights is crucial.

- **Understanding Local Concerns and Experiences:** Gathering qualitative data from community members about their experiences with climate impacts and their views on potential adaptation measures.
- **Stakeholder Interviews and Surveys:** Conducting structured interviews and surveys to collect diverse perspectives from various stakeholders.

IDENTIFYING STAKEHOLDERS

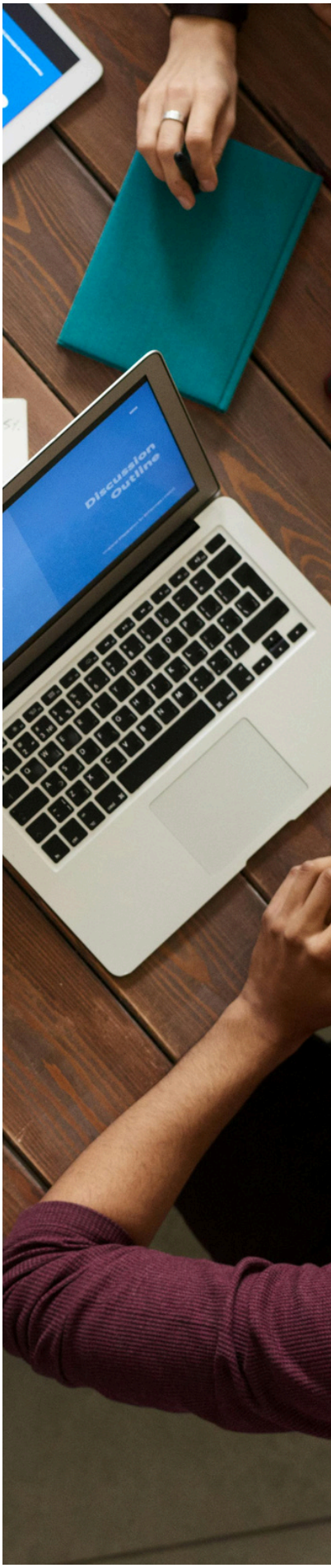
Identifying and engaging relevant stakeholders is critical.

- **Local Authorities and Government Agencies:** Key players in implementing adaptation policies.
- **Community Groups and NGOs:** Essential for grassroots engagement and advocacy.
- **Business and Industry Representatives:** Important for understanding economic impacts and mobilising resources.
- **Academics and Researchers:** Provide valuable insights and data for evidence-based planning.

ASSESSING YOUR RESOURCE NEEDS

Determine the resources required for effective adaptation planning:

- **Human Resources:** Assess the need for expertise and personnel.
- **Financial Resources:** Identify funding requirements and potential sources of financial support.
- **Technical Resources:** Determine the technical tools and technologies needed for data collection, risk assessment, and implementation of adaptation measures.



Financing opportunities

*An **INITIAL REVIEW** of all gathered information allows for a comprehensive assessment of the current status of climate risks and adaptation efforts in your area.*

This review helps to:

- ***Evaluate Existing Risks and Vulnerabilities:** Understand the baseline scenario and identify priority areas for intervention; and*
- ***Support Adaptation Planning:** Use the data to inform and guide the development of targeted adaptation strategies and action plans.*

ENGAGING COMMUNITIES IN ADAPTATION

Effective climate adaptation hinges on meaningful community engagement, ensuring that adaptation strategies are informed by local knowledge, values, and needs, and that they gain the support of those most affected by climate change.

It must involve various sectors such as citizens, researchers, companies, NGOs, development agencies, and authorities. Community engagement fosters a sense of ownership and responsibility, making adaptation efforts more sustainable and impactful.

RAISING AWARENESS

- **Information Campaigns:** Inform the community about the impacts of climate change and the importance of adaptation, utilising various channels such as social media, local newspapers, community meetings, and workshops.
- **Educational Programs:** Develop educational programs and materials tailored to different age groups and demographics, including courses, adult education sessions, guides, infographics, and brochures.
- **Interactive Forums and Workshops:** Engage participants in activities to help them understand the issues and potential solutions.

Stakeholder and Citizen Engagement in Climate Adaptation - MIP4ADAPT

INVOLVING COMMUNITY MEMBERS IN DECISION-MAKING

- **Public Consultations:** Gather input on adaptation strategies and plans, ensuring that these consultations are accessible to all community members, including vulnerable groups.
- **Citizen Science:** Involve community members in citizen science projects to contribute to data collection and monitoring efforts.
- **Participatory Planning:** Use the Participatory Action Research (PAR) approach to involve community members in the planning and implementation of adaptation projects, allowing open dialogue.
- **Inclusive Engagement:** Ensure engagement efforts include people of all ages, from children to the elderly, to provide an intergenerational perspective.

RESOURCES

Adaptive Transformation Playbook (TransformAR)

Actor Analysis for Urban Climate Adaptation: Methods and Tools in support of Stakeholder Analysis and Involvement (RESIN)

UTILISING LOCAL KNOWLEDGE AND EXPERTISE

- **Local Experts:** Engage local experts who have a deep understanding of the area's environmental, social, and economic context, providing invaluable insights.
- **Traditional Knowledge:** Recognise and incorporate traditional knowledge and practices that have been used by local communities to adapt to environmental changes over generations.

CREATING NETWORKS
AND SHARING KNOWLEDGE

01 Networks

Create networks that bring together a diverse range of stakeholders, facilitating the exchange of knowledge, experiences, and best practices, promoting collaboration and the development of effective climate adaptation strategies.

See the following examples:

European CAP Network (agriculture and rural policy)

Rete Rurale Nazionale
ITALY

Expert Network focused on New Rurality
SPAIN

02 Citizen Assemblies

Citizen assemblies are a form of deliberative democracy that gather a representative group of individuals to be informed about, debate, and deliberate on important social issues, strengthening participation mechanisms. I.e.:

Asamblea Ciudadana para el Clima in Spain (Citizen Assembly for Climate)

CREATING NETWORKS
AND SHARING KNOWLEDGE

03 Communities of Practice

Form communities of practice specifically focused on climate change adaptation. They provide a platform for continuous learning, sharing of expertise, and joint problem-solving and can help translate communication strategies into actionable plans within the community.

Useful resources:

Communities of Practice Playbook by the European Commission

EU Mission Adaptation Community

REBOUND
Fostering Resilience in Rural Communities

Summary Report of State of the Art and Practices of Rural Community Resilience (Slovenia)

Map - Case Studies of Rural Community Resilience

UNDERSTANDING
LOCAL RISKS

Once the groundwork has been prepared, it is time to evaluate the vulnerabilities specific to your area. This process includes outlining the key components of your risk assessment, pinpointing specific hazards, highlighting the importance of vulnerabilities and the effects across regions, and finally evaluating climate-related risks.

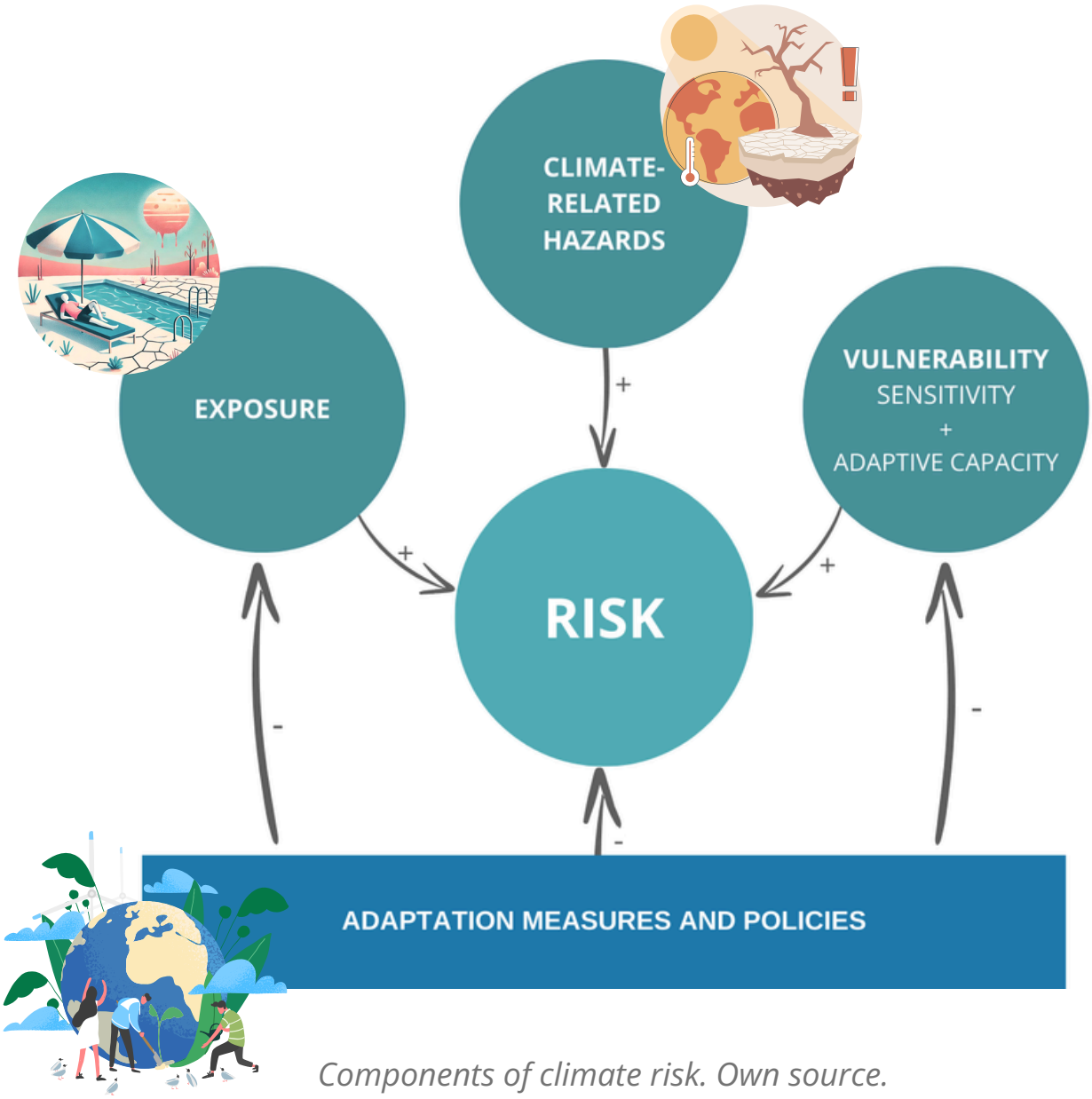
This thorough analysis will help in **understanding the predominant risks, selecting adaptation objectives, and creating viable adaptation options**. With this knowledge, you can strategically plan your adaptation efforts to effectively mitigate the impacts of climate change in your region.

METHODOLOGIES
FOR ASSESSING LOCAL RISKS

The risk of impacts associated with the phenomenon of climate change arises from the interaction of climate hazards with the vulnerability and exposure of human and natural systems.

- **Hazards:** Defined as changes in patterns of extreme events and adverse weather conditions. Historical trend analysis and climate change scenarios provide information on these threats.

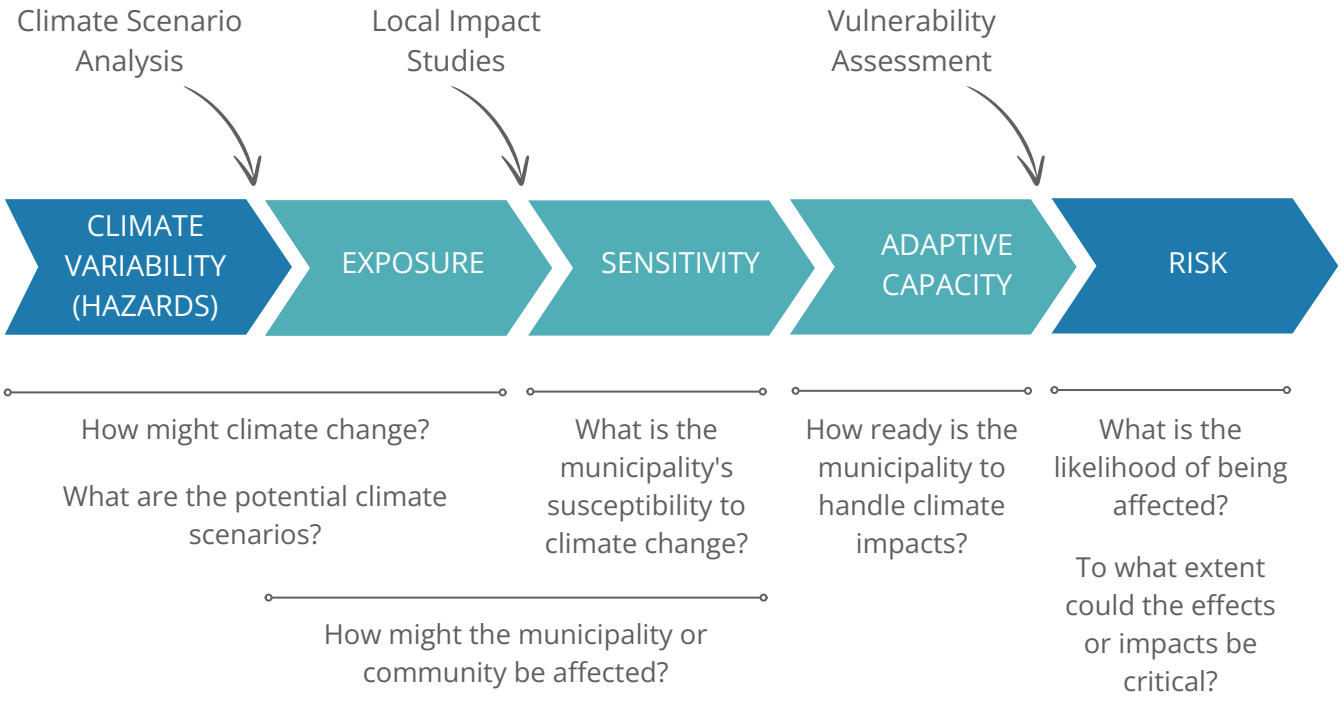
  For more details, watch the video Types of Natural Hazards by Geography Case Studies.



Components of climate risk. Own source.

- **Exposure:** Refers to the people, assets, and services that can potentially be affected by a particular hazard.
- **Vulnerability:** Characterisation and assessment of the territory, its systems or sectors, infrastructure, and the population and species inhabiting it, based on their propensity or predisposition to be affected by a climate threat. It includes two components: **sensitivity** (susceptibility to damage) and **adaptive capacity** (ability to cope with and overcome the effects).

Therefore, the definition and development of risks are founded on a preliminary identification of the potential impacts a municipality or community might face, as well as the areas deemed most vulnerable. **This foundational understanding is crucial for effective adaptation planning and implementation**.



Risk assessment is the process by which information on hazards, exposure, and vulnerability of the receptors is systematised.

In line with the IPCC's fifth assessment report, risk is understood as a combination of these factors and it is usually expressed as a function of the probability of occurrence of a certain event (or sequence of events), multiplied by its adverse consequences. Exposure and vulnerability contribute to generating the consequences, while the probability is determined by the hazard.

Risk analysis can be carried out to a greater or lesser depth, based solely on a **multicriteria analysis of indicators or supplemented with spatial modelling** that allows obtaining detailed spatial information that can be very useful for the planning phase, which is especially recommended for municipalities of greater extent and population.

This approach is consistent with the methodological guidelines provided by the Covenant of Mayors, which precisely distinguishes between these two approaches to address vulnerability and risk analysis depending on the size of the municipality or community.

PHASES OF METHODOLOGY

01 Determining Exposure

The objective of this phase is to characterise the exposure, understood as **the people, assets, and services that can potentially be affected by a particular hazard**. To focus and guide the vulnerability and risk analysis, it is suggested to define impact chains that reflect the cause-effect relationships between the most relevant identified climate threats and the main receptors in the rural environment susceptible to impacts from these threats.

It is suggested to define the ***POTENTIAL IMPACT CHAINS FOR CLIMATE AND ENERGY PLANS****, prioritising and selecting the most significant ones for vulnerability and risk analysis and for identifying associated adaptation measures to integrate into rural planning based on:*

- *the relevance of the threat in the municipality;*
- *the possible effects that may arise; and*
- *the possibilities for action.*

As an example, we can look at the methodology applied by the Generalitat Valenciana, Spain.

SELECTION OF MAJOR THREATS

The Generalitat Valenciana identified the following main threats:

- Flooding from torrential rains and extreme weather events affecting urban infrastructure.
- Coastal flooding due to sea-level rise impacting urban infrastructure and natural capital, leading to biodiversity loss and altering ecosystem services.
- Changes in the frequency, intensity, and magnitude of forest fires impacting natural capital, biodiversity, and ecosystem services.
- Changes in water resource availability affecting the guarantee of supply for human consumption.
- Soil degradation, erosion, and desertification affecting natural capital, biodiversity, and agricultural production.
- Frequency, duration, and intensity of heat and cold waves impacting energy poverty and human health and quality of life.
- Air quality deterioration affecting the population.

Another example is the methodology applied by the project LifeGreen4Blue, Italy.

SELECTION OF MAJOR THREATS

The consortium of the project (Consorzio della Bonifica Renana, Alma Mater Studiorum Università di Bologna - Dipartimenti DISTAL e DIMEVET, Legambiente Emilia Romagna) identified the following main threats:

- Alteration of the environmental balance due to intensive reclamation works.
- Depletion of natural components because they are mainly intended for agricultural use or pervaded by widespread urbanisation.
- Reduction in the rate of biodiversity of the ecosystem with consequent exposure to situations of strong instability and imbalance, due to the spread of alien (allochthonous) wildlife species for commercial or pseudo-amateur purposes.
- Impairment of channel function as ecological corridors as waters contain high nutrient content, high chlorophyll content, low oxygen content, and/or high heavy metal content.
- Process of bank erosion, landsliding and establishment of invasive herbaceous species alien to the Italian flora due to the disturbance of the banks due to the maintenance of the hydraulic function of the canals.
- Pollution and intensive land use due to mechanisation and the use of chemicals such as fertilisers and pesticides, for extensive production.

Another example is the Report by the Biotechnical Faculty, University of Ljubljana (2014), which served as the basis for the preparation of the National Strategic Framework for Climate Change Adaptation (2016), and the most recent scientific monograph People and Environmental Changes Over Time by the Faculty of Arts, University of Ljubljana (2024).

SELECTION OF MAJOR THREATS

- Rising temperatures and reduced rainfall are creating difficulties in providing drinking water during the summer months.
- Increased heatwaves are altering energy consumption patterns and affecting production, leading to a greater need for blue-green infrastructure in urban areas.
- More frequent and intense extreme weather events (floods, storms with hail and wind, drought, frost, freezing rain, etc.) are damaging property, disrupting agriculture, tourism, and infrastructure, leading to economic losses, abandonment of settlements of entire areas, and the significant decline of key sectors in rural areas (e.g. agriculture).
- Extreme weather events, especially droughts, are significantly affecting the quality of life in many parts of Slovenia, particularly in rural regions.

- Changing weather conditions threaten tourism infrastructure, such as ski resorts, and reduce natural attractions (nature and water resources), causing disruptions to industrial operations and increase operating costs and impacting the flow of visitors.
- Changing precipitation and evapotranspiration patterns are disruptioning energy production, especially in hydropower.
- The emergence of new weather-related diseases and pests negatively affects agricultural productivity and contributes to biodiversity loss.
- Warming seas are threatening marine species in the Adriatic Sea, and rising sea levels may require future relocation of road and rail infrastructure, and resettlement of certain (parts of) coastal settlements.
- Climate change may increase the need for humanitarian aid and assistance in crisis areas affected by conflicts over natural resources.

PRIORITISE AND SELECT IMPACT CHAINS

Now, it's necessary to select the most significant impact chains based on the relevance in the municipality, the potential effects derived from the threat, and the possibilities for action.

02 Evaluating Vulnerability

Once you've identified what's at risk, the next step is to understand how vulnerable these elements are. This involves evaluating how susceptible the rural community and its resources are to the identified threats.

Approaches to Building the Assessment Model:

SPATIAL/STRUCTURAL APPROACH

Evaluate the vulnerability of different spatial units within the rural area (e.g. entire villages, districts, neighbourhoods) to a given threat. This assessment can cover multiple dimensions such as environmental, social, infrastructural vulnerabilities.

SECTORAL/FUNCTIONAL APPROACH

Assess vulnerability from a functional perspective, focusing on different economic and social sectors in the rural area that might be exposed to a specific threat, across one or multiple dimensions. This includes evaluating agricultural sectors, water management systems, and rural healthcare infrastructure.

HYBRID APPROACH

Combine the spatial and sectoral approaches to create a comprehensive assessment. Define spatial units or current and future sectors and evaluate their vulnerability to threats across multiple dimensions. This is the most commonly used approach.

	SENSITIVITY	ADAPTIVE CAPACITY		
DIMENSIONS	SENSITIVITY	AWARENESS	ABILITY	ACTION
ENVIRONMENTAL	Ecosystem services, green areas, biodiversity, soil health	Ecosystem services and biodiversity thresholds and indices	Resilience. Environmental management capacity	Governance. Conservation initiatives
ECONOMIC	Employment, land prices, economic activities	Economic vulnerability indices, local economic trends	Risk perception	Economic diversification initiatives. Investment in rural infrastructure
PHYSICAL	Sealed soils, infrastructure, rural morphology (farm structures, road quality)	Urban patterns and types of structures. Infrastructure maintenance capacity, resource allocation for rural development. Access to basic services (water, electricity)		Governance, implementation of rural development plans
SOCIAL	Population structure (gender, age, occupation, dependency ratio, accessibility to services)	Education levels, skills, human capital	Response capacity, social cohesion	Democracy, empowerment, community participation
CULTURAL	Heritage sites, cultural offerings, museums	Conservation status and diversity of cultural offerings	Capacity for cultural preservation, local craftsmanship skills	Governance, cultural heritage protection policies

Calculation of Vulnerability. Own source.

Then, we will choose the type of evaluation based on the objectives of our analysis and the attributes applied to the vulnerability assessment, distinguishing between exploratory and focused evaluations.

EXPLORATORY EVALUATIONS

These evaluations cover a wide range of topics and spatial areas or sectors using coarse future climate trend data and generally low-resolution information. They are relatively low-cost, use mainly qualitative analysis methods based on expert judgement, and typically rely on existing documentation and data.

FOCUSED EVALUATIONS

These are detailed and complex, involving multiple stakeholders. They focus on specific spatial areas, systems, units of analysis, or sectors. They require more resources and time and the methods used generate precise information to be used to define specific adaptation strategies.

Finally, risk can be evaluated in two ways:

QUANTITATIVE EVALUATION

When sufficient information is available to characterise the threat, inventory the exposed elements, and characterise their vulnerability.

QUALITATIVE EVALUATION

Based on expert knowledge. To reduce uncertainty in qualitative evaluation, involve as many experts with diverse profiles as possible and apply participatory analysis techniques.

HOW IS CLIMATE CHANGE AFFECTING US?

HAZARD	EXPOSURE	VULNERABILITY	
		SENSITIVITY	ADAPTATIVE CAPACITY
Increase in temperatures and heatwaves	Identification of rural populations, livestock, and crops exposed to this threat	Are there especially vulnerable people? (elderly, children) Are there specific areas which exacerbate high temperatures?	Are there enough shaded areas? Sufficient water resources for humans and livestock?
Increase in drought periods	Identification of crops, livestock, and rural communities exposed to this threat	Are there areas where agriculture is particularly vulnerable? Are there water-dependent farming activities or industries?	Are there efficient irrigation systems? Adequate water storage facilities? Are drought-resistant crops being used?
Increase in torrential rainfall episodes	Identification of rural homes, farmlands, and infrastructure exposed to this threat	Are there low-lying farmlands or homes in flood-prone areas? Are there agricultural activities that could be disrupted?	Are there early warning systems for floods? Have measures been implemented to reduce flood impacts?
Increase in pest infestations due to climate change	Identification of crops and forests at risk from increased pest activity	Are there specific crops or forested areas more vulnerable to pest infestations?	Are there integrated pest management systems in place? Are there resources for pest monitoring and control?
Increased risk of wildfires	Identification of rural homes, farmlands, and forests exposed to wildfire risk	Are there forested areas or dry farmlands highly susceptible to wildfires? Are there communities living close to forests?	Are there firebreaks and forest management practices in place? Are there community fire response plans?

This table serves as an example to illustrate how climate change impacts can be assessed in a rural context, focusing on specific threats, exposures, and vulnerabilities.

This table is designed for practical use and is intended to be printed for hands-on analysis. You can evaluate each risk by multiplying its probability and consequence, providing a clear and quantifiable way to prioritise and address potential threats.

			0	3	4	5	7	9	10
			Non-existent	Minimal	Low	Moderate	Significant	Severe	Very severe
			CONSEQUENCE						
1	Improbable	PROBABILITY	0	3	4	5	7	9	10
2	Unlikely		0	6	8	10	14	18	20
3	Possible		0	9	12	15	21	27	30
4	Likely		0	12	16	20	28	32	40
5	Probable		0	15	20	25	35	45	50
6	Very Likely		0	18	24	30	42	54	60

Risk Assessment. Own source.

[See Annex: Printable version]

FINAL STAGE: ASSESSING KEY RISKS AND DEFINING ADAPTATION OBJECTIVES

Identify Key Risks, determine who and what is most at risk in your area and consider both immediate and long-term threats.

Prioritise Areas Based on Impact Severity using the methodology described before.

Define Adaptation Objectives:

- Address the key risks and priority areas identified in your risk assessment.
- Establish clear and actionable adaptation objectives.
- Use these objectives to guide the assessment and selection of adaptation options in subsequent steps.
- Collaborate with stakeholders to develop and agree on adaptation objectives.

IDENTIFYING ADAPTATION OPTIONS

After conducting your climate risk assessment, compile a list of adaptation options for each identified risk or vulnerability that aligns with your adaptation priorities and objectives.

INCLUDE A DIVERSE RANGE OF OPTIONS

Ensure your list contains a variety of adaptation strategies to address different types of risks and vulnerabilities.

ENSURE COHERENCE AND ALIGNMENT WITH OTHER INITIATIVES

Make sure your adaptation options are consistent and compatible with other ongoing projects, initiatives, and strategies.

CREATE A CATALOGUE OF ADAPTATION OPTIONS

Describe each solution and include climate risks addressed, financial requirements, and practical implementation steps.

For more ideas and examples, check the Climate Change Adaptation Actions from ADaptation in Agriculture.

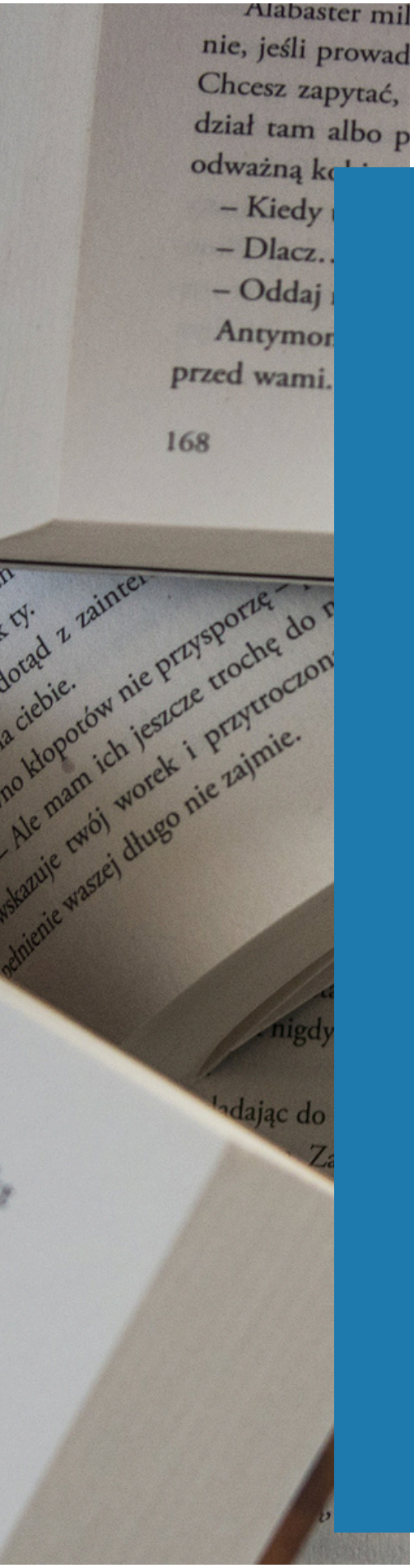
EXAMPLES OF CASE STUDIES, PROJECTS, AND GOOD PRACTICES

- EU CAP Network Good Practices
- Climate-ADAPT tool - Adaptation Stories
- Climate Innovation Window

- Piattaforma Nazionale Adattamento Cambiamenti Climatici
- Manuale di buone pratiche per l'adattamento ai cambiamenti climatici

- Platforma SAMO1PLANET
- Evropsko partnerstvo za inovacije (EIP)
- Dolgoročna podnebna strategija Slovenije do leta 2050

- Plan Nacional de Adaptación al Cambio Climático 2021-2030
- Plataforma sobre Adaptación al Cambio Climático en España



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- GLOBAL COVENANT of MAYORS for CLIMATE & ENERGY - PACES
- European Climate Risk Assessment (EUCRA)
- AR6 Synthesis Report: Climate Change 2023. IPCC
- The European Green Deal
- Communities of Practice Playbook
- Consequences of climate change. European Commision
- REGILIENCE Regional Pathways to Climate Resilience
- Planes de Acción por el Clima y la Energía Sostenible en la CV: Guía metodológica. Generalitat Valenciana
- Climate Action in Rural Areas. European Network for Rural Development
- Science for Climate Action. European Commission

APPENDICES

ANNEX 1

IMPACTS OF CLIMATE CHANGE
ON NATURAL AND SOCIO-ECONOMIC SYSTEMS

This preliminary list of climate change impacts serves as a foundation **for conducting a risk mapping exercise and subsequently developing tailored solutions.**

It facilitates an initial analysis by providing an overview of potential impacts. Items on this list can be discarded or supplemented based on the specific needs and conditions of each region or community, ensuring that adaptation strategies are relevant and effective.

CLIMATIC STIMULI
THAT CAUSE CHANGES AND IMPACTS

- Temperature Increase
- Extreme Temperature
- Drought Trends
- Precipitation Variation
- Extreme Precipitation
- Sea Level Rise
- Sea Temperature Increase
- Ocean Acidification
- Snow Cover
- CO2 Fertilisation
- Land Use Changes
- Vegetation Cover

Consequences of climate change. European Commision

GO BACK

ENVIRONMENTAL CHANGES AND IMPACTS

Atmosphere:

- Greenhouse gas concentrations
- Temperature increase
- Changes in precipitation patterns
- Extreme precipitation events
- Heatwaves
- Number of frost days

Hydrological Environment:

- Severe storm surges
- Atmospheric pollution
- Increased flooding events
- More frequent drought
- Decrease in water resources
- Ice cover on lakes and rivers

Soil:

- Soil water retention
- Changes in soil carbon reserves and forest biomass
- Water erosion of soil

Cryosphere:

- Snow cover
- Decreased carrying capacity of mountain pastures
- Altitudinal shift of vegetation

Biodiversity:

- Changes in plant growth cycles
- Alterations in animal phenology and species distribution
- Emergence of invasive species
- Increased vegetation evapotranspiration

SOCIAL THREATS

- Health
- Vulnerable population
- Employment
- Education

THREATS TO BUSINESS

- Infrastructure and buildings
- Energy
- Agriculture
- Forestry
- Tourism
- Cross-cutting issues for businesses

Coastal Ecosystem:

- Increased flooding due to sea level rise
- Retreat of beaches
- Intrusion of saline water
- Erosion of cliffs and coastal lines
- Trophic and phenological changes in marine ecosystems
- Northward migration of species
- Expansion of toxic algae and invasive species

			0	3	4	5	7	9	10
			Non-existent	Minimal	Low	Moderate	Significant	Severe	Very severe
			CONSEQUENCE						
1	Improbable	PROBABILITY	0	3	4	5	7	9	10
2	Unlikely		0	6	8	10	14	18	20
3	Possible		0	9	12	15	21	27	30
4	Likely		0	12	16	20	28	32	40
5	Probable		0	15	20	25	35	45	50
6	Very Likely		0	18	24	30	42	54	60

Risk Assessment. Own source.

Sustainable Rural Future

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CLIMATE CHANGE HANDBOOK FOR RURAL AREAS

EN VERSION

SUSTAINABLE RURAL FUTURE
ERASMUS+ KA2 COOPERATION
2023-1-ES01-KA220-ADU-000151613

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