

NAVARRE AND CLIMATE CHANGE

Climate change is clearly a reality and one of humankind's greatest environmental challenges.

Human activity is causing rapid changes to the global climate with serious consequences:

The number and intensity of heat waves are increasing

Greater frequency and intensity of torrential rains and floods

More frequent and severe droughts

More forest fires

Deterioration of air quality

Degradation of natural habitats and loss of biodiversity

Increase in pest populations and diseases affecting people, animals, crops and forests

Decline in agricultural productivity



What are we doing?

KLINa

Navarre has a Climate Change Roadmap called KLINa, a cross-cutting environmental strategy whose main objective is to fight climate change.



LIFE NADAPTA

Life IP NAdapta CC is a specific climate change adaptation project that seeks to prevent and moderate the expected effects on the climate and their consequences.



IS THE CLIMATE CHANGING IN NAVARRRE?

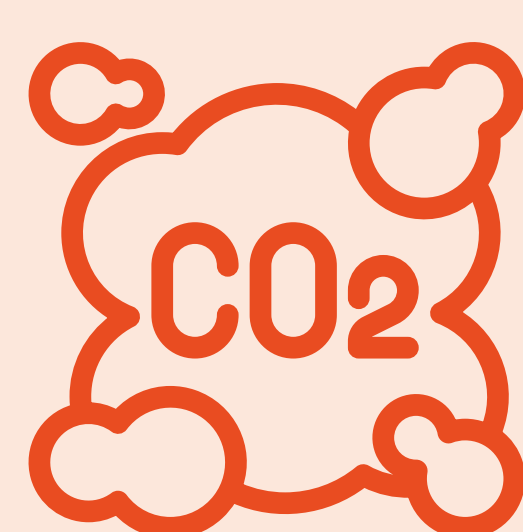
Anticipating the climate that we will have in Navarre in the coming decades is essential in order to take the most suitable measures.

That is why we work with **climate scenarios**, which are forecasts of that future climate. Different forecasts can be made depending on the factors we take into account:



Current and past climate information.

The more information we have, and the higher its quality, the better our forecast of the future climate will be.



Emissions scenarios.

Greenhouse gas (GHG) emissions directly contribute to climate change. Different emissions scenarios exist: in the most optimistic ones, GHG emissions fall worldwide in the coming decades; in the more pessimistic ones, however, they continue to increase.

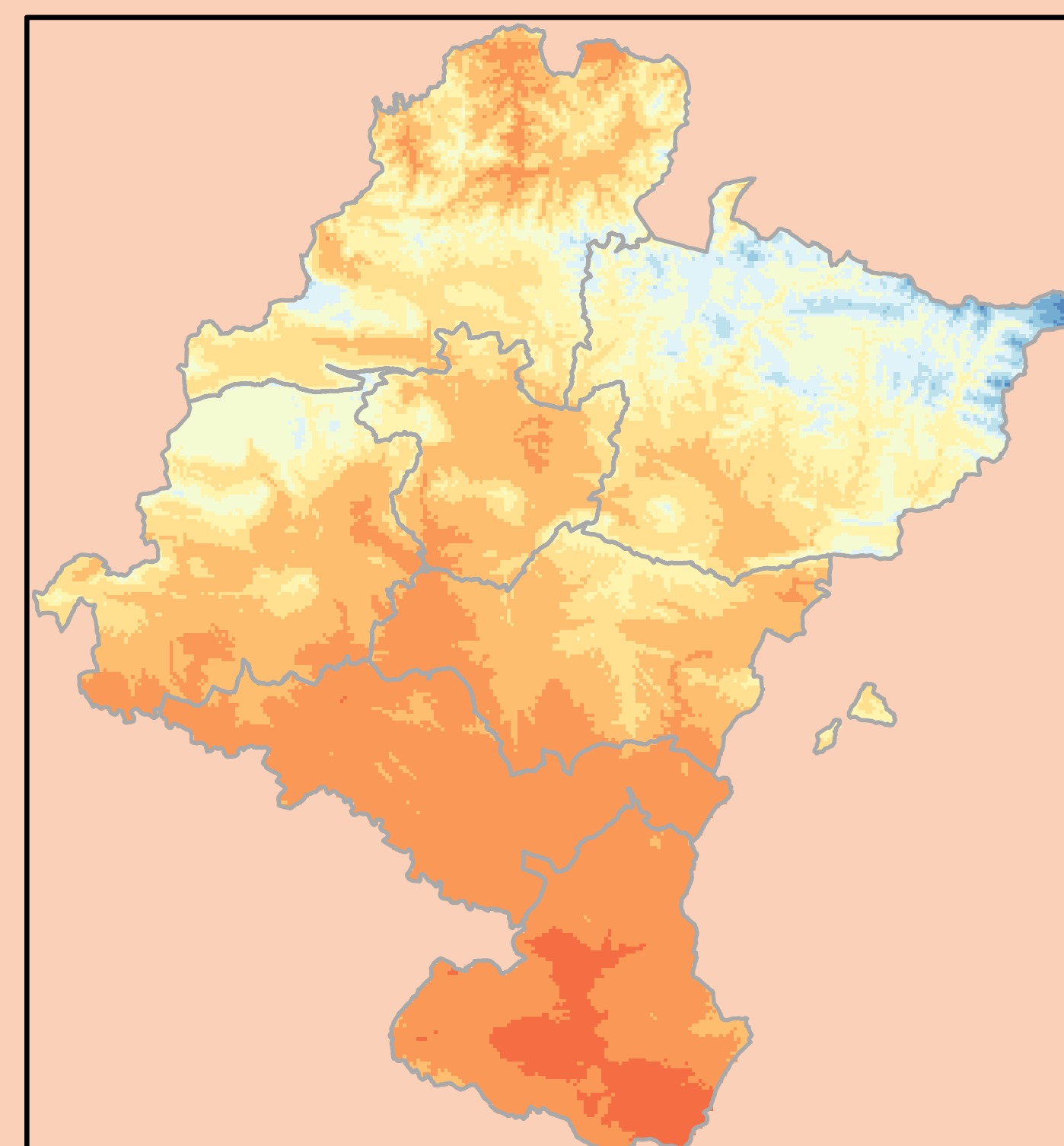
Climate models, complex algorithms which process information on the current climate, calculate the different emissions scenarios and simulate the interactions between the physical, chemical and biological processes that affect the climate, are used to make these forecasts, which are called **climate projections**. The number of models we have is constantly increasing and they are getting better and better, allowing us to make better projections.

The **variability of the climate in Navarre** has been studied in the LIFE-IP NAdapta-CC project. This study has been carried out using the most negative GHG emissions scenario, which estimates that emissions will continue to increase throughout the 21st century and is the one that best reflects the real situation to date.

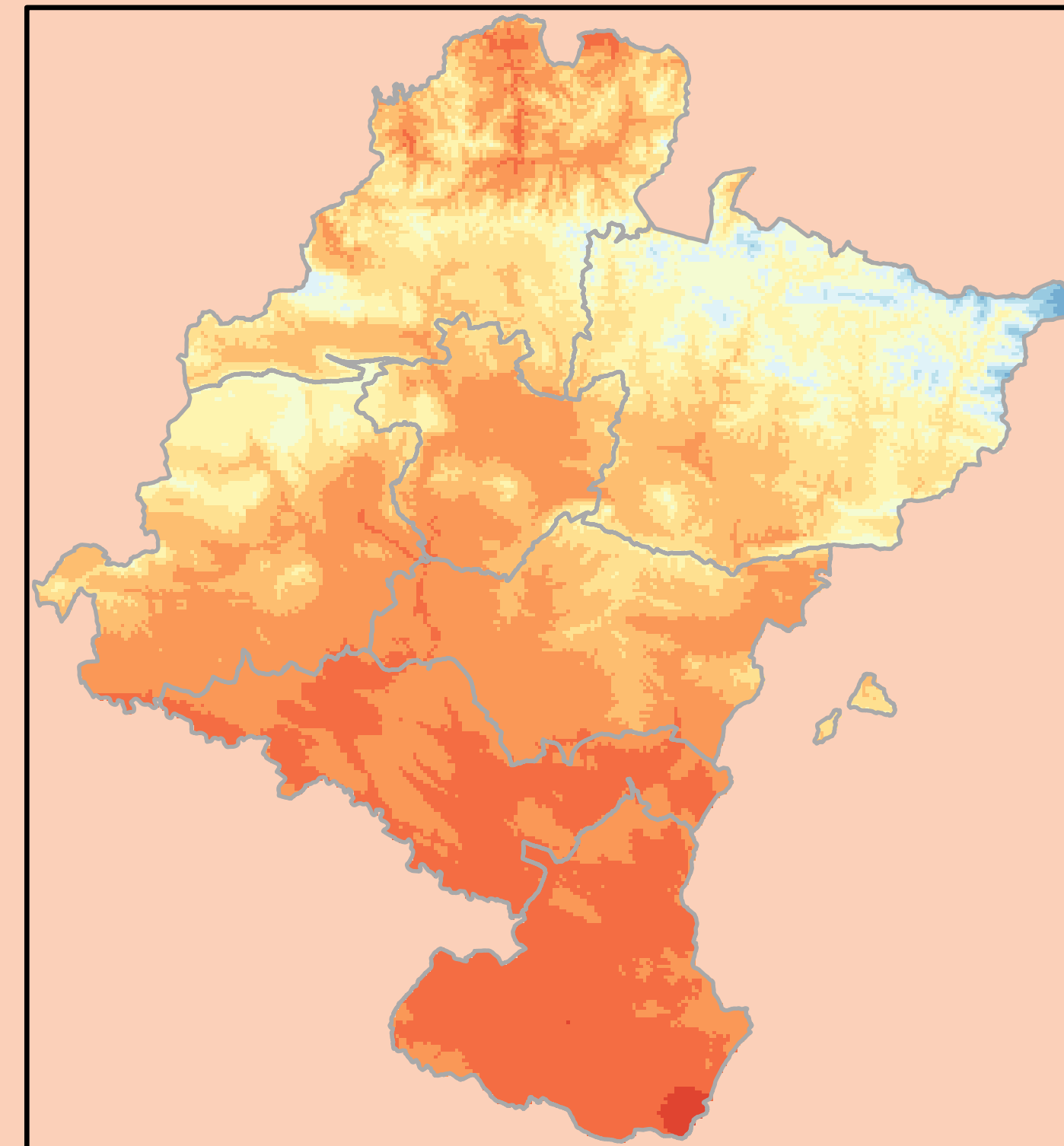
Average temperatures are shown in the following maps. The evidence of global warming in Navarre is plain to see. The difference between the period 1991-2019 and 2021-2050 is almost 1°C and may increase significantly, up to something like 2.5°C by the period 2051-2080. Such an increase would be quite homogeneous throughout Navarre, although somewhat more marked in the north and the Sakana and Ribera regions.

Average temperature [°C]

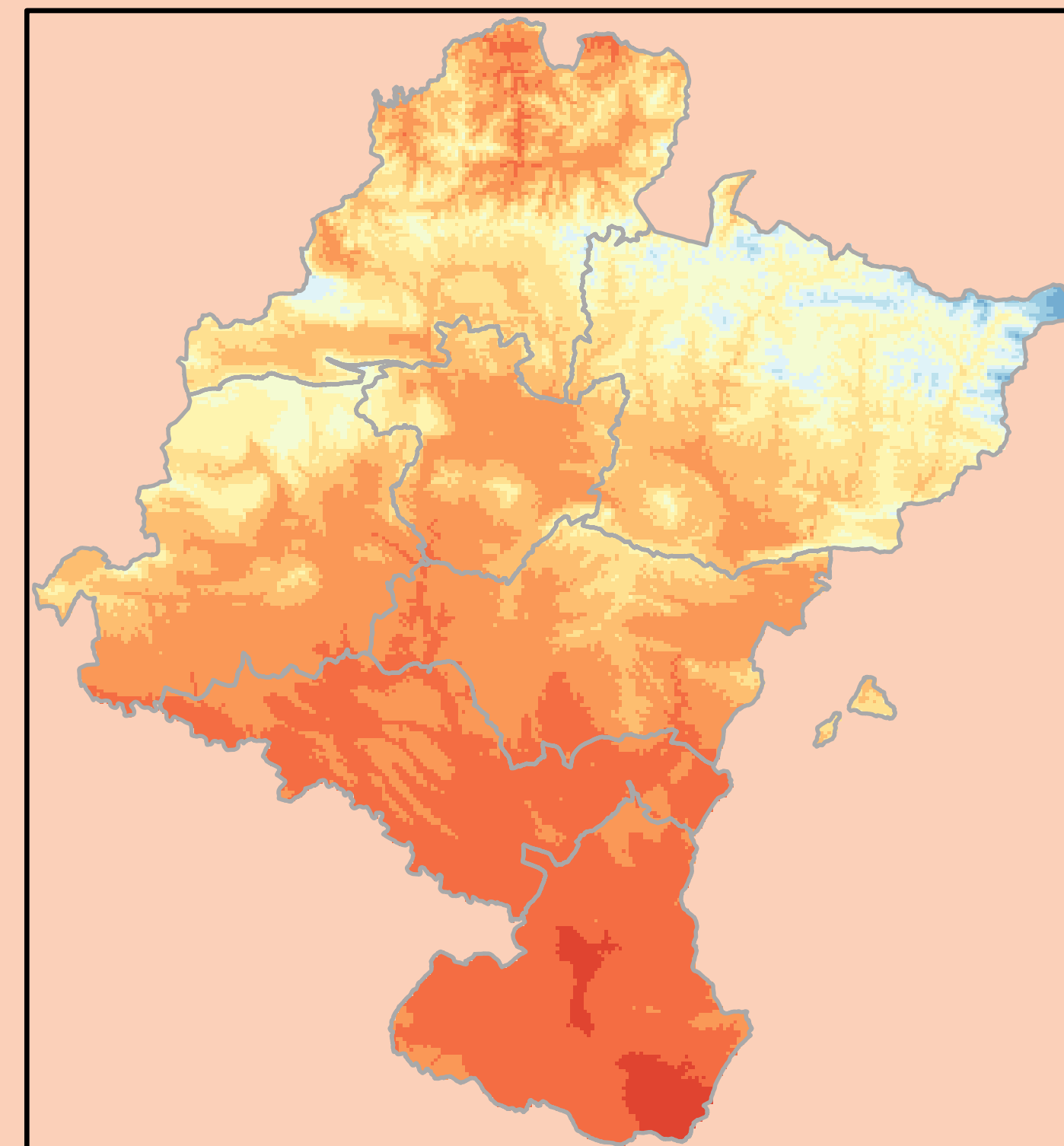
Observed 1961-1990



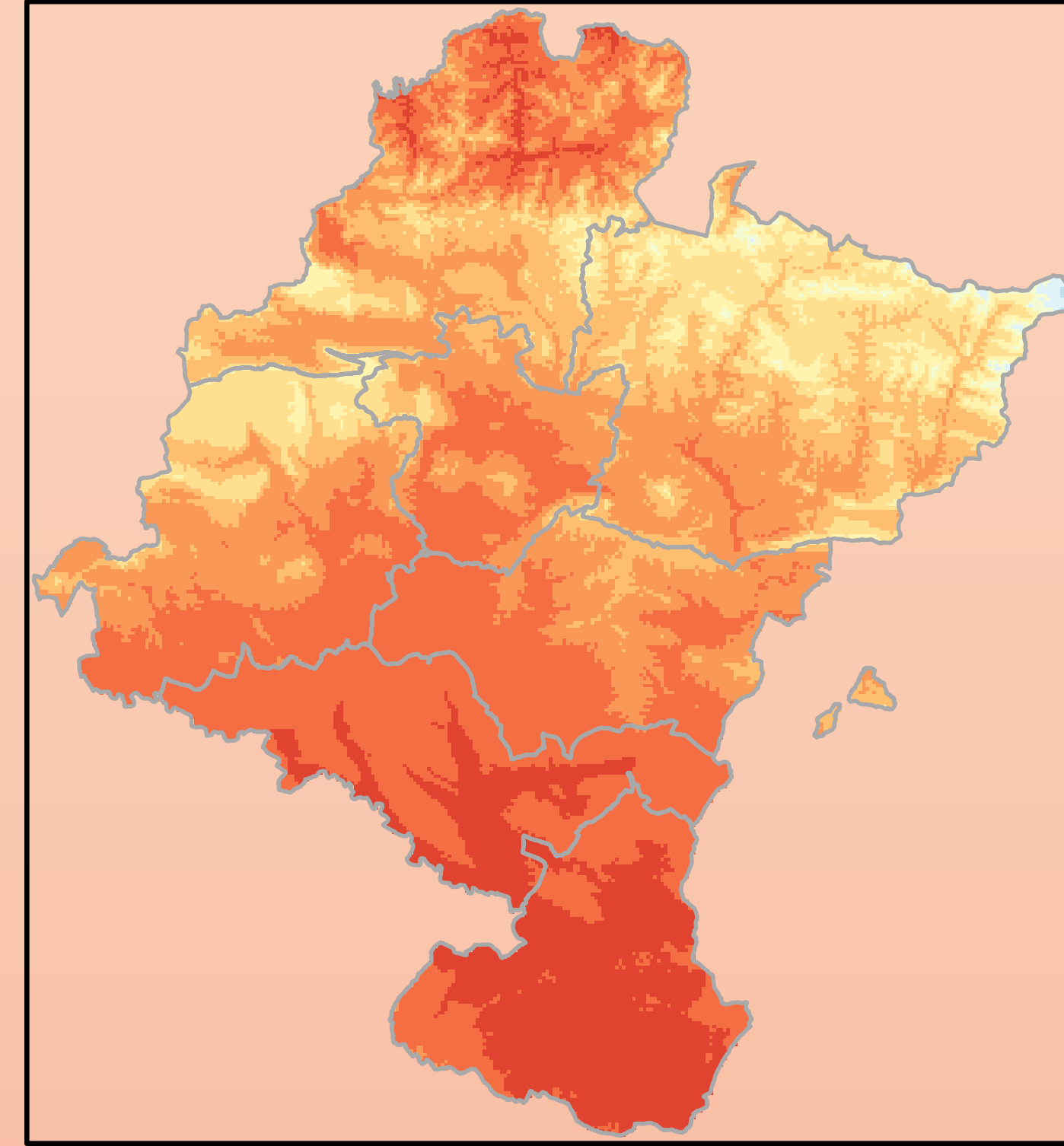
Observed 1991-2019



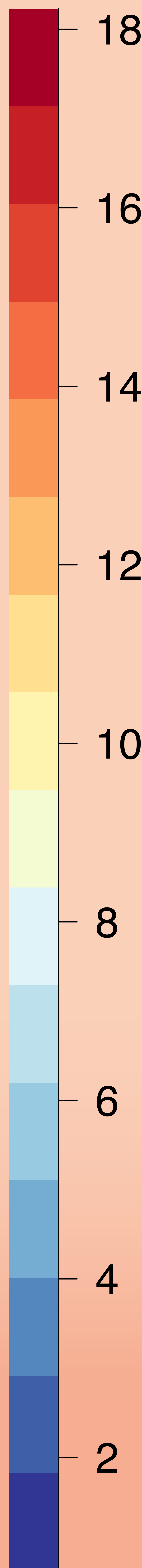
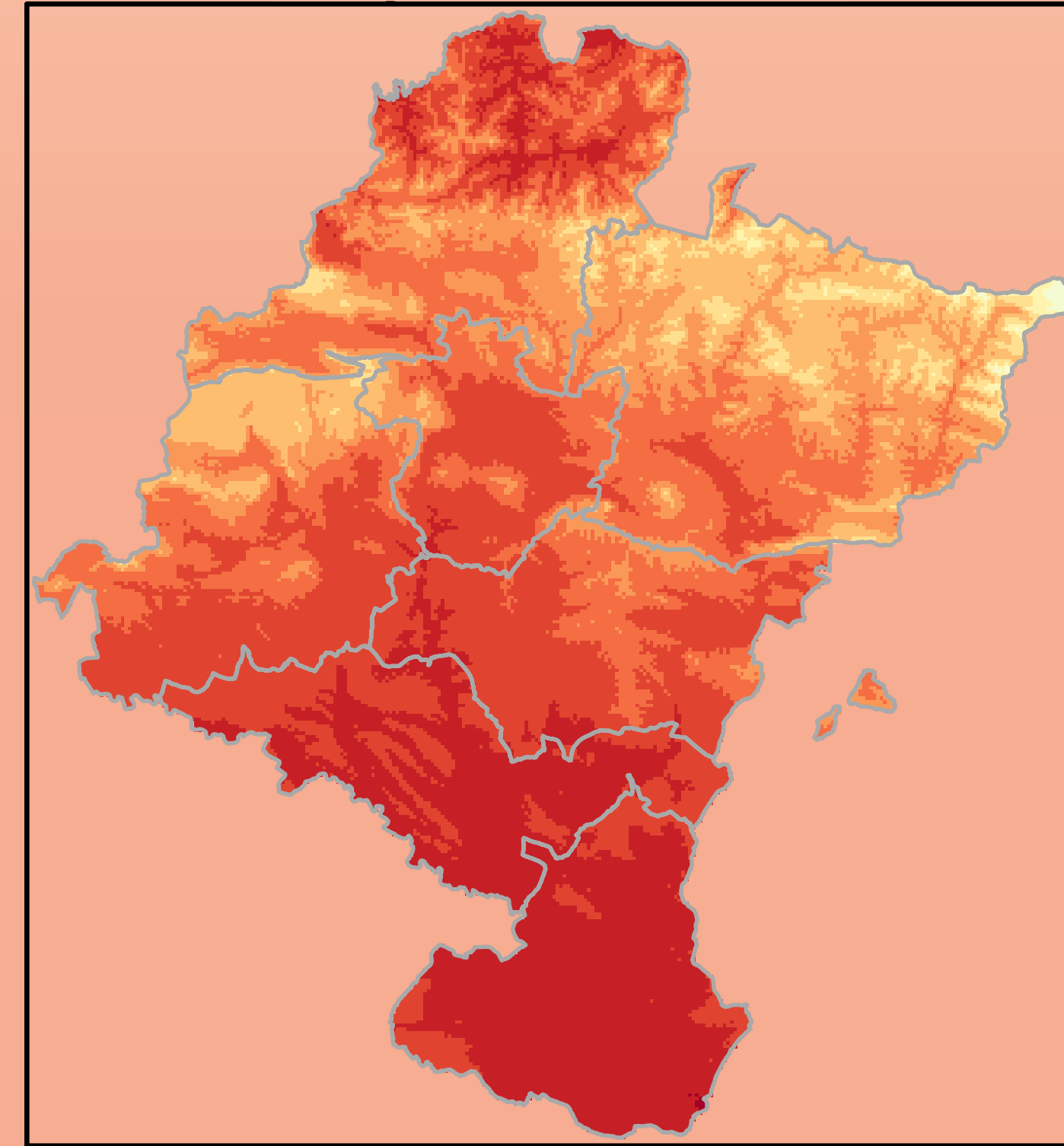
Observed 2006-2019



Predicted 2021-2050



Predicted 2051-2080





OUR STRATEGY FOR A SUSTAINABLE AND RESILIENT NAVARRRE

The Navarre Climate Change Roadmap, KLINa, is a cross-cutting environmental strategy which brings together and aligns all the community’s sectoral policies and incorporates international and European commitments on climate change.

PRINCIPLES

SUSTAINABILITY

Navarre, a benchmark for sustainable territories by 2050.

MAINSTREAMING POLICIES

Integration of climate change in all policies.

COOPERATION

Involvement of society as a whole: public authorities, organisations, companies, citizens, etc.

FLEXIBILITY AND RESILIENCE

Establishment of open and adaptable planning in the face of the uncertainties of climate change.

CULTURAL CHANGE

Sharing a cultural change that evolves into a new model.

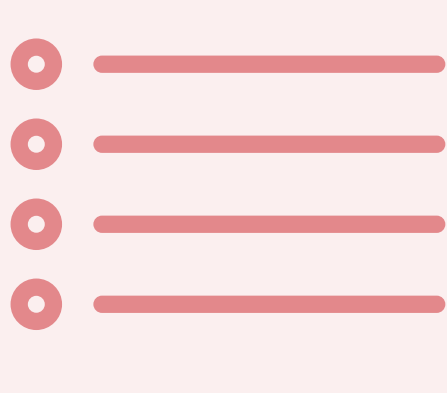
KNOWLEDGE AND INNOVATION

Learning and innovating to fight climate change

ACTIONS



25
LINES OF ACTION



63
MAIN MEASURES

- 10 CROSS-CUTTING MEASURES
- 9 MITIGATION MEASURES
- 44 ADAPTATION MEASURES

OBJECTIVES

MITIGATION

The mitigation measures aim to reduce greenhouse gas [GHG] emissions. Work focuses on different areas, such as:

ELECTRICITY

INDUSTRY

TRANSPORT

RESIDENTIAL-SERVICES

PRIMARY SECTOR

WASTE



See the results at <https://klina.navarra.es/>

ADAPTATION

The adaptation measures seek to prevent and moderate the expected effects on the climate and their consequences. The areas for action are:

NATURAL ENVIRONMENT

RURAL AND URBAN ENVIRONMENT

WATER

FORESTS

AGRICULTURE AND LIVESTOCK

HEALTH

INFRASTRUCTURE AND TERRITORIAL PLANNING



These measures are implemented through the Life NADAPTA project.



LET'S ADAPT NAVARRRE TO CLIMATE CHANGE

The European Union has been funding the LIFE IP NAdapta-CC project since 2017.

The project seeks to anticipate all these changes by developing adaptation measures which limit the effects of climate change.

These early adaptation measures will ensure a better future and economic savings.

WHO?

6 key entities are involved in the fight against climate change:



OBJECTIVES

- ✓ To increase Navarre's resilience to climate change.
- ✓ To achieve long-term sustainability.
- ✓ To include the fight against climate change in Navarre's different sectoral policies.

¿CÓMO?



AREAS

The LIFE-IP NAdapta-CC project has 53 actions, of which 37 are technical, distributed in 6 areas to make the territory and society more resilient.

53 ACTIONS



MONITORING AND LOCAL CLIMATE ACTION

OBJETIVOS

- ✓ **To increase knowledge** on the impact of climate change in Navarre.
- ✓ **To boost local climate action** through the Covenant of Mayors for Climate and Energy initiative.

ACTIONS

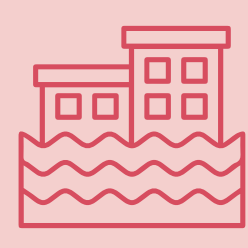


1. Monitoring climate change on a website.

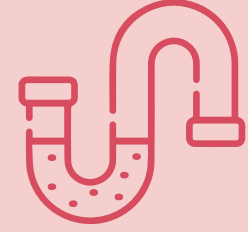
Climate change affects all sectors of Navarrese society and the volume of information available is enormous. To facilitate access to data, these have been structured into 15 impact chains which offer more than 120 indicators on the effects of climate change.



All this information is displayed on the website monitoring-en.lifenadapta.eu



FLOODING



WATER SUPPLY AND SANITATION SYSTEMS



WATER AVAILABILITY



FOREST FIRES



ROADS



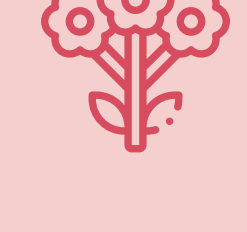
PESTS AND DISEASES



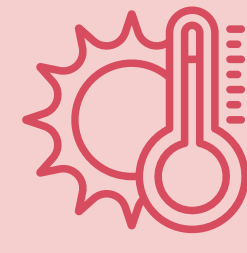
LIFE CYCLE



AGRICULTURE



POLLEN



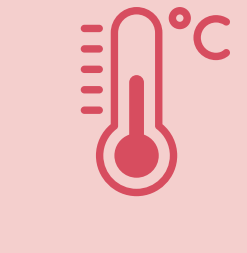
HEATWAVES



HEATWAVES IN THE WORKPLACE



DISEASES



TEMPERATURES



PRECIPITATION



LANDSCAPE



2. Covenant of Mayors for Climate and Energy.

Global initiative in which municipalities and local authorities express their commitment to:

- REDUCING GREENHOUSE GASES (GHG)
- ADAPTING TO CLIMATE CHANGE
- FIGHTING AGAINST ENERGY POVERTY

To this end, they have Sustainable Energy and Climate Action Plans (SECAPs) in their municipalities with, at minimum:

Mitigation measures



3

Adaptation measures



3

Measure against energy poverty



1

The Government of Navarre and local bodies have collaborated closely in promoting the Covenant of Mayors.

These municipal plans propose actions on energy, urban planning adapted to climate change, mobility, water and waste, among other things.



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WATER

OBJECTIVES

- ✓ **To improve** adaptive water **management**.
- ✓ **To reduce** the impact of torrential rains, floods and droughts.
- ✓ **To prepare** wastewater treatment plants for environmental emergencies.

ACTIONS

1.

Monitoring system for possible environmental emergencies at **wastewater treatment plants**.

2.

Network for monitoring sanitary sewer overflows and diagnosing their environmental impact. On occasions, the capacity of the drainage system is exceeded during periods of heavy rainfall, which causes overflows in the sanitation systems and untreated wastewater can reach the rivers.

3.

Promotion of sustainable urban drainage systems [SUDS] to reduce the amount of rainwater reaching sewage networks, drains and rivers.

4.

Flood risk early warning system. Data is collected from dozens of weather stations and river gauging stations to forecast river flooding in real time and respond earlier at local level.

5.

Flood self-protection plans in local authorities to reduce the impact of floods in cities, towns and villages.

6.

River space recovery projects as a strategy for environmental improvement and reduction of the impact of floods.

7.

Study to assess the effect of climate change on water resources. The analysis of the amount of water available in Navarre makes it possible to plan how to better meet the needs of the different sectors: water for human use and consumption, industry, irrigation, etc.



Flood early warning system.

FORESTS

OBJECTIVES

- ✓ **To enhance the resilience** of the most vulnerable forests.
- ✓ **To promote sustainable forest management.**
- ✓ **To establish management models** to conserve ecological value and improve forest productivity.

ACTIONS

1.

Identification and mapping of the forest territories most vulnerable to climate change to establish priorities for action.

2.

Selection and conservation of seeds of native species that are better adapted to climate change, for example, ones which are less combustible. In this way, a reserve of resilient genetic material is ensured for the conservation and restoration of our forests in the future.

3.

Analysis of **comprehensive management models in Mediterranean agroforestry systems** to increase their ecological value and minimise risks.

4.

A **web viewer** which allows you to consult the geographical database of the **forest planning instruments** approved by the Navarre Forestry Administration in a climate change scenario.

5.

Studies and guides on **forest growth models** to assess changes in forests and strengthen their adaptation and productivity.



Emergence of forest pests and diseases

AGRICULTURE AND LIVESTOCK

OBJECTIVES

- ✓ To improve the adaptive management of agriculture and livestock.
- ✓ To implement **innovative techniques** for soil, plant material and irrigation water management.
- ✓ To establish **alert systems** for emerging pests and diseases.
- ✓ To minimise **fire risk** through silvopastoral management.

ACTIONS

1. Establishment of **plans to adapt agrosystems** through soil management strategies [organic matter, crop diversification and soil conservation].

2. Adaption of **water management in agriculture**.

3. **Computerised consultation tool** on the best adapted crops which includes a **guide to varieties and techniques for growing** local varieties.
Conservation of 50 varieties of local **seeds** highly adaptable to climate change.

4. Emerging **plant pest and disease alert** system.

5. Monitoring of **insect-borne diseases** such as mosquitoes or ticks.

6. **Fire control through silvopastoral management** [combination of extensive livestock farming and forest management].



Fire control through silvopastoral management



How can grazing help prevent fires?

HEALTH

OBJECTIVES

- ✓ **To define and monitor** the effects of climate change on the health of the population.
- ✓ **To disseminate adaptation** measures for the population.

ACTIONS

1.
Preventive actions on the effects of **excessive temperature** on human health through monitoring and data recording tools, and information campaigns aimed at citizens.

2.
Monitoring the impact of climate change in the **workplace** [especially in the face of high temperatures] and the production of information guides.

3.
Improved **air quality** monitoring and health impact assessment tools.

4.
Improved monitoring of **emerging risks** in food, drinking water and bathing water.

5.
Monitoring system to detect **invasive species** which **transmit human diseases** such as the tiger mosquito [*Aedes albopictus*] and improvement of action protocols.

6.
Improved monitoring of **pollen** composition and **pollination periods**.



Pollen composition monitoring



Sign up for pollen alerts and newsletters

INFRASTRUCTURE

OBJETIVOS

- ✓ To define **new measures to adapt** to climate change in the urban environment.
- ✓ To **improve adaptive management** in infrastructure and territorial planning in Navarre.
- ✓ To **promote energy rehabilitation** in urban and rural environments.
- ✓ To **analyse** the vulnerability of infrastructure and landscapes.

ACTIONS

- 1.** Thematic guide for landscape management in regional and district planning.
- 2.** Architecture and urban planning guide defining mechanisms to integrate adaptation into territorial planning at different scales.
- 3.** Platform to manage energy consumption and adapt public buildings to climate change.



- 4.** Roadmap of innovative management models to adapt Navarre's built environments (urban and rural).
- 5.** Climate classification map with vulnerable points in transport infrastructure and an intervention plan for them: road surfaces, bridges, drainage works, earthworks, tunnel openings and works of art.
- 6.** Revision of climate change scenarios in built environments, allowing for the inclusion of lessons learnt in future projects and urban planning.

PILOT ACTIONS

- 1.** Public housing. Adaptation-to-climate-change pilot action on a rented public housing building in Burlada acting on its thermal insulation, waterproofing and ventilation system, and promoting renewable energies.
- 2.** Energy communities. Adaptation-to-climate-change pilot action on public facilities in energy communities, allowing the methodology to be contrasted and its replication promoted. More than 20 energy communities have been created in the last 4 years.
- 3.** Energy rehabilitation in urban environments. Demonstrative action in Tudela to check the methodology established in the Roadmap of Innovative Management Models for adaptation to climate change.
- 4.** Energy rehabilitation in rural environments. Consisting of demonstrative action in a rural setting.
- 5.** Energy rehabilitation in Areas with Vulnerable Economic Activity.