Deliverable Phase 2 – Climate risk assessment

QCATI (Climate Adaptation Toolbox Implementation)

Spain, Quart de Poblet

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HORIZON-MISS-2021-CLIMA-02-01 - Development of climate change risk assessments in European regions and communities based on a transparent and harmonised Climate Risk Assessment approach

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Author(s)	• David Valdearcos Teruel (City Council of Quart de Poblet) • Aitana Navarro Molina (Sequoia Pro) • Lorena Núñez Iranzo (Sequoia Pro)
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Abbreviations and acronyms

Abbreviation / acronym	Description
AEMET	Spanish Meteorological Agency
CEDEX	Center for Studies and Experimentation in Civil Engineering
CHJ	Júcar Hydrographic Confederation
CRA	Climate Risk Assessment
CSIC	Spanish National Research Council
COSCV	Land Use Cartography of the Valencian Community
EDAR	Wastewater treatment plant
DANA	Isolated high-altitude depression / Cut-off low
GCM	Global Climate Model
GDP	Gross Domestic Product
JRC	Joint Research Centre
ICV	Valencian Cartographic Institute
INE	National Institute of Statistics
NDVI	Normalized Difference Vegetation Index
PNACC	Spanish National Climate Change Adaptation Plan
QCATI	Climate Adaptation Toolbox Implementation for Quart de Poblet
RCM	Regional Climate Model
RCP	Representative Concentration Pathway
RP	Return Period
SNCZI	National Flood Zone Mapping System

Executive summary

Motivation: This report presents the results of Phase 2 of the QCATI project, which consists of a climate risk assessment (CRA) developed using local data in the municipality of Quart de Poblet (Valencia, Spain) under the harmonized methodology proposed by CLIMAAX. The risks assessed are river flooding, heatwaves, and heavy rainfall. The CRA's ultimate goal is to improve local adaptive capacity and preparedness for these risks and their potential evolution under climate change, through informed decision-making by local authorities.

Main results: In this phase, the risk screening was expanded to include heavy rainfall, due to its significant impact on the municipality and its link to river flooding. Furthermore, the workflows developed by CLIMAAX were modified to incorporate the refined databases used to enrich the CRA. Hazard, exposure, and vulnerability variables were incorporated for each risk. Two workshops with project stakeholders were also held during this phase.

- River flooding: New hazard datasets (flood maps and discharge projections by sub-basin) and exposure datasets (land use maps) have been incorporated into the analysis and combined with damage curves associated with economic losses by land use type. Flood maps for different return periods (10, 100, and 500 years) encompass the various existing watercourses and more accurately indicate the affected areas. Hazard is concentrated particularly in the central and western regions, in areas occupied by industrial and agricultural uses. Projections indicate a possible increase in extreme flow rates (m^3/s) until mid-century, followed by a decline in this trend towards the end of the century. Economic losses have been estimated thanks to the greater precision of the spatial data.
- Heatwaves: Downscaled projections prepared by AEMET (the Spanish State Meteorological Agency) for the maximum duration of heatwaves have been included. A progressive increase in risk is expected throughout the century, especially under the RCP8.5/SSP5-8.5 scenarios. The attribution of risk levels to the municipalities of the province using zonal statistics shows an increase in the risk level in Quart de Poblet as the century progresses. Furthermore, the combination of satellite-derived imagery (Landsat8) of ground surface temperature and data on vulnerable populations (people over 65 years old) by census tract has allowed for the identification of the areas most at risk from the urban heat island effect.
- Heavy rainfall: Analysis of different GCM-RCM combinations and scenarios under the consideration of a critical rainfall impact threshold shows a general increase in the intensity of events for RP T5. However, given the uncertainty associated with the variability of model results, it is advisable to interpret these data with caution.

Conclusions: Refining the analysis with local data has yielded results that are more tailored to the local scale and much more concrete, facilitating the adoption of specific measures to increase adaptability and resilience. While uncertainties remain, the CRA provides highly valuable information for local government, which has been communicated in an accessible and understandable manner. Equally important has been considered the work with project stakeholders and the dissemination of information via web and social media to the general public to raise awareness.

1 Introduction

1.1 Background

The municipality of Quart de Poblet is located in the province of Valencia, in the district of l'Horta Sud, 5 km from the city of Valencia. It covers an area of 19.72 km^2 in the so-called Valencian coastal plain, so the topography is practically flat, interrupted only by the channels of gullies and rivers. The location of the municipality can be seen in Figure S-1 of the Supporting Documentation.

The municipality has a population of 26.304 (INE, 2024), which represents a very high population density per km^2 (>1.000 inhabitants/km^2). Furthermore, Quart de Poblet is home to extensive industrial areas around the A-3 motorway, where a large number of companies and workers are concentrated, as well as strategic facilities such as the UN Communications and Data Center, a military residence, part of Manises Airport, and the Valencia metropolitan area waste treatment plant, among others. All of this emphasizes the importance of good preparation for extreme weather events. Furthermore, the aging rate is very high (157.3%), which is important since the older population is a vulnerable group to certain climatic risks such as extreme heat.

Quart de Poblet has a typical Mediterranean climate (Csa), characterized by hot, dry summers and mild winters. Annual rainfall is usually concentrated in autumn and spring. The variability of this climate type makes it susceptible to climate-related hazards, such as forest fires, droughts, heavy rainfall, river flooding, and heatwaves.

The CLIMAAX project in Quart de Poblet will focus on studying the risk of river flooding and heatwaves, given the current impact of these risks on the population and established land uses. Considering the known impacts, it is important to study the projection of these risks into the future in the context of climate change so that preparedness can be improved.

1.2 Main objectives of the project

The QCATI project aims to assess various climate risks within the municipality of Quart de Poblet, identifying hazards and vulnerabilities to develop strategies that improve the resilience of the population, the environment, and municipal infrastructure.

While the Phase 1 of the project involved a risk assessment using European databases, this Phase 2 requires developing a climate risk assessment that integrates local or higher-resolution data into the analysis. The goal is to incorporate refined information to obtain results tailored to the local scale, specifically in the case of Quart de Poblet. This addresses the shortcomings and problems identified during the first phase.

This local risk assessment is focused on **improving understanding of current climate risks in the municipality and their potential future evolution under climate change**. This knowledge, communicated in a clear and accessible way to public officials and managers, should serve to improve risk awareness and preparedness, guiding potential mitigation and adaptation measures that promote sustainable development and the protection of people, the environment, and critical infrastructure.

The objectives of the second phase of the project include:

- Assessing climate risks using the CLIMAAX framework and methodology, adapting workflows to incorporate available data for local analysis, taking into account the municipality's needs.
- Identifying the areas of greatest exposure and the location of vulnerable groups within the Quart de Poblet area.
- Consulting with local authorities regarding databases and local information to contribute to the analyses.
- Providing local authorities with accessible and understandable information on current and expected risks under various climate scenarios to support decision-making regarding adaptation and mitigation, as well as emergency preparedness.
- Enhancing local adaptive capacity by engaging local stakeholders and raising public awareness to improve risk perception.

As discussed in Deliverable 1, the **CLIMAAX Handbook** facilitates a **scientific and standardized approach** to climate risk assessment, using a common methodology adaptable to different regions. Thus, the assessment carried out during this Phase in Quart de Poblet could also be **replicated in other municipalities**. Given the databases used, other Valencian towns wishing to conduct a similar analysis would find it easier, although any Spanish municipality could adopt the methodology and adapt it to its own circumstances.

The climate models and local data used in this Phase have allowed us to achieve a **more detailed understanding of the risks and potential impacts of climate change** in Quart de Poblet, with a much more refined spatial resolution and regionalizations better suited to Spain's climatic characteristics. The results obtained will be used to guide and optimize short-, medium-, and long-term decision-making, in accordance with European standards and best practices.

1.3 Project team

The QCATI project involves a diverse team, led and coordinated by the European Projects Department of the Quart de Poblet City Council, in collaboration with the Department of Environment. The following people are involved:

- David Valdearcos Teruel: technician from the European projects department in the municipality of Quart de Poblet, in charge of financial follow-up and technical issues.

Thus, the City Council is responsible for overseeing the project objectives and managing stakeholder engagement. Besides, the technical team supporting the City Council on the QCATI project was contracted through a public tender process, which led to the hiring of an environmental consultancy firm. This technical team, responsible for applying the CLIMAAX methodology, includes:

- Aitana Navarro Molina: Environmental and climate consultant, responsible for executing workflows and developing the climate risk assessment.
- María López Devesa: Communication officer and consultant, responsible for managing press releases, posts and social media engagement.
- Verónica Sánchez-Ferragut: grapich designer in charge of the project image and the elaboration of all communication products.

- Lorena Núñez Iranzo: European Projects manager, responsible for the internal communication with the city council of Quart de Poblet, about aligning all project outcomes with EU financing initiatives, and to developing stakeholders' engagement strategy and public participation plan.

1.4 Outline of the document's structure

This document presents the work carried out during the Phase 2 of the QCATI project, developed between September and December 2025. The **introduction** provides a brief description of the municipality to contextualize the project within its territory. It also outlines the main objectives and the project team.

The main body of the document presents the **climate risk assessment**. This section begins with the **scope**, defining the project's objectives, context, and stakeholders. It then moves on to **risk exploration**, re-evaluating the workflows and scenarios selected in the first phase and detailing the modifications made in this second phase. Next, the **regionalized risk analysis** presents the various steps taken to adapt the workflows to local data, incorporating new information for the hazard, vulnerability, and exposure variables. The **results of the risk assessment** are described in terms of severity, urgency, and capacity, which ultimately inform risk prioritization.

The **conclusions** summarize the most relevant aspects of this Phase of work and the key findings. This is followed by an **evaluation of progress** and a reflection on the challenges for the next and final phase of the project.

Finally, the **supporting documentation** accompanying this report is listed, along with the **references** used.

2 Climate risk assessment – phase 2

2.1 Scoping

Defining the project scope is a fundamental initial step. The scope establishes the project's objectives, context, and stakeholders, including those responsible for risk management. This step ensures that the risk assessment is conducted at a scale appropriate for the municipality and aligned with its administrative and competency framework.

2.1.1 Objectives

The climate risk assessment in this project began with the objective of analysing in detail the risks of **river flooding** and **heatwaves**, given their impact on Quart de Poblet. With the development of the Phase 1 of work, **it was also deemed appropriate to address, in the next phase, the risk of extreme rainfall** due to its close link with flooding in the Mediterranean area. This assessment aims to achieve several objectives: to understand the future projections of these phenomena in relation to climate change, to identify vulnerable areas and groups, and to evaluate the potential impacts of the analysed risks on the territory and the population.

The results obtained should provide a **reliable and verified source of information for political decision-making** within the City Council regarding risk preparedness, mitigation, and adaptation to climate change. Specifically, this information can be used in urban planning, prevention and response planning for natural hazards, support for vulnerable groups, and any sustainable development planning. Furthermore, the aim is to improve risk awareness and understanding among various stakeholders and the general public, thereby enhancing local adaptive capacity and resilience.

Regarding the **limitations** of our CRA, some have been overcome during this Phase 2 of work through the implementation of local data. On the other hand, the availability of more refined data sources has led us in some cases to work with different variables than those used during Phase 1 (for example, in the heatwave hazard analysis), so the results are not directly comparable, as explained in the corresponding section. Furthermore, we have encountered some limitations regarding data availability, for example, for validating the discharge analysis for the municipality's ravines, and therefore it has been decided to supplement the analysis with the Heavy Rainfall workflow. The limitations related to uncertainty in the results of climate projections remain. In addition, given the project's technical limitations (personnel, training, resources and proprietary data, hardware, software, etc.), we have opted for a CRA that, while striving to be appropriately professional and technical, also aims for broad accessibility and replicability, so that other municipalities with similar resources can apply it in their territories.

2.1.2 Context

[This section has remained the same as in Deliverable 1]

Current risk management and assessment: At the regional level, the Valencian Climate Change and Energy Strategy 2030 defines the effects of climate change on the Valencian territory: general increase in temperatures, decrease in rainfall, aridification, rising sea levels, increased intensity of extreme events such as floods and heatwaves, emergence of invasive species and new diseases.

Risk management falls under the responsibility of the Civil Protection System, whose powers are shared among the different administrative levels in Spain (national, regional, and local). The Valencian Community has its own civil protection law, one of its objectives being "To analyze the vulnerability of the territory of the Valencian Community for the preparation of various risk maps [...]." This mapping is included in the Special Risk Plans, which have assessed and determined the risk level for each municipality. Municipalities must also have local civil protection planning. The climate risks addressed by this planning are specifically floods and forest fires. In addition, local authorities can develop programs and action plans to address specific risk situations.

However, no climate risk assessment has been previously conducted at the local level in Quart de Poblet. Current information on the risks to be assessed in this project comes from regional and/or national authorities and institutions.

Official flood risk mapping exists at both the regional and national levels. Furthermore, the Júcar River Basin Authority (CHJ), which includes Quart de Poblet, also has a Flood Risk Management Plan. The risk of heatwaves is managed through the regional health authority, which annually prepares a summer program to prevent and address health problems arising from high temperatures. This program includes communication of the daily risk level assigned to each municipality.

In addition, the Spanish Meteorological Agency (AEMET) provides weather information and forecasts and maintains continuous monitoring of adverse weather events and issues warnings when certain risk thresholds are reached. AEMET is also responsible for developing and updating downscaled climate change scenarios for Spain. Information on climate change projections for the 21st century is disseminated through the AdapteCCa portal, part of the Spanish Climate Change Office.

Problems to address: Extreme weather events linked to temperature and water are a growing concern among society and decision-makers, especially along the Mediterranean coast. In the current context, extreme heat events are becoming more intense (temperature records are being broken) and longer lasting (heatwaves are extending over time). June 2025 was the most anomalously warm month on record in Spain, with an average temperature of 23.7°C, 3.6°C higher than the reference period average, according to AEMET. Furthermore, the region recently experienced one of the most severe flooding events recorded to date: the DANA flood of October 2024, with 215[1] deaths and an estimated loss of more than €17 billion[2] in capital stock in the Valencian Community. This leads to greater concern and risk perception, and demonstrates the need to improve local knowledge about current risks and their evolution under climate change. Therefore, the project seeks to address questions such as how risks can be expected to evolve in the future, what climate events the municipality should prepare for, which areas and groups will be most affected, and how to improve decision-making for risk prevention and management.

Governance context: As previously mentioned, risk governance falls under different administrative levels, primarily through civil protection plans. Local planning is integrated into regional planning through operational emergency response mechanisms.

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1 https://www.lamoncloa.gob.es/info-dana/paginas/2024/131124-datos-seguimiento-actuaciones-gobierno.aspx

2 https://www.ivie.es/es_ES/ptproyecto/ivielab-alcance-economico-de-la-dana-del-29-de-octubre-en-la-provincia-de-valencia/

Regarding risk assessment and climate change adaptation, various legal frameworks, plans, and strategies can be highlighted at the national and regional levels:

- Law 7/2021, of May 20, on climate change and energy transition.
- Spanish National Climate Change Adaptation Plan 2021-2023
- National Integrated Energy and Climate Plan 2023-2030 (PNIEC)
- Law 6/2022, of December 5, of the Generalitat, on climate change and the ecological transition of the Valencian Community
- Valencian Integrated Energy and Climate Change Plan (PVIECC 2030)
- Valencian Climate Change and Energy Strategy (2030)
- Law 17/2015, of July 9, on the National Civil Protection System.
- Law 13/2010, of November 23, of the Generalitat, on Civil Protection and Emergency Management.
- National Plan for Preventive Actions against the Effects of Excessive Temperatures on Health
- Program for the Prevention and Response to Health Problems Derived from High Temperatures in the Valencian Community
- Special Plan for Flood Risk in the Valencian Community (PEIN)
- Sectoral Territorial Action Plan for Flood Risk Prevention in the Valencian Community
- Flood Risk Management Plan of the Júcar Hydrographic Confederation

At the local level, the following risk management tools stand out:

- Municipal Territorial Emergency Plan
- Municipal Flood Risk Action Plan
- Municipal Prevention Plan for the Risk of Heavy Rainfall
- Environmental Promotion Plan for Climate Change Adaptation

Relevant sectors: Due to their exposure, the sectors considered most susceptible to the consequences of the risks analyzed are the population, urban and transportation facilities and infrastructure, the industrial and agricultural production sectors, and the natural environment. The October 2024 flooding highlighted the exposure of these sectors to risk. Regarding heatwaves, public health is of particular concern.

Outside influences: Beyond the municipal context, there are external influences on the adaptive and resilient capacity that can be achieved in Quart de Poblet. These include regional and national climate change adaptation and mitigation strategies; river authority risk management plans; and European initiatives (CLIMAAX, Covenant of Mayors, Pathways2Resilience, etc.). Specifically, the "Plan Endavant", a strategy promoted by the Generalitat Valenciana, that is currently being developed to adapt a strategy to recover from the effects of the DANA, in which the municipality of Quart de Poblet is also located, and that involves an external influence to be taken into consideration for our QCATI project.

Possible adaptation interventions: These include hydrological interventions in ravines (channeling, diversions), adapted urban planning (green infrastructure, urban flood parks) and improvement of drainage and rainwater harvesting networks, creation of shaded areas in public spaces, adaptation of public buildings as climate shelters, improvement of early warning systems for the population, and increased information and public awareness.

2.1.3 Participation and risk ownership

The stakeholder engagement process in Phase 2 has been completed successfully, addressing vulnerable people, as well as environmental associations from Quart de Poblet, which have been working in related initiatives and complementary projects to QCATI.

The participatory process has involved the following objectives:

- Approach QCATI Phase 2 main results to QCATI stakeholders.
- Celebrate working groups with relevant environmental associations of the municipality, and identify possible synergies between their initiatives and QCATI project.
- Compile environmental hazard results from different stakeholders, about relevant data of principal risks (heatwaves, heavy rainfall, and river flooding).
- Foster vulnerable people participation in the project execution, and promoting sustainable development among them.

As explained in the previous section, **risk management is a shared responsibility**. At the local level, the City Council is responsible for identifying risks and preparing for them, but it has the assistance and resources of the regional authorities when needed. Information on risk levels for the population is provided by agencies such as the regional government (Valencian Agency for Security and Emergency Response), AEMET (the Spanish State Meteorological Agency), and the regional Department of Health.

Regarding the priority groups, the main representatives of known **vulnerable groups** are older people, which are a priority group for QCATI project and for the Area of Elderly People of the City Council of Quart de Poblet. This group has been specially addressed as a priority group due to lack of knowledge of consequences and risks of climate change, the necessity to adapt the information and resources for them, and the importance to count with their opinion and suggestions to address those risks from the vulnerable and elderly perspective. Also, exposure to the extreme risks of climate change is of significant importance to the health of this people: physical and reduced mobility, mental health issues, and several pathologies. We worked the mentioned important issues for elderly people, in an open event in the municipality of Quart de Poblet, where we spoke about sustainable development, how risks have affected the municipality in the past and in the present, what measures are being adopted by the City Council, and what we can do to reduce risk exposure. In general, elderly people came out satisfactory from an event that hosted around 45 people, with an open dialogue resulting with the following conclusions:

- Heatwaves are more frequent and intense than past years.
- There is concern about the pollution caused by transportation and its effect on global warming.
- They have noticed changes in the environment caused by climate change, such as out-of-season flowering.
- There's a lack of green spaces in some sectors of the city.
- Heavy rainfall occurs each year.
- New proposals for the municipality: fix the damaged Turia river area (a green space for rest and strolling, frequently used past years for elderly people), avoid construction in flood-prone areas by adapting urban development plans, and create more green areas.

Regarding the Quart de Poblet region**, information concerning acceptable or tolerable risk levels** is derived from a combination of official regulatory standards, health-based scientific thresholds, and the recent consensus reached through participatory stakeholder engagement:

1. Official and regulatory risk classifications

- Flood risk: Valencian regional authorities have officially classified Quart de Poblet as having a "high level of flood risk". This is managed through the Civil Protection System, where Special Risk Plans (such as the PEIN) categorize municipalities based on their vulnerability and exposure.
- Heavy rainfall: The QCATI team established a critical impact threshold of 98 mm/24 h (associated with a 5-year return period), based on official information and local experience. Rainfall exceeding this magnitude is considered to cause significant disruptions to civic activity and safety.

2. Scientific and Health-Based Thresholds

- Heatwaves: The threshold for health-related risk is defined by temperatures exceeding 34.7°C during the day and 24.0°C at night for at least three consecutive days. Historical data and projections show these levels are being exceeded with increasing frequency, moving the risk beyond a "tolerable" baseline.

3. Participatory consensus on risk acceptability

During the project's second phase, stakeholders used a standardized evaluation dashboard to categorize risk levels into four action-based tiers: "no action needed," "watching brief," "more action needed," and "immediate action needed". The findings indicate the following regarding local tolerance:

- Heatwaves (unacceptable): Assigned a "very high" priority requiring "immediate action". Stakeholders indicated the current climate has surpassed comfortable or tolerable levels.
- River Flooding (low tolerance): Assigned a "high" priority requiring "more action". The memory of the 2024 DANA event, which exceeded the 500-year return period expectations in some areas, has significantly lowered the community's tolerance for current flood-preparedness gaps.
- Heavy Rainfall (moderate tolerance): Assigned "high" priority requiring “watching brief” by local stakeholders.

2.1.4 Application of principles

In terms of **social justice, equity, and inclusion**, the participatory process has engaged local vulnerable population groups (elder people). Gender equality has also been a key focus, with a large number of women participating in the activities.

For **rigour**, the project strictly adheres to the CLIMAAX methodological framework, ensuring standardised, replicable, and scientifically robust analysis. **Transparency** is based on open information regarding the sources used for the risk analysis. This information has been shared throughout the participatory process and will also be publicly accessible through the QCATI project website when the Phase 2 results report is published, as was done with the previous phase report.

The **precautionary approach** is incorporated into the assessment of key risks. Analyses include worst-case emission scenarios (RCP 8.5 / SSP5-8.5) to ensure that local planning and adaptation measures maintain resilience under extreme climate pathways, consistent with EU climate adaptation strategies. Uncertainties, particularly those related to water risks, have been taken into account, giving greater weight to current trends, vulnerabilities, and impacts that are relevant enough to drive action. Furthermore, in the next phase, actions with low or no regret may be prioritized if deemed appropriate.

2.1.5 Stakeholder engagement

Regarding **engagement**, Phase 1 involved staff from various City Council departments to assess the risks. In this phase, we have sought to incorporate the perspectives of citizen groups from Quart de Poblet. Stakeholder participation was achieved through two actions:

We engaged the **local Environmental Council**, comprised of members from local associations (L'Animeta Association for Organic Agriculture) and the Limne Foundation (dedicated to river restoration and public awareness). Through the Department of the Environment, a **participatory workshop** was organized to explain the QCATI project, present the results of the analysis, and conduct a joint risk assessment. Feedback was also gathered on the methodology used for the risk analysis, with suggestions for improving flood risk analysis by incorporating sociodemographic variables in addition to economic ones. It was also agreed to collaborate with the Environmental Council on developing the set of adaptation proposals to be implemented in Phase 3 of the Project.

Furthermore, a dynamic session was organized with the Area of Elderly People of the City Council, targeting the municipality's **senior citizens** as a vulnerable group. This activity was designed as a **participatory and awareness-raising workshop**, in which people could learn more about climate change in Quart de Poblet and also share their experiences, perspectives, and ideas about the municipality's needs. The contributions of this group have been taken into account in the risk assessment. Furthermore, their perspectives are invaluable for understanding the public's perception of climate risks, a factor that influences the degree of social acceptance of measures that may be taken to improve the municipality's preparedness and adaptation to climate change. Therefore, this information will be relevant for the final phase of the project.

2.2 Risk Exploration

Risk screening begins the climate risk assessment process. It is essential to examine which risks pose the greatest threat to the municipality and generate the greatest concern among individuals and stakeholders, as well as among citizens, in order to focus the project on local needs and the hazards that may have the greatest impacts.

2.2.1 Screen risks (selection of main hazards)

For the **Phase 1** of the project, the QCATI team selected the **two risks considered most pressing** for the municipality of Quart de Poblet: river flooding and heatwaves. The risk of river flooding was chosen in recognition of the existing risk in the municipality, taking into account the various sources of hazard and the elements present in flood-prone areas. This choice also reflected the recent experience of a major flood, caused by the DANA storm of October 2024, which wreaked havoc in the province of Valencia. The risk of heatwaves was selected due to the growing trend of rising temperatures in the region, as extremely high values have been recorded in recent years compared to historical data from AEMET. The characteristics of the population and the large amount of built-up area within the municipality (urban and industrial land, transportation infrastructure) exacerbate the problem of high temperatures.

During the **Phase 2** of the work, due to limitations in studying future trends in river flood risk, it was deemed appropriate to add an assessment of the risk of **extreme rainfall** to the analysis, since these trigger flooding episodes in the municipality, both riverine and urban. As Camarasa and Caballero [1] mention, while the river system requires time to respond to flooding, on-site rainfall causes disruptions to the normal development of civic activity.

As can be seen in the figures obtained from the **Copernicus Atlas** (*Figure S-20 in the Supporting Documentation*) for the CORDEX-EUR-11 projections of the *Very Heavy Precipitation Days* variable, in the RCP 4.5 scenario the relative change values show little change compared to the baseline, while in RCP 8.5 the relative change shows a slightly positive evolution in the three future reference periods. However, all projections are conditioned by conflicting signals, so there is a **high degree of uncertainty** about the evolution of extreme rainfall events in the region.

2.2.2 Choose Scenario

As discussed in Deliverable 1, at a local scale like that of Quart de Poblet, the action capacity by decision-makers is typically short-term (4-year cycles). However, the problems arising from climate change require a broader perspective. To improve the municipality's preparedness and adaptation capacity, it is necessary to understand the potential evolution of climate risks over the coming decades.

In the context of Quart de Poblet and in relation to the selected risks, possible future conditions and socio-economic developments were considered:

In the **medium term** (2040-2060) – a progressive increase in temperatures will increase the severity of heatwaves and may also favor the occurrence of intense torrential rainfall events. According to the study by Miró et al. [3], extreme precipitation could increase in the Valencian region in the short to medium term under RCP scenarios 4.5 and 8.5, which may lead to more flooding from overflowing rivers and ravines. However, channeling and diversion interventions can be implemented to reduce the associated risk. Likewise, the application of structural measures at the urban level (stormwater tanks, SuDS, channeling, or sewers) can reduce the risk in areas where flooding problems currently occur due to on-site rainfall or to ravines activity. The INE's population projections indicate a population increase (more than 5 million in the next 15 years)[3] if current trends continue, with particularly strong growth in the Valencian Community, as well as an increase in the population over 65 (from 20.4% to 30.5% around 2055). However, specifically in Quart de Poblet, population growth may be limited, as there is hardly any residential land left to develop, according to the current urban planning regulations.

[3] https://www.ine.es/dyngs/Prensa/PROP20242074.htm

In the **long term** (2070-2100) – the worst-case scenario, as outlined in RCP 8.5, is projected for the end of the century, with severe changes in climate risks, particularly the risk of heatwaves. There is greater uncertainty in the projections regarding the risk of river flooding and extreme precipitation events. For the end of the century, projections obtained by Miró et al. [3] show a reduction in extreme precipitation events in the central and coastal areas of the province of Valencia.

For the development of this Phase, the selection of scenarios used was also based on the availability of climate projection datasets. Thus, the scenarios used in the development of the workflows during the Phase 2 were the following:

River floods	*River discharge: RCP 4.5 and RCP 8.5 for near, mid and far future*
Heatwaves	*Local hazard projections: RCP 4.5 and 8.5 from 2006 to 2100; SSP2-4.5 and SSP5-8.5 from 2015 to 2100* *Regional risk projection change: SSP2-4.5 and SSP 5-8.5 for near, mid and far future*
Heavy rainfall	*Projections for Precipitation IDF: RCP 4.5 and RCP 8.5 for near, mid and far future*

2.3 Regionalized Risk Analysis

2.3.1 Hazard #1 RIVER FLOODS - fine-tuning to local context

The refinement of this workflow has been based on the use of two new cartographic data sources: one on flood hazards and the other on land use. This has allowed us to incorporate into the analysis the ravines that the JRC mapping did not include (Saleta, Gallego, and les Basses), and to improve the identification of damaged areas and infrastructure and their cost estimation. In addition, we have compared the hazard mapping with a real, high-impact flood event that affected the province of Valencia at the end of October 2024 (the DANA storm of October 29).

Table 2 - 1 Data overview workflow #1

Hazard data	*Vulnerability data*	*Exposure data*	*Impact metrics/Risk output*
SNCZI flood map dataset for present day scenario (PR 10, 100, 500) *ICV mapping of the extent and depth of flooding (DANA October 2024)* *River discharge statistics (E-HYPEcatch model by SMHI) and observational daily timeseries from GRDC*	*JCR depth damage curves*	*COSCV (Land Use Cartography of the Valencian Community) land use dataset, provided by ICV*	*Flood damage maps for different RP (10, 100, 500). The damage is expressed in monetary value (€)* *(Hazard output) Comparative maps of the expected extent and depth of a 500-year PR flood and the actual event of October 2024* *(Hazard output) Seasonal variations in river discharges in different climate scenarios (RCPs 4.5, 8.5)* *Absolute and relative change in extreme river discharges for RP 10 and 50 (RCPs 4.5, 8.5)*

2.3.1.1 Hazard assessment – Flood maps

The hazard assessment in this Phase 2 followed the workflow provided by the CLIMAAX Handbook, with some modifications to incorporate the refined datasets. First, the flood **hazard maps from the National Flood Zones Mapping System (SNCZI)** were used. This is an open-access map, in raster format (1m resolution) and projected in EPSG:25830, produced by the river basin authorities (Hydrographic Confederations) for the return periods of 10, 100, and 500 years. The files were manually downloaded from the National Geographic Institute's Download Center and saved in the working folder for later processing. To cover the area of Quart de Poblet and its surroundings, two files were downloaded for each return period. These are combined in the workflow using a "merge" function and then cropped with a bounding box to limit the study area and avoid unnecessary processing. This map includes all the watersheds (rivers and ravines) present in the municipality of Quart de Poblet. The maps for the three return periods are drawn to allow for comparison, incorporating the municipal boundary of Quart de Poblet into the map composition as a shapefile (based on the ICV's municipal boundary map).

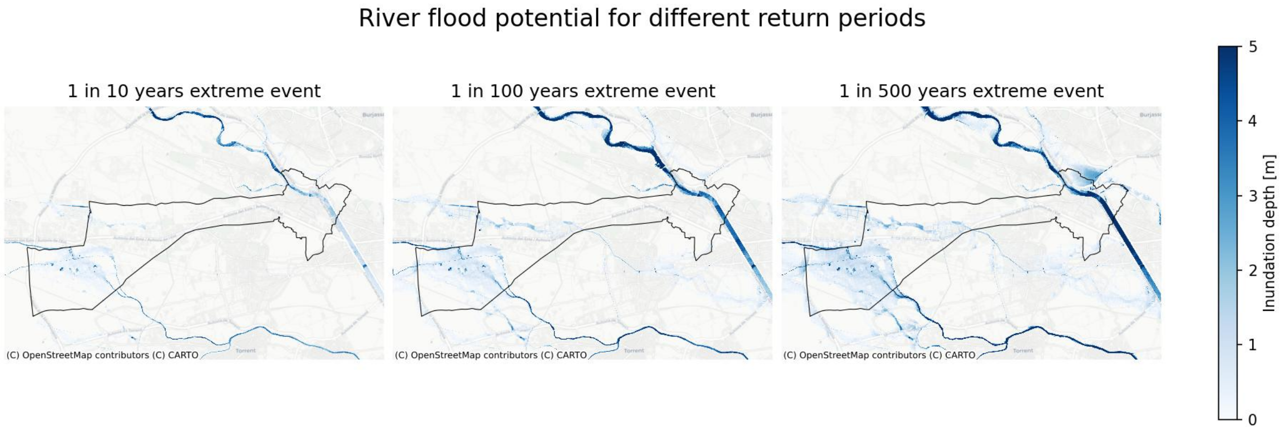


Figure 2 - 1 Flood extension and depth for the return periods of 10, 100 and 500 years.

There is a notable difference between the three return periods. Regarding the most unfavorable one (500 years), the greatest depths are reached in the Turia River; however, the floodwaters do not overflow their banks, so **no significant impact is expected on the town center**. However, a section of the V-30 and CV-369 roads at the entrance to the town of Quart may be affected. North of the V-30 (left bank of the Turia), an area prone to flooding due to the overflow of the *d'en Dolça* ravine is observed, affecting agricultural land. Conversely, the **Poyo, Gallego, and Saleta ravines** may experience **overflows affecting large areas**. The Saleta ravine, which originates in the neighboring municipality of Riba-roja de Túria, enters the Quart industrial area from the rural district of "La Canyada" (The Glen) and then turns south, entering Aldaia. With a 500-year return period, it affects approximately **0.9 km² of industrial and public land**, with depths reaching almost 2 m in some areas. Meanwhile, the Gallego, Les Basses and Poyo ravines form a complex to the west with a large spillway area (approximately **5 km²**), affecting **farmland, strategic infrastructure (wastewater treatment plant), and also part of the industrial area south of the A-3 highway**. Depths in this area average around 0.5 m but exceed 3 m in some places.

Compared to the results obtained in Phase 1, a representation of all watercourses within the municipality, both permanent and intermittent, has been achieved. The Saleta ravine is of particular importance, as its activation directly affects the industrial area. The higher resolution of the dataset allows for better delineation of flood-prone areas, as well as zones prone to greater flood depth.

Maps have been drawn for the same return periods (10, 100, and 500 years). The greatest difference compared to the flood-prone areas already identified by the JRC dataset is located on the left bank of the Turia River, as the SNCZI dataset shows a more gradual change between flood zones and a better-defined coverage. The SNCZI dataset also provides a larger area affected by the Poyo ravine and its tributaries (Gallego and Les Basses).

Following this observation, the analysis was expanded to include a **study of the expected hazard in relation to a high-impact flood event**: the DANA of October 29th (2024). This analysis is of interest because the flood event is considered to have exceeded the forecast for a 500-year return period. In this case, the data comes from the ICV as vector files (projected in EPSG:25830) representing the extent of the flooded area (polygon shapefile) and the water depth recorded at specific points (point shapefile). The files were manually downloaded from the ICV website. The extent layer was processed using a geometry correction function to resolve an issue and was clipped to the study area before being plotted alongside the 500-year return period map. The resulting figure shows a **greater extent of the affected areas than that defined by the SNCZI map**. The Poyo and Saleta ravines were the main cause of the flooding in the municipality during this event.

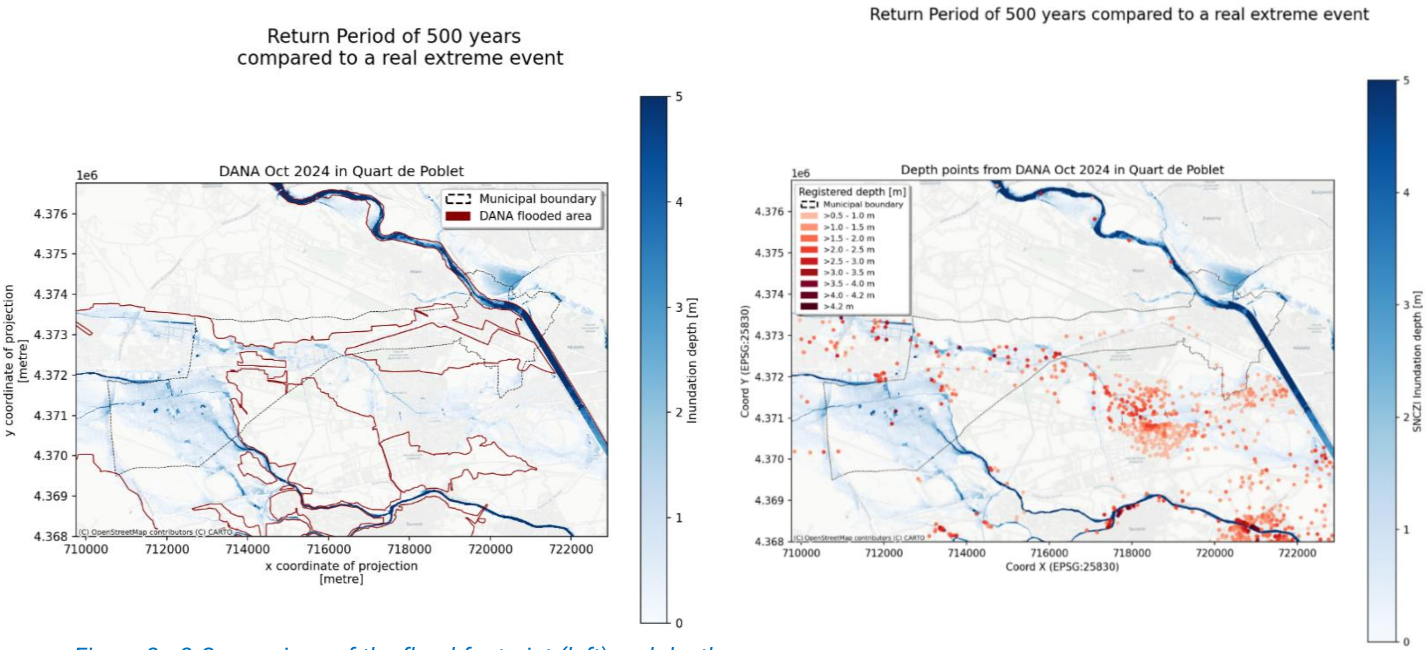


Figure 2 - 2 Comparison of the flood footprint (left) and depths (right) reached due to the DANA 2024 compared to what is expected for a return period of 500 years.

Depth measurements were provided by various sources (Risk Management Territorial Service, Institute of Valencian Edification, Polytechnic University of Valencia, City Councils, and others), resulting in four vector layers. These were combined and clipped to the study area. They are represented on the hazard map by classifying points with a color gradient. This allowed for the **identification of areas with the greatest depths**. The areas around the municipal wastewater treatment plant, where the Poyo ravine makes an almost 90° turn, and the Ciudad Mudeco Industrial Park, where the Saleta ravine reclaimed its former natural course, proved particularly problematic. Depths exceeded 2 meters in the first case and 3 meters in the second. The greatest recorded depths exceeded the scenario projected for the RP 500, **in some cases reaching double the expected depth**.

2.3.1.2 Hazard assessment – River discharges

The incorporation of this new workflow has allowed us to **expand the analysis of flood hazards under the effects of climate change**. The QCATI team has executed the hazard assessment and validation workflows with observations as designed. First, the sub-basins affecting Quart de Poblet were identified according to the EHYPE3 determination, and the availability of observational data from the CHJ gauging stations located in these catchment areas was verified. This verification led to the selection of the Turia River sub-basin in the vicinity of Quart, which includes the La Presa gauging station (Manises/Paterna), located approximately 7 km upstream from Quart de Poblet. The Poyo and Saleta ravine sub-basin was also selected, although it lacks station data for validation (see *Figure S-2 in the Supporting Documentation*).

Table 2 - 2 Study area definition for river discharges

	Code	Name	Station
Catchment	9724838	Turia river sub-basin	6227130 (La Presa, Valencia)
Catchment	9724966	Poyo and Saleta ravines	Not available

Data was accessed from the CLIMAAX cloud storage. Once the data was loaded and the sub-basin selected, **daily values from the 1991-2005 historical series** were plotted for the different hydrological models (00 to 07) and climate models (GCM-RCM) (*Figure S-3*). For the Turia sub-basin, the **average of the hydrological models** (catchment model) for the GCM-RCM combinations was plotted and compared with the observational data from the La Presa station (*Figure S-4*). It was observed that the data projected by the models were higher than the actual flow data. Subsequently, the **flow duration curve** was calculated for the same historical period (*Figure S-5*), verifying that the values recorded at the station were lower than those predicted by the models, below 130 m³/s. From this step onwards, it is decided to exclude 2 GCM-RCM combinations for the following steps of the analysis of the Turia sub-basin, since they comprise more extreme values (above 650 m3/s), while the rest of the combinations reach a maximum of 500 m3/s.

Next, the **seasonal variations in average monthly flow** (m³/s) for the different GCM-RCM combinations and their medians, for the historical, near, medium, and far periods are plotted (*Figure S-6*). Monthly flow values for the river range from 0 to 40 m³/s, and those for the ravines range from 0 to 3 m³/s. Compared to the historical period, the median values for both basins show a **slight decrease towards the end of the century**, especially in the RCP 8.5 scenario. The **discrepancy** in model values for the months of **September through December** is noteworthy. Meteorologically, these are the months in which the most intense storms typically occur on the Spanish Mediterranean coast. Furthermore, the greatest difference between the scenarios occurs in the long term. The CHJ, in its 2021-2027 River Basin Management Plan [5], includes projections of changes in river inflows (average of 6 climate projections and short- and medium-term impacts, 2039 scenario), calculated by the CEDEX Center for Hydrological Studies, which contribute to this reduction in flows for the study area (*Table S-1 in the S.Doc.*). As mentioned in Deliverable 1, climate change studies carried out for the CHJ area [3] describe a reduction in precipitation in the long term, and more markedly under the RCP 8.5 scenario, which will affect runoff and inflows in the basin. Regarding the validation of the **monthly flow distribution**, it should be noted that the data observed for the Turia River from 1971 to 2000 (*Figure S-7*) show a **virtually flat curve throughout the year**, reflecting the water management practices implemented by the CHJ across the basin. Regulation through reservoirs and demands for human, agricultural, and industrial supply impose an artificial flow regime, in contrast to the more natural regime of a Mediterranean river as reflected in the models.

Finally, the dataset allows for obtaining and plotting the **extreme discharge values** of the basins for different return periods (10 and 50 years) in the RCP 4.5 and 8.5 scenarios. The plotting of the absolute change values can be seen in *Figure S-8*. These results can be compared with the **maximum flow values**[4] **used by the Spanish authorities** to develop flood hazard maps, although it is important to note that their definition of basins is not the same as that used in this workflow.

Table 2 - 3 Comparison of maximum flow rate values (m^3/s) at T=10

Catchment	***CHJ Hydrologic study (peak flow)***	**GCM-RCM combination model projections (median values)**						
		Historic	RCP 4.5			RCP 8.5		
			Near	*Mid*	*Far*	*Near*	*Mid*	*Far*
Turia	*678*	*398*	*483*	*491*	*511*	*416*	*524*	*373*
Poyo / Saleta	*179 / 18*	*85*	*108*	*114*	*91*	*94*	*100*	*84*

As can be seen, the projected m^3/s values for the Turia River are lower than the maximum flow rate considered by the CHJ for T=10. Furthermore, the CHJ provides individual values for the Poyo and Saleta ravines, while the workflow considers them as a single basin. However, it is worthwhile to consider the potential future trends for the basins under the projected scenarios.

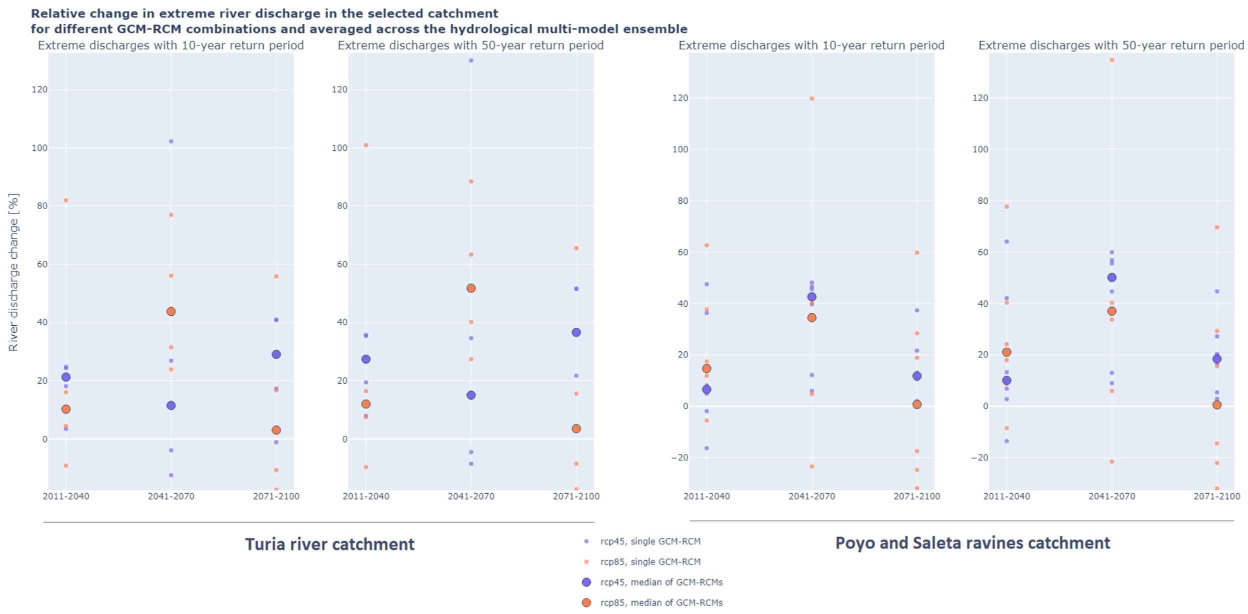


Figure 2 - 3 Relative change in extreme discharges (return periods 10 and 50) in the sub-basins of the Turia River and the Poyo and Saleta ravines, for different combinations of GCM-RCM under the RCP 4.5 and 8.5 scenarios.

[4] The maximum flows provided by CEDEX are the basis for preparing the flood hazard maps (SNCZI), although due to certain limitations of the calculations, the basin authorities such as the CHJ have required to carry out some complementary hydrological studies to prepare the cartography. Information available at: https://www.chj.es/es-es/medioambiente/GestionRiesgosInundacion/Paginas/Plan-vigente-y-cartograf%C3%ADa-de-zonas-inundables.aspx

Thus, the relative change values (above) generally show an **increase in the extreme discharge** of the river and the ravines for the different RPs, based on the medians of the model combinations used. The values are somewhat higher for RP 50. All the medians of the GCM-RCM are positive (>0%), even though some individual models have negative values. The trend for the **Poyo and Saleta** ravine basin points to an increase in the medium term and a reduction at the end of the century for both scenarios and return periods. For the **Turia River**, RCP 4.5 shows a smaller change in the medium term and an increase in the long term, while RCP 8.5 shows a very marked change in the medium term, which decreases in the long term. Given the dispersion of individual values in the graphs, there is greater **uncertainty** in the projections for the Turia River in the medium term for RCP 4.5, and for the short and long term for RCP 8.5. For the ravines basin, the RCP 8.5 shows a greater dispersion of values in the medium and long term. Comparatively, these outputs differ from the results of the climate projection study by Miró et al. [3] on extreme precipitation in the Júcar River Basin (causing river flooding), which shows an increasing trend in the short to medium term in the middle section of the Turia River (especially under the RCP 4.5), and a marked decreasing trend in the Valencia area in the long term, especially under the RCP 8.5.

Regarding the results obtained for a 250-year return period event with **Aqueduct Floods** in the Phase 1 of the project, which showed a reduction in the expected depth in the long term (RCP 8.5), and negative values when comparing the projected flood depth and the baseline depth for both scenarios, we see that in this case the projected extreme flows increase with respect to the reference period, which would increase the depth.

2.3.1.3. Risk assessment

The workflow has been adapted to the local context by using the **SNCZI flood potential mapping** (seen in the hazard analysis) and incorporating a **land use dataset specific to the Valencian Community**. The methodology for calculating economic damages has been maintained. Thus, the exposure data corresponds to the land use mapping (COSCV) provided by the ICV. The dataset corresponds to the year 2023 and is provided in vector format (.gpkg), projected in EPSG:25830. The file must be downloaded manually from the ICV website.

Since the damage calculation methodology was retained, it was necessary to establish a **correspondence** between the land use classes present in the Excel spreadsheet *LUISA_damage_info_curves_[area name].xlsx* (46 classes) and the classes defined by the ICV map (89 classes for the area selected during the download process). **A LUISA code was manually assigned to each of the COSCV classes**, seeking the best match. Once this information was entered into the attribute table, the vector file was converted to raster format, with a spatial resolution of 5 m, using GIS software. The raster file was saved in the Workflow's working folder and processed to crop it to the area of interest, using the bounding box defined by the hazard map.

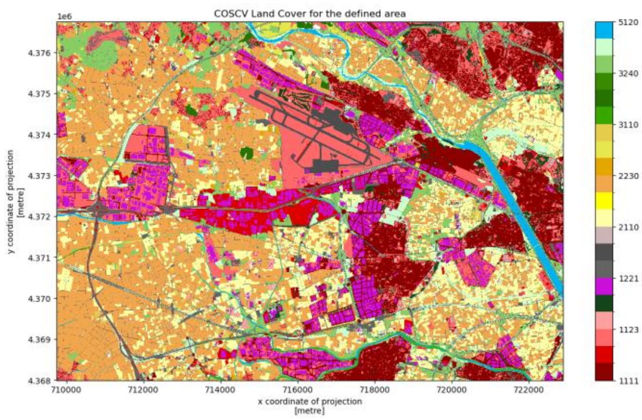


Figure 2 - 4 COSCV land use map adapted to LUISA's classes.

From this point, the **damage curves provided by the JRC** are used, as in Phase 1. Using the *LUISA_damage_info_curves.xlsx* template, a monetary value is assigned to the land use categories, allowing for the calculation of potential losses in €/m². To adapt this template to the local context, the GDP per capita of the Valencian Community (€26.453 in 2023) has been used. Finally, the DamageScanner Python library is used to **calculate the risk** for each available return period (10, 100, and 500 years), and the results are plotted. In this case, the code line dividing the damage data by 10M has been modified, as our economic values are lower. It can be observed that the area with the **greatest economic damage** is the **industrial zone affected by the Saleta and Poyo ravines**. The Supporting Documentation shows the results that combine the hazard map and the exposure map for return periods of 10, 100 and 500 (*Figures S-9 to S-11*).

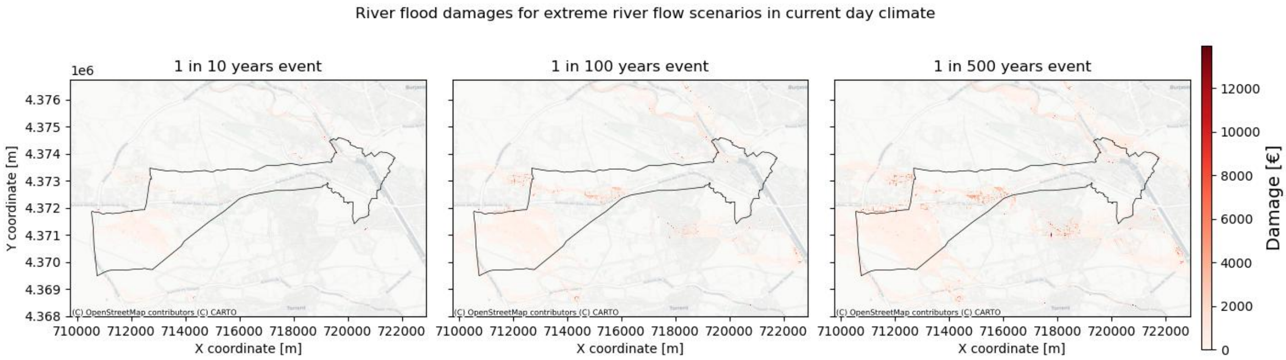


Figure 2 - 5 River flood economic damages for the 10, 100 and 500 year return periods.

Comparing this to a real flood damage case, the example of the Molí de la Vila Auditorium illustrates the impact of a T500+ flood (DANA 2024) on a cultural facility. While the workflow results do not account for the impact on the auditorium itself, the damage to its surrounding area (for a use characterized as *high-density urban fabric*) is estimated at up to €10.000/m². However, municipal reports value the flooding damage to the auditorium's ground floor (where the water reached 2.5m) at approximately €1.500/m², including both structural and material damage.

As discussed in Deliverable 1, the initial risk analysis was limited due to the shortcomings of the hazard maps, which did not cover all the watercourses in the municipality. This problem has been resolved, and a more detailed land use distribution has been achieved with the ICV map. **The combination of the new datasets has resulted in a much more refined risk assessment**, with a more accurate delineation of the areas that suffer damage and a more realistic calculation of economic losses due to flooding. As can be seen, the monetary scale of damages has been significantly narrowed due to the greater granularity of the data. However, considering the example mentioned before, there is still room for improvement in the assessment of damages.

2.3.2 Hazard #2 HEATWAVES - finetuning to local context

Table 2 - 4 Data overview workflow #2

Methodology	Hazard data	Vulnerability data	Exposure data	Impact metrics/Risk output
Hazard assessment	*Scenarios-PNACC 2024 dataset:* *Grid projections by bias-adjusted EURO-CORDEX (CMIP5) [scenarios RCP 4.5 & RCP 8.5]* *and by statistical methods (CMIP6) [scenarios SSP2-4.5 & SSP5-8.5]* *Files in csv and netCDF format.*	…		*Graph for the evolution of the maximum duration of heatwave days from 2006 to 2100, under the scenarios RCP 4.5 and RCP 8.5, and from 2015 to 2100 from 2006 to 2100, under the scenarios SSP2 4.5 and SSP5 8.5*
Risk assessment *(satellite-derived data)*	…	*Population aged 65 and over, by census tracts*	*Satellite-derived land surface temperature data based on land surface temperature (LST) calculated from Landsat 8 imagery & Vector layer of vulnerable places*	*Map of possible heat risk level to vulnerable population*
Risk assessment (climate change)	*Scenarios-PNACC 2024 dataset:* *Grid projections by statistical methods (CMIP6) [scenarios SSP2-4.5 & SSP5-8.5]*	*Population aged under 5 and over 65, by municipalities (prepared from INE data)*		*Map representing change in the risk due to the duration of heatwaves and vulnerable population in the province of Valencia*

2.3.2.1 Hazard assessment

The QCATI team has sought to improve the assessment of heatwave hazards in Quart de Poblet using the CLIMAAX Handbook's proposed EuroHEAT methodology. The newly incorporated data belongs to the **PNACC Scenarios 2024 project**, which compiles regional climate information for Spain, including both current climate data and future scenarios under climate change. AEMET is the institution responsible for coordinating and developing this component of the National Climate Change Adaptation Plan. Within this framework, AEMET and the CSIC (Spanish National Research Council) have developed climate change scenarios for Spain. The information generated is accessible through the AdapteCCA web portal of the Spanish Office for Climate Change. The PNACC scenarios have been developed using two methodologies:

- Dynamic downscaling: EURO-CORDEX models are fitted to a 5 km resolution grid using a bias adjustment technique (ISIMIP3), with a national observational grid (ROCIO_IBEB) as the reference. RCP scenarios are used.
- Statistical downscaling: Based on the latest generation of global CMIP6 models (the six models selected by EURO-CORDEX), various statistical techniques are applied, and the national grid (ROCIO_IBEB) is used as the observational reference. SSP scenarios are used.

Using the results obtained by AEMET and CSIC under these two methodologies, we studied the variable "**maximum duration of heatwaves**" measured in days. The definition used is: *a period of at least 5 consecutive days in which the maximum temperatures exceed the 90th percentile of the reference climate period (1971-2000)*. In this respect, the definition differs from that used by EuroHEAT: *a period where the maximum apparent and the minimum temperature is over the 90th percentile of the monthly distribution (based on 30-year time series of daily temperatures in the recent historical climate (1971-2000)) for at least two days*.

First, to study the occurrence of heatwaves under different future scenarios, data in **Excel** format was downloaded directly from the **AdapteCCa Viewer** (*Figure S-12*) for Quart de Poblet. To do this, the display options (Data / Variable / Scenario / Season-Month) were adjusted as follows:

- Gridded CMIP5 projections (adjusted EURO-CORDEX) - ensemble mean / Maximum heat wave duration / RCP 4.5 and RCP 8.5 / Full year
- Gridded CMIP6 projections (statistical methods) - ensemble mean / Maximum heat wave duration / SSP2 - 4.5 and SSP5-8.5 / Full year

The downloaded files have been processed in the Workflow to convert them into .csv, containing the values **"year" and "average"**, which have been used to plot a bar chart for each methodology.

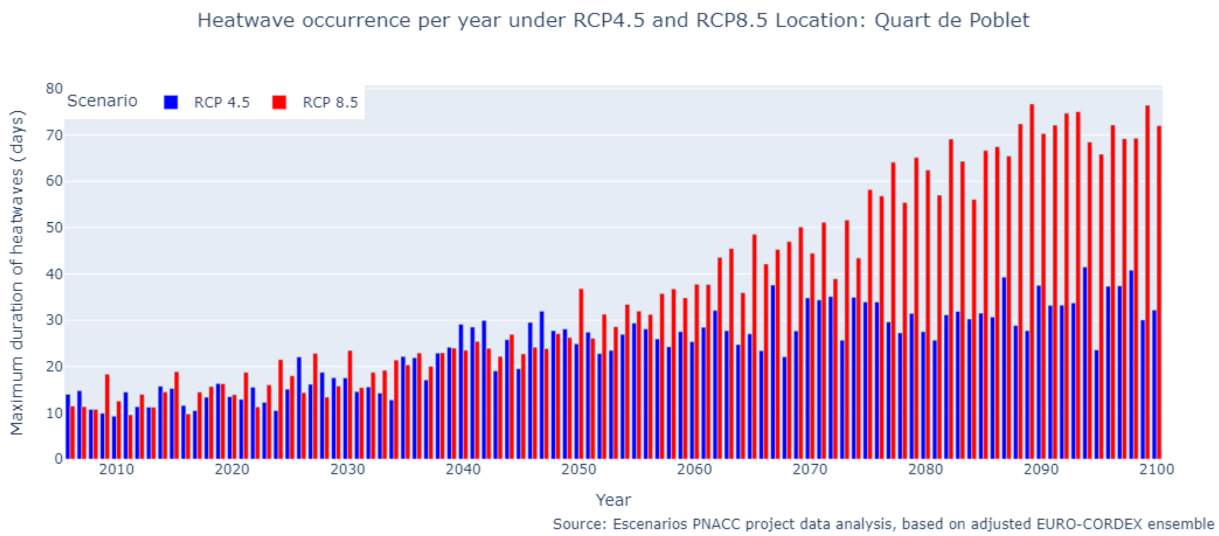


Figure 2 - 6 Evolution of the maximum duration of heatwaves under the RCP 4.5 and RCP 8.5 scenarios by a dynamic downscaled dataset (adjusted EURO-CORDEX), period 2006-2100.

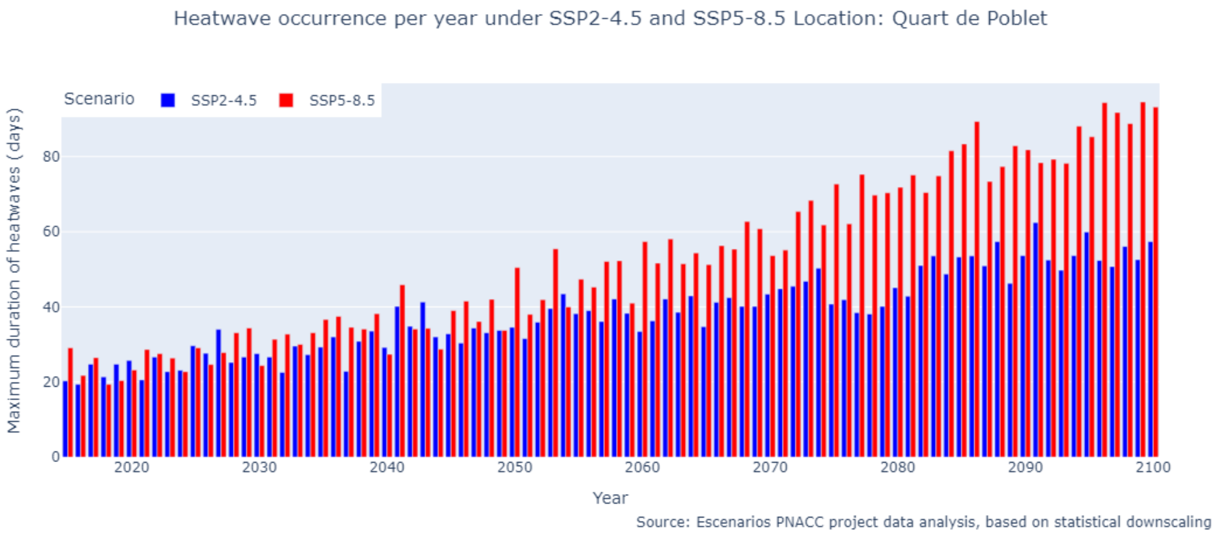


Figure 2 - 7 Evolution of the maximum duration of heatwaves under the SSP2-4.5 and SSP5-8.5 scenarios by a statistical downscaled dataset (ESD-RegBA method), period 2015-2100.

The data representation clearly shows that the trend under the different scenarios in both methodologies is toward **longer heatwaves throughout the 21st century**. As already observed in the Phase 1 assessment, the difference between the emissions scenarios increases from mid-century onward, with RCP 8.5 and SSP5-8.5 being the most unfavorable. The **variable is not directly comparable** to the one used in the previous phase of work (number of heat wave days), which measures the total number of days meeting the heat wave criteria, and the definition of a heat wave is also different, but **the trend in the results is similar**. Furthermore, when comparing the two PNACC-Scenarios methodologies, it is noteworthy that the statistical downscaling yields higher values.

Table 2 - 5 Results of the different methodologies on the occurrence of heatwaves (days of heatwave and maximum duration of heatwaves) under different climate scenarios.

Phase	*Methodology*		*RCP 4.5*		*RCP 8.5*	
			2025	*2100*	*2025*	*2100*
1	*EuroHEAT (EURO-CORDEX) Number of heatwave days*		*11*	*30*	*12*	*62*
2	*PNACC-Scenarios Maximum duration of heatwaves*	*CMIP5 projections (adjusted EURO-CORDEX)*	*15*	*32*	*18*	*72*
		CMIP6 projections (statistical methods)	**SSP2-4.5* 30*	**SSP5-8.5* 57*	**SSP2-4.5* 29*	**SSP5-8.5* 93*

Furthermore, the AdapteCCa **THREDDS** service was accessed to obtain **data in netCDF format, which can be displayed on a map**. From this server, the files generated within the framework of the Scenarios-PNACC 2024 project for the two downscaling methodologies discussed can be downloaded. In this case, we used the files for the "*tasmaxhwdmax*" variable for the CMIP6 grid projections. Files were obtained for the SSP2-4.5 and SSP5-8.5 scenarios. These files were processed in the Workflow to **average the 11 models** (members) that make up the ensemble, taking the annual data and extracting the data into GeoTIFF files. Subsequently, the GeoTIFF was used on an interactive map to select the pixel corresponding to the urban center of Quart de Poblet and plot the climate projection data for the variable (*Figure S-13*), as can be done in the Phase 1 hazard Workflow with the EuroHEAT data.

2.3.2.2 Risk assessment

- **Satellite-derived Data**

The QCATI team has refined this workflow by incorporating **local data on the vulnerable population**. The Quart de Poblet Municipal Register Office was asked to provide available information on the spatial distribution of people over 65 years of age in the municipality. The Office was able to provide this data, broken down into five-year age groups, in Excel format for each of Quart's census tracts (21 in total, *Figure S-14*). In Spain, a census tract is a territorial unit smaller than a municipality, used for disseminating statistical information (e.g., census data) and also for organizing electoral processes.

Following the Workflow, the data used to calculate exposure is that provided by **RSLab Portal**, as was done in the previous phase of the project. Landsat 8 images with NDVI-based emissivity (30x30m resolution) were used for the months of June, July, and August. While the images for 2022, 2023, and 2024 were downloaded in Phase 1, this phase also incorporates the summer of 2025. Our new vulnerability data has been incorporated into the Workflow, projected onto the local CRS (EPSG: 25830). Therefore, the raster stack generated with the L8 images is transformed and cropped using new code blocks to ensure proper operation. The cropping is performed using a bounding box specifically generated for this purpose. Considering the minimum and maximum temperature values contained in the exposure dataset (41ºC and 54ºC respectively), **the reclassification of values from Phase 1 has been maintained**.

Regarding the vulnerable population data, using the values provided by the Municipal Register Office and the census tract maps supplied by the National Institute of Statistics (INE) in vector format, **a shapefile was prepared in GIS software**. This shapefile was then **converted to raster** format (EPSG: 25830, 5x5m resolution) for inclusion in the Workflow. The population raster, which had been generated for the entire municipality, was cropped to the study area, comprising the town center and the Cristo neighborhood. This cropping was performed using the same bounding box generated previously. Since only the census tracts of Quart have assigned numerical values, the NaN values corresponding to neighboring municipalities are represented without color. The population data were reclassified into **10 classes**, following the scheme of Phase 1.

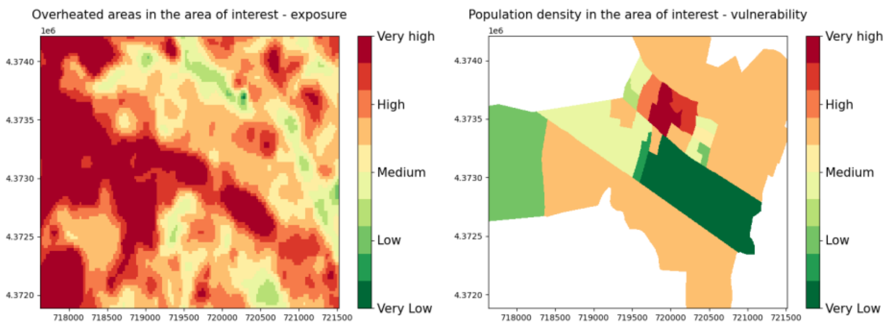


Figure 2 - 8 Representation of exposure and vulnerability variables: overheated areas and distribution of the vulnerable population by census tracts.

To apply the (10+10) risk matrix, the reclassified LST and vulnerable population density **datasets must be summed**. Before summing, due to differences in the datasets, **two adjustment processes** were necessary. Since the grids in these rasters have different resolutions (24.5x24.5 in risk_LST and 5x5 in risk_pop), a **resampling** was performed on the population dataset. Furthermore, population values are only available within the municipal boundaries of Quart de Poblet. To prevent NaN population values from interfering with the risk summation, a **masking** function was applied to risk_LST. Finally, the processed datasets were summed. The map layout is supplemented with a vector layer showing the buildings of Quart de Poblet (in light gray) as a visual guide, as well as a vector layer to represent the **infrastructures that are considered critical** because they have vulnerable users, such as sociocultural centers, residences, health centers, sports facilities, parks and squares (in dark gray), so that it can be determined whether they are located in areas of greater or lesser risk.

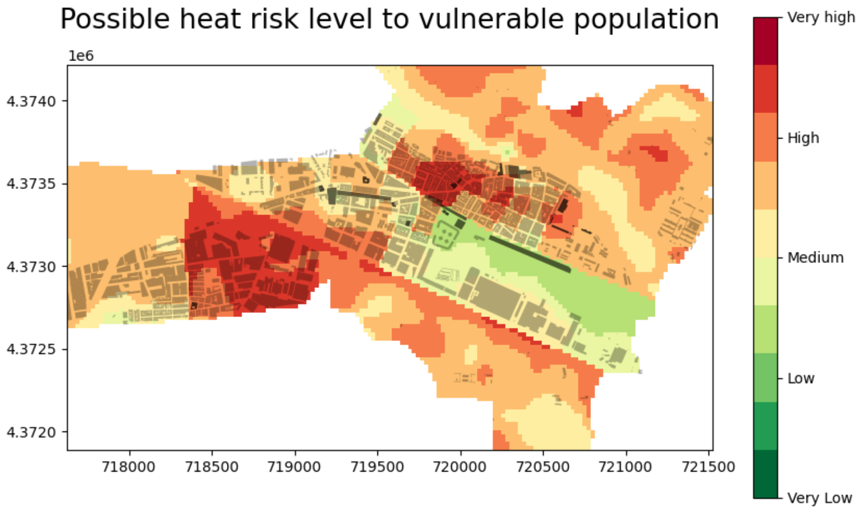


Figure 2 - 9 Risk map for extreme heat in the urban center of Quart de Poblet, Cristo neighborhood and some industrial areas.

Regarding the results obtained during Phase 1, a more detailed distribution of risk zones has been achieved, and the change is quite significant. **Comparatively**, the results of Phase 1 indicated a low-to-medium risk for the entire residential area of the town center and the Cristo neighborhood. The areas classified as medium-to-high risk corresponded to the industrial zones. However, **by incorporating local population data, we see where vulnerable elderly people are actually concentrated**, especially the historic center and its surroundings, which are therefore marked as high-risk zones (even though they do not reach temperatures as high as other areas). The Cristo neighborhood is also considered high-risk, as it does reach higher temperatures due to its location within an industrial area and also has an elderly population. A comparison of the results of both phases is provided in *Figure S-16* (Supporting Documentation). This variation in the workflow has allowed for the **identification of risk areas with a greater level of detail and accuracy**. This information is considered especially useful for public managers, as it allows them to prioritize adaptation actions according to the needs identified in each area.

- **Climate Projections**

This workflow presents a risk assessment at the regional level (province of Valencia) that has been refined by incorporating local data on both hazard level and vulnerable population. As in the Hazard Workflow, the new climate projection data incorporated belongs to the **PNACC Scenarios 2024** project. Datasets (in netCDF format) corresponding to the ***tasmaxhwdmax*** variable (maximum duration of heatwaves) from the CMIP6 grid projections were downloaded from the AdapteCCa THREDDS web portal for scenarios **SSP2-4.5 and SSP5-8.5**. These projections, based on the ESD-RegBA statistical method for downscaling, have a spatial resolution of 5x5km. The value they represent is the maximum number of consecutive days in which the temperature exceeds the 90th percentile of the climate.

The **datasets were processed** in the workflow to extract average data for the 11 models comprising the ensemble, broken down by period: reference (1971–2000), near future (2011–2040), medium future (2041–2070), and distant future (2071–2100). For the future scenarios, the relative change compared to the reference period was calculated. Next, zonal statistics were calculated, incorporating the municipal boundaries of the province of Valencia. By reclassifying the values from 1 to 10 (very low to very high), the magnitude of change was obtained. The resulting figure is found in the Supporting Documentation (*Figure S-17*).

Next, the **vulnerable population data** was incorporated into the workflow. For this, official data from the 2024 INE population census was used to obtain the number of inhabitants under 5 years of age and over 65 years of age in each municipality of the province of Valencia. The data, originally in Excel format, was processed outside the workflow to create a shapefile of the municipalities with a column representing the sum of the vulnerable population. When the GeoDataFrame was imported into the Workflow, this population data was reclassified into 10 classes using the natural breaks method, which adequately represents the differences in population density among the Valencian municipalities (*Figure S-18*). Finally, the 10+10 matrix was applied to the reclassified hazard and vulnerability data to obtain the risk maps (*Figure 2-10*, below).

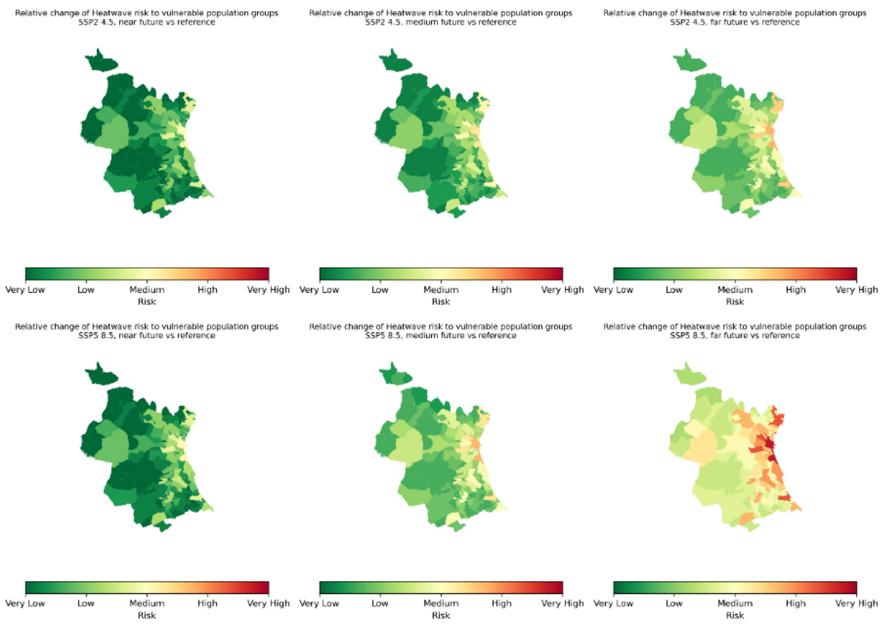


Figure 2 - 10 Change in the risk due to the duration of heatwaves and vulnerable population in the province of Valencia under the SSP2-4.5 and SSP5-8.5 scenarios.

The relative change in risk becomes more pronounced as the century progresses, and even more so under the SSP5-8.5 scenario. **The area most affected by the increased duration of heatwaves is the coastal arc**, where Quart de Poblet is located. The risk level in the municipality ranges from low to medium under the SSP2-4.5 scenario, and from low to high under the SSP5-8.5 scenario. These processes have been replicated in the workflow, carrying out the risk assessment also for the Mancomunitat de l'Horta Sud, comprised of 20 municipalities, including Quart de Poblet (*Figure S-19*).

When **comparing the results with the analysis carried out in Phase 1**, it is important to note that the maps were not created using the same variable (number of heat wave days in Phase 1 / maximum heat wave duration in Phase 2), and that the definition of a heat wave also differs between the EuroHEAT methodology and that used by PNACC Scenarios, as mentioned in previous sections. Regarding the **magnitude of change** in the variables, in Phase 1 the most affected areas were found in the central and southern parts of the province, while with the new varaible, the most affected areas are located in the eastern half. Regarding **population data**, the WorldpopHub dataset proved inadequate for representing the distribution of vulnerable population density, as it yielded very low values for the entire province and concentrated medium-to-high values only around the capital (Valencia), presenting highly unequal density values among municipalities that share a similar population structure. The census data used in this phase has allowed for a more realistic identification of the differences between municipalities. Due to these changes, **the risk maps differ from those of Phase 1**. The highest risk area has shifted from the south of the province (the Costera, Vall d'Albaida, and Ribera Alta regions) and the Valencia metropolitan area, to the coastal and pre-coastal regions, particularly from Xàtiva to the Valencia metropolitan area.

2.3.3 Hazard #3 HEAVY RAINFALL

The heavy rainfall risk assessment is incorporated in this Phase 2 of the project, as it is a risk especially linked to the river flooding risk (already analyzed) and due to its impact in generating floods in urban and industrial areas of Quart de Poblet.

Table 2 - 6 Data overview workflow #3

Hazard data	*Vulnerability data*	*Impact metrics/Risk output*
GCM-RCM bias-corrected pre-calculated datasets (EURO-CORDEX) for Precipitation IDF	*Critical impact-based rainfall threshold associated with a return period*	*Expected changes in magnitude and frequency for scenarios RCP 4.5 and 8.5 and 3 future periods*

2.3.3.1 Risk assessment

The QCATI team followed the guidelines of the *Extreme precipitation: Changes under climate scenarios workflow [Risk assessment]* to obtain results for the specific location of Quart de Poblet. First, a study on episodes of heavy rainfall that occurred in the municipality was conducted to establish a critical impact threshold (98 mm/24 h, T=5). Official information on maximum rainfall by return period[5] and on the alert thresholds established by AEMET was also investigated (information available in Zenodo, file: *Record-extreme-rainfall-Quart.xls*).

Path A of the Workflow has been followed, using the pre-calculated European datasets. Magnitude and frequency changes were calculated for the three available GCM-RCM combinations, for the RCP 4.5 and 8.5 scenarios, and for the three available future periods. The reference period was 1976–2005, and the rainfall duration was 24 hours. The results of the expected magnitude changes at the critical rainfall threshold for each model, as well as the average of the models, are presented below. A table with all the results for magnitude and frequency changes is provided in *Table S-2*.

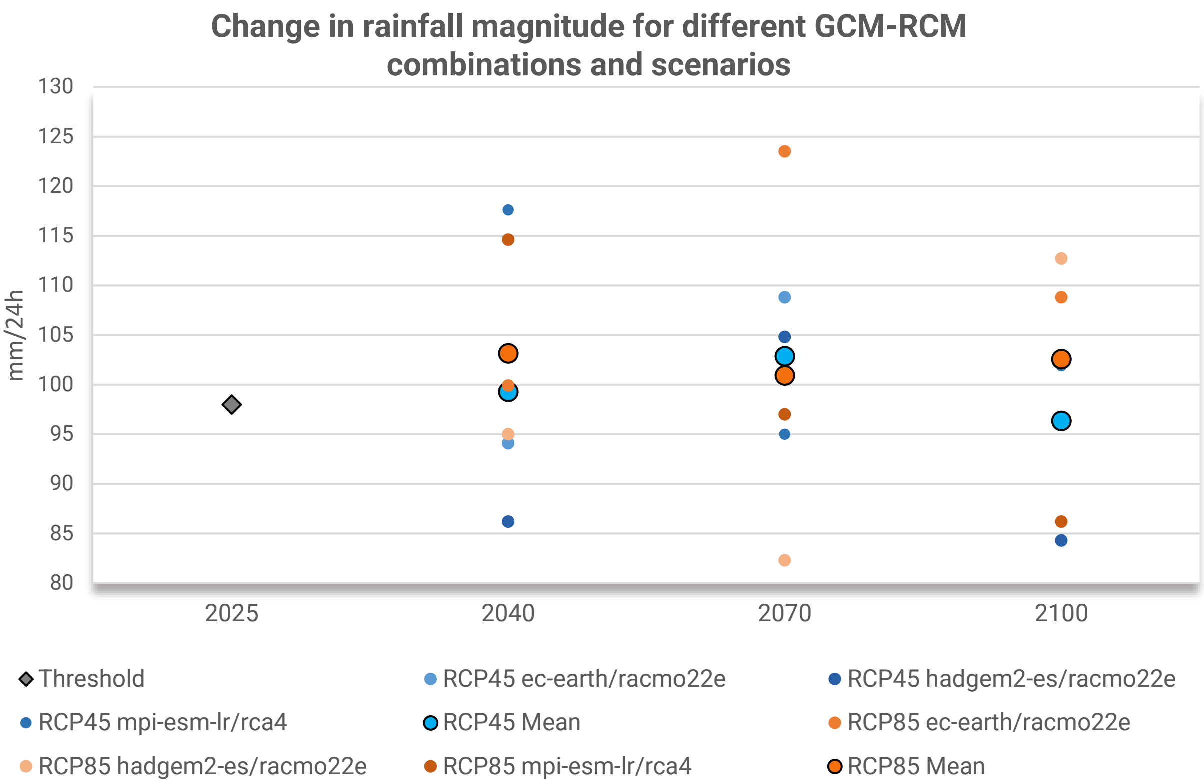


Figure 2 - 11 Change in the magnitude of rainfall if the T5 frequency is maintained, for different scenarios and combinations of GCM-RCM.

[5] Calculated from CEDEX and the methodology established in *Maximum daily rainfall in Peninsular Spain* (Ministry of Development, 1999).

There is significant variability among the responses of the different models, so the **mean** was calculated. If the event frequency is maintained (T5), the models show an **increase in magnitude** in future periods, with the exception of the 2100 horizon under RCP 4.5. Regarding **changes in frequency**, if the magnitude is maintained (threshold of 98 mm/24 h), return periods tend to remain the same or increase (from 5 to a maximum of 8 years) under RCP 4.5, resulting in an equal or lower frequency of occurrence. Under RCP 8.5, there is greater uncertainty in the near future, a tendency towards a lower frequency in the medium term, and a higher frequency in the distant future (reduction from 5 to 4 years). In general, **an increase or maintenance of the return period is more common than a reduction**: 72% of the results indicate an equal or lower frequency of occurrence, compared to 28% indicating a higher frequency.

To broaden the perspective of the analysis carried out with this Workflow, the QCATI team consulted other studies on the **future evolution of heavy rainfall in Spain**, primarily the **CEDEX** report [6] and its associated maps, which document the mean quantile change rates in annual maximum daily precipitation for different return periods (10, 100, and 500 years). The QCATI team consulted the T10 data for Quart de Poblet, which show **positive change rates in the medium and long term**, ranging between 7% and 11%, for the RCP 4.5 and 8.5 scenarios, indicating greater intensity (*Figure S-21*). However, this report clarifies in its conclusions that "*change rates cannot be considered directly related to climate change*" due to the uncertainty of calculations with small sample sizes and the variability of climate model results. According to the study, **statistically significant changes** (related to climate change) **do not occur in the eastern Iberian Peninsula**.

2.4 Key Risk Assessment Findings

2.4.1 Mode of engagement for participation

The risk evaluation process was designed not as a purely technical exercise, but as a collaborative, multi-stakeholder process. While the initial assessment produced regionalized risk analyses, including hazard, vulnerability and exposure maps and models, these outputs were presented to local stakeholders to integrate experiential knowledge and local context into the evaluation. This approach aligns with the CLIMAAX participatory methodology, which emphasizes co-creation of risk knowledge and stakeholder validation of scientific results. The method for involving stakeholders is explained in section 2.1.5. Regarding **feedback** on the risk assessment, we can point out the following:

- The **local Environment Council** considered that the greatest current and future severity corresponds to heatwaves, assigning a more moderate role to water-related risks, although acknowledging their potential increase in intensity in the coming decades. Consequently, they considered immediate action necessary regarding the heat risk, further action regarding flooding, and monitoring of the risk of extreme rainfall. From their perspective, there is a high capacity to act at the municipal level regarding heatwaves and flooding, taking into account the powers related to urban planning and the municipal section of the Turia River. Regarding the risk of extreme rainfall, they considered a medium capacity due to the more sudden occurrence of these phenomena and the time required to manage the weather warnings issued by AEMET (the Spanish State Meteorological Agency) at the local level. The highest priority was given to the risk of heatwaves, followed by flooding (with particular attention to the Poyo ravine), and in third place, heavy rainfall.

- A formal assessment was not conducted with the **elderly population**; however, their input made it clear that the risk of heatwaves has increased significantly in recent decades, a fact they have a very clear perception of. They highlighted situations such as going from not needing air conditioning to being highly dependent on it during the summers; not being able to go outside at certain times; and that summers are longer or that there is no longer a distinct spring and autumn. They emphasized the need for more wooded areas or climate shelters available in the city. Regarding water-related risks, they noted that rainfall used to be different, less intense and concentrated in specific periods. They are particularly concerned about the effects of flooding in the city center due to the overflowing of the Turia River, following the impact of the 2024 DANA storm. They consider urban planning that does not conflict with flood-prone areas to be essential and view flood prevention measures as positive.

The QCATI team has taken all these considerations into account, as well as the City Council's internal perspective, to carry out the conclusive risk assessment for this phase of the work.

2.4.2 Gather output from Risk Analysis step

At the local level, the stakeholders primarily belong to the public administration sector and civil society in Quart de Poblet. The individuals to whom the risk analysis information is intended are not closely involved with climate change and its associated risks studies, but they are key agents for the municipality's preparedness and adaptation. Therefore, key outputs from the Risk Analysis phase have been selected to facilitate the assessment process.

Table 2 - 7 Risk Analysis outputs used for Risk Evaluation.

Risk	*Output*
River floods	*SNCZI return periods (Figure 2-1)* *Absolute change in extreme river discharges for Turia river and Poyo and Saleta ravines (Figure S-8, Support Documentation)* *Expected river flood economic damages (Figure 2-5)*
Heavy rainfall	*Change in rainfall magnitude (Figure 2-11)*
Heatwaves	*Evolution of the maximum duration of heatwaves (Figure 2-6)* *Possible heat risk level to vulnerable population (Figure 2-9)* *Change in the risk due to the duration of heatwaves and vulnerable population in the province of Valencia (Figure 2-10)*

2.4.3 Assess Severity

River flooding risk: Currently, the Valencian authorities have classified Quart de Poblet as having a **high level of flood risk**. This risk affects the municipality through various waterways (river and ravines) and threatens natural, agricultural, industrial, and urban areas, as well as key transportation routes and infrastructure. Its impact is more frequent on certain industrial areas and associated roads due to the effect of ravines. The **frequency** with which this risk causes problems in the municipality is medium, associated with episodes of intense rainfall, especially in the autumn, with **impacts** that generally range from low to medium, including flooded areas, traffic disruptions, and damage to industrial facilities with the resulting economic losses. On exceptional occasions, rescue operations have been required. The DANA flooding episode of 2024 resulted in the recovery of 7 deceased people in Quart de Poblet. Those consulted also expressed concern about chain effects such as pollution from the runoff of waste and toxic materials with floods.

Potentially, these impacts may increase in the medium term, according to climate projections, although there is a significant level of uncertainty regarding this phenomenon.

Heatwave risk: Considering current trends, heatwaves are a **growing risk**. These phenomena are typical of the Mediterranean climate and occur periodically during the summers; however, their intensity (the temperatures reached) is increasing, as is their annual distribution, since extreme heat begins earlier in the summer season (June) and extends into autumn (October) [4]. Regarding their effects on human health, an estimated 3.832 deaths attributable to excessive temperatures were recorded for the summer period (May 16 to September 30) of 2025 in Spain[6] (434 in the Valencian Community), with 95.98% of those affected being over 65 years of age, highlighting the significant impact of this climatic phenomenon. Given the large elderly population of Quart and its spatial distribution, the areas most affected by this risk have been identified. When this population group was consulted, they highlighted changes they have experienced throughout their lives, such as air conditioning becoming a necessity they did not have years ago, the spring and autumn seasons seeming to be disappearing, and the fact that during the summer there are hours when they cannot go outside.

Potentially, the risk increases progressively as the century progresses. Furthermore, as a cascading effect, rising temperatures and the temperature of the Mediterranean Sea are generating more intense and destructive rainfall events. Extreme heat also favors the occurrence of forest fires, which could affect the forested area of Quart, and promotes a greater proliferation of pests, which is why the City Council is already carrying out more intensive preventive treatments during the summer.

Heavy rainfall risk: The climate of the Valencian Community is prone to torrential rainfall events. The summer heat accumulates energy in the atmosphere, intensifying the hydrological cycle and increasing the number of extreme, high-intensity rainfall events, which can in turn cause catastrophic flooding [2]. The municipality has a large amount of impermeable surface area (urban, industrial, and transportation infrastructure), where rainfall can cause significant problems in specific locations. In Quart, these events are frequent in the autumn and can disrupt daily life: flooding of low areas, basements, and garages; disruption to roads and traffic; flooded industrial areas; cancellation of classes and events... This is compounded by the activation of ravines during torrential rains, which increases the flooded areas, with the Saleta ravine being particularly problematic, although this phenomenon is less frequent and depends on the rainfall that also occurs upstream. Authors such as Camarasa et al. [2] have demonstrated a trend toward increased rainfall intensity in recent decades (1989-2016) in the CHJ area. The older population of the municipality has also commented that it now rains differently compared to 50-60 years ago, in a more concentrated way over time.

[6] https://www.lamoncloa.gob.es/serviciosdeprensa/notasprensa/sanidad14/paginas/2025/021025-garcia-calor-extremo-mortalidad.aspx

Potentially, the models point to a greater intensity of maximum rainfall (up to +26% in the most pessimistic outcome), especially in the medium term, although there is significant uncertainty in the results.

2.4.4 Assess Urgency

River flooding risk: The expected change implies an increase in the magnitude of river floods under climate change scenarios, especially in the medium term (2041-2070), with relative change values of up to 50%. This worsening represents an increased risk. Because it is associated with sudden events (torrential rains), there is less time to respond to the emergencies it may cause, making preparedness and prevention measures essential. This is also the view of the stakeholders consulted, who agreed that more action is required. According to projections, in the long term there would be a more regressive trend, although the relative change would remain positive.

Heatwave risk: The severity of heatwaves is undergoing a progressive but significant and persistent change, with the situation worsening considerably as the century progresses. Under RCP4.5/SSP2-4.5, the duration of heatwaves doubles from today until the end of the century, while under RCP8.5/SSP5-8.5 it triples. Since the effects of extreme heat are already being experienced, it is essential to act as soon as possible to minimize potential damage. In fact, the stakeholders consulted expressed a high level of concern about this factor, which requires immediate action. Testimonies from senior citizens regarding lifestyle changes (e.g., the need for air conditioning and spending extended periods indoors during summer) were critical in assigning a “immediate action” rating to extreme heat hazards.

Heavy rainfall risk: In recent years, Quart de Poblet has experienced episodes of heavy rainfall that have caused significant problems. The risk is both current and future, and the model results emphasize the need to act now to address current problems and their potential worsening in the medium term. Based on the experience of the impacts suffered to date, Quart has already begun taking steps to adapt to this risk, such as the implementation of Sustainable Urban Drainage Systems (SUDS) in the city and developing a risk prevention Plan. Given the less damaging effects of this risk on people, infrastructure and the environment, compared to the risk of flooding, environmental stakeholders considered it to be of lower urgency, although it has ultimately been assigned a greater need for action, since the municipality has already promoted measures in this regard.

2.4.5 Understand Resilience Capacity

River flooding risk: The resilience to river flooding in the municipality has been considered medium. A large-scale flood like the one experienced due to the DANA storm of October 2024 can cause widespread damage (in industrial areas, agricultural plots, roads, critical equipment and facilities, urban areas, and natural spaces), with economic costs that exceed local capacity. In such cases, the City Council alone would not have the capacity to recover; therefore, it relies on the support of regional and national authorities (financial, human, and material). In the event of smaller and less extensive flooding, the Quart de Poblet City Council can respond through preventative actions such as the closure of roads and highways, and subsequent actions of cleaning and restoration of services.

Regarding **interventions to reduce risk**, actions on riverbeds depend on the CHJ (the basin authority) for their execution and for the approval of local actions by the City Councils. As mentioned in Deliverable 1, the Turia diversion project and the NaTURTURia environmental and hydromorphological restoration project are examples of actions aimed at reducing risk. Following the DANA storm of 2024, a national project for the hydrological and environmental adaptation of the Poyo ravine and its connection to the Turia river has been put on the table to reduce the risk in the municipalities of its basin. Furthermore, the hazard is currently monitored through a network of rainfall and flow sensors (Automatic Hydrological Information System, CHJ), and is prevented periodically through cleaning and maintenance of riverbeds. As for human/social capacity, there is local planning for flood risk management (Municipal Emergency Plan, Municipal Action Plan against Flood Risk). At the CHJ level, work is also underway with the affected municipalities on the *Plan for the recovery and improvement of resilience against flooding in the territory affected by the DANA storm in the Valencian Community* (following the events of October 2024), as a prelude to the review and update of the Flood Risk Management Plan of the CHJ, which must be approved in 2027. This plan includes recovery measures and prevention and protection measures.

Heatwaves risk: The resilience to heatwaves in the municipality has been considered high and is valued mainly based on the urban planning and management possibilities that the City Council can carry out. Currently, there are social and physical measures in place to prevent the risk, such as health alerts issued by the regional authority (*Program for the prevention and care of health problems arising from high temperatures in the Valencian Community*) and by the City Council itself, and the use of the municipal senior citizens' center as a climate refuge during the summer. The City Council also has the financial capacity/can obtain public funding for the adaptation of other public buildings as shelters, bioclimatic urban planning projects, rehabilitation of public buildings, improvement of gardens and the creation of new shaded and cooling areas. There is also the possibility of developing new action plans (*Local Action Plan for High Temperatures*).

Heavy rainfall risk: Resilience capacity to this risk has been considered medium. Measures taken to date to reduce this risk include: improvements to stormwater drainage in specific areas (Santa Cecilia neighborhood), integration of sustainable urban drainage systems (Avda. Ramón y Cajal, Molí d'Animeta sector, Industrial Park, etc.), and local planning (Municipal Prevention Plan for the risk of heavy rainfall, Environmental Promotion Plan for Adaptation to Climate Change -PIMA Adapta- for adapting the industrial area to flood risk). The City Council also acts preventively in response to risk warnings, with the closure of roads and access points, closure of parks, suspension of classes in public educational centers, police surveillance, etc. In addition, AEMET provides weather forecasts and risk warnings for extreme rainfall, although sometimes sudden changes can occur that make preparation difficult.

The capacity to act in the physical/material sphere depends not only on the financial, technical, and human resources of the City Council and the teams it can hire, but also on jurisdictional requirements, since works related to stormwater diversion can be subject to restrictions by the CHJ.

2.4.6 Decide on Risk Priority

The risk prioritization was formulated taking into account the input of the consulted stakeholders, as well as the technical perspective of the City Council and the QCATI team. Considering the aspects discussed above, the following prioritization was established:

	Severity		*Urgency*	*Capacity*	*Risk Priority*
	Current	*Future*		*Climate risk management - Resilience*	
River flooding					High
Heatwaves					Very high
Heavy rainfall					High

Severity
- Critical
- Substantial
- Moderate
- Limited

Urgency
- Immediate action needed
- More action needed
- Watching brief
- No action needed

Resilience Capacity
- High
- Substantial
- Medium
- Low

Risk Ranking
- Very high
- High
- Moderate
- Low

2.5 Monitoring and Evaluation

The second phase of the CLIMAAX project, developed by the QCATI team, has resulted in a refined analysis of the risks of river flooding, heatwaves, and heavy rainfall in Quart de Poblet. The team has verified the **flexibility of the workflows** in adapting to a local analysis, as they have been modified based on the available information on hazard, exposure, and vulnerability, and the needs of the municipality. **Comparing the results** of this phase with those of the previous one highlights the importance of having higher-resolution or local data to obtain a more reliable and functional risk analysis. Again, the results, presented in the form of maps and graphs, facilitate the understanding and communication of information to stakeholders and the general public.

Regarding the **difficulties**, no major problems were encountered in completing this phase. From a technical standpoint, while it is true that the team did not have its own climate databases (as it is not a scientific institution or research team), we were able to develop the analysis by using refined information thanks to the databases and materials made available to the public by Spanish entities such as AEMET and the CHJ, and Valencian entities such as the ICV. We believe this opens the door for many other municipalities and regions in Spain to carry out similar risk assessments to improve their adaptation capacity and resilience. However, it is undeniable that having large and robust observational databases (of temperature, precipitation, etc.) is a crucial tool for overcoming biases in climate models and providing more realistic results at the local scale, especially for extreme events such as heavy precipitation. The use of high-resolution climate models (such as those generated by Miró et al. in their work [3]) is essential to include projections in the territorial planning of regions and municipalities, through which measures (infrastructure, urban design, etc.) can be applied to mitigate the impacts of climate change.

Our results have been communicated in an educational way to project stakeholders through workshops and in-person meetings, also addressing the uncertainties associated with some of the climate projections. These meetings have allowed for a **collaborative assessment** of the severity, urgency, resilience, and priority of each risk. Regarding feedback, at the working meeting with the local Environment Council they discussed the possibility of improving the flood risk analysis based on socio-demographic aspects (as is done with the risk of heatwaves) and not only considering the risk from an economic perspective. We have also sought to **broaden public awareness** of climate risks by developing a series of thematic informational training material, which have been made available through the QCATI project website. Their publication has also been supported by the Quart de Poblet City Council's social media channels.

Furthermore, the results of the QCATI project are being published on its website, accessible to all citizens. The aim of the website is to communicate information clearly and **make climate science more accessible to the general public**.

Regarding the overall assessment of this phase of the project and the **team's efficiency**, it should be noted that the team was small (as described in section 1.3) and the timeframe was limited due to operating under the Recovery Plan. Despite the circumstances, the team has been able to expand the risk analysis, incorporating heavy rains into the assessment. The QCATI team has strived to use its resources efficiently, and we believe the work carried out is adequate and meets the CLIMAAX project requirements, although it could certainly be improved with more technical and personnel resources, as well as more time. In any case, the impact of the CRA on the municipality is considered positive, as it has improved the understanding of both current and future risks.

2.6 Work plan Phase 3

In Quart de Poblet, various strategies and actions have been implemented in recent years to improve adaptation to climate change, based on current risks and the general information available about its effects in Spain and the Valencian Community. Now that a specific Climate Risk Assessment is in place for the municipality, these adaptation efforts and their suitability to anticipated risks can be reviewed and assessed. To evaluate the inclusion of potential climate change effects in local plans, programs, and strategies, as well as cases of *maladaptation*, the following will be reviewed:

- Municipal Action Plan for Flood Risk
- Municipal Prevention Plan for Heavy Rainfall Risk
- Environmental Promotion Plan for Climate Change Adaptation
- NaTURTURia Project
- EDUSI (Integrated Sustainable Urban Development Strategy)

The main objective of this phase, taking into account the findings of our CRA and the options already implemented in the municipality, is to **pre-select potential new adaptation measures** for application in Quart de Poblet. Various sources will be consulted for their identification:

Table 2 - 8 Sources of potential new adaptation measures for Quart de Poblet.

Source	Material
Ministry of Environment, Infrastructure and Territory of the Valencian Government[7]	- *Municipal adaptation initiatives. A compilation of adaptation solutions implemented in Valencia, in response to risks and vulnerabilities under climate change.* - *Portfolio (Manual) of Nature-Based Climate Change Adaptation Solutions and Successful Implementation Experiences.* - *Adaptation measures included in the Tool for Integrating Climate Change into Urban Planning.*
AdapteCCa[8]	- *Adaptation Plans (from Spanish cities and regions), Manuals and Guides*
EU Covenant of Mayors[9]	- *Community stories*
PNACC[10]	- *Lines of Action*

The collected measures will be classified in a **matrix**[11] to combine categories (grey actions, green actions, and soft actions) and objectives (reducing exposure, reducing sensitivity, or increasing responsiveness). Subsequently, the preselected measures will be characterized with sufficient minimum information to facilitate their evaluation and selection in the future.

Since Quart de Poblet has not yet developed its Action Plan for the EU Covenant of Mayors initiative, it is considered relevant to collect actions that can be incorporated into this Plan for future implementation.

[7] https://mediambient.gva.es/es/web/cambio-climatico/eines-recursos-i-financament
[8] https://adaptecca.es/index.php/administracion-local
[9] https://eu-mayors.ec.europa.eu/en/com-munity-stories
[10] https://www.miteco.gob.es/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/plan-nacional-adaptacion-cambio-climatico.html
[11] This step will adopt the methodology proposed by the Guide for the Development of Local Climate Change Adaptation Plans of the Spanish Climate Change Office.

3 Conclusions Phase 2- Climate risk assessment

The CRA carried out by the QCATI team during the second phase of the CLIMAAX project comprised the analysis of three climate risks: river flooding, heatwaves, and heavy rainfall. The first two underwent preliminary processing during the first phase, while the third was incorporated during the second phase to complement the river flooding analysis, given their close relationship. The workflows provided by the CLIMAAX Handbook were modified (in the case of river flooding and heatwaves) to incorporate **local data, allowing for a more refined analysis**. This report presents the processes carried out and the results obtained in each case.

As mentioned in previous sections, areas exposed to **river flooding** have been identified within the municipality. It has also been verified that the last major flooding event exceeded the expected extent and depth in certain areas. Damage levels have been calculated based on land use and return periods, identifying the areas with the greatest losses. River discharge modelling has also allowed for the observation of future trends for the Turia River and the main ravines within the municipality.

Regarding the **risk of heatwaves**, the incorporation of new modelling data has confirmed the increasing trend in extreme heat hazards in the municipality, with heatwaves lasting longer. The use of satellite-derived imagery has identified the most overheated areas of the municipality due to the urban heat island effect, and the inclusion of local data on vulnerable population by census tract has allowed for a more detailed mapping of this risk. The hazard values from the models have been combined with vulnerability values to determine, through zonal statistics, the evolution of the risk (absolute and relative change) in the municipalities at the provincial and intermunicipal levels.

For these two risks, a **comparison of the results** from phases 1 and 2 has been made, highlighting the improvements achieved with the new data provided.

The **risk of heavy rainfall** was analysed by locally determining a critical rainfall impact threshold associated with a return period of 98 mm/24 h (T5). Changes in magnitude and frequency were estimated for this threshold based on different short-, medium-, and long-term climate projections.

As in the Phase 1 of the project, stakeholders **assessed** the risks based on the results obtained and local knowledge, considering their severity, urgency, and resilience. In this case, the participatory process involved a larger number of participants, including civil groups such as the municipality's senior citizens and the local Environmental Council. This allowed for the integration of perspectives, experiences, and needs identified by new stakeholders in the evaluation compared to the previous phase.

The **key findings** to highlight are:

a) River flooding:
- The greatest risk stems from the potential for ravines to overflow, primarily affecting industrial areas, communication routes, and agricultural zones.
- Economic damages reach their highest levels in the urban area surrounding the Turia River (approximately €10.000/m²) and in the industrial area of the Valencia 2000 Industrial Park and Ciudad Mudeco (approximately €5.000/m²), under a 500-year return period.

- Under climate change scenarios (RCP 4.5, 8.5), models indicate an increase in extreme rainfall events (10- and 50-year return periods) in the near and medium future, and a reversal of this trend in the distant future.

b) Heatwaves:
- The models show a clear trend toward an increase in the maximum duration of heatwaves. The magnitude of this phenomenon increases, most pronounced in the high-emissions scenario RCP 8.5 and, especially, from mid-century onward.
- Different models and regionalization methods provide similar trends.
- The urban heat island effect increases the risk, especially in the historic center of Quart and in the area surrounding the Cristo neighborhood.
- In the context of the province of Valencia and the Association of Municipalities of l'Horta Sud, the risk level in the municipality increases throughout the century, from low to medium with the SSP2-4.5 scenario, and from low to high with the SSP5-8.5 scenario.

c) Heavy rainfall
- The average of the combined models shows that, maintaining the frequency (T5), the threshold rainfall increases in intensity, with the exception of the 2100 horizon under RCP 4.5.
- If the intensity (98 mm/24 h) is maintained, the calculated change in frequencies shows an equal or lower frequency of occurrence under RCP 4.5. Under RCP 8.5, there is greater uncertainty in the near future, a tendency towards a lower frequency in the medium term, and a slightly higher frequency in the distant future.
- Given the uncertainty associated with the variability of model results, these data should be interpreted with caution.

Regarding the **stakeholder's participation**, the participatory process has been fundamental in giving a human dimension to the technical analysis, revealing a clear and alarming perception of rising temperatures and the loss of seasonal climate patterns in Quart de Poblet. Dialogue with older residents has made it possible to identify critical unprotected infrastructure, such as the municipal market, and vulnerable residential areas such as the Barrio del Cristo neighbourhood. The community urgently demands urban planning that focuses on nature-based solutions, increasing tree-covered areas and protecting flood-prone areas in the face of increasingly torrential rains. This collaborative process has made it possible to identify heatwaves as the highest priority risk for future planning.

4 Progress evaluation (1-2 pages)

- *Describe the connection between this deliverable, its outputs and the planned activities for the following phases of the project.*
- *Include the **Key Performance Indicators** and **Milestones** achieved in this phase and the actions executed to achieve these as per the Individual Following Plan. Please use the summary tables below to give an overview of the progress.*

Table 4-1 Overview key performance indicators

Key performance indicators	*Progress*
Number of stakeholders involved in the activities of the project (at least 5: other municipalities, supramunicipal entities, local organisations, Universities, research centres, etc.)	Completed in phase 1, with at least we have 5 stakeholders mapped (University of Valencia and Polythecnic University of Valencia, municipality of Manises, municipality of Aldaia, municipality of Mislata and Mancomunidad Horta Sud). Then, we have involved 3 key areas from the municipality: local police and emergencies, environment and senior citizens. Completed in phase 2, with 2 more relevant stakeholders: L'Animeta Association for Organic Agriculture, and Limne Foundation. At this point, a total of 7 key stakeholders have been involved in QCATI project.
Number of local and european data collection sources (at least 3 different sources)	At least 3 completed: Joint Research Centre, Aqueduct Floods, EuroHEAT and XCLIM (EURO-CORDEX), RSLab, Worldpop Hub, Climate-ADAPT. And then from Spain: AEMET and Ministry of Health
Number of complementary actions useful for the municipality climate plans (at least useful for two local mentioned policies, paragraph 3.1)	Not yet started, will start in Phase 3
Number of communication actions taken to share results with the stakeholders (at least 1 per project phase).	1 communication action succesfully completed in Phase 1: website implementation and presentation. 1 communication action succesfully completed in Phase 2: elderly people workshop for sharing project results. At this point, a total of 2 communication action has been completed.
Number of publications and dissemination actions (at least 1 per month): social media publications, website, explanatory video. Correction: number of publications and dissemination actions in social media (1 per project month: total 22	6 publication and dissemination actions in Phase 1 completed: kick off meeting, press release, 4 social media posts. 6 social media posts completed in Phase 2, plus 3 dissemination material: 1 training material pack, 1

Key performance indicators	*Progress*
publications). For reaching that amount of publications, we will ellaborate a dissemination plan where we will publicate on a scheduled basis the progress of the project (meetings, information about CLIMAAX, implementation of actions, good practices, etc.). On the other side, we will have dissemination actions (1 per month: website Phase 1; infographics Phase 2; Explanatory video Phase 3)	elderly people workshop presentation, 1 local environmental association wotkshop. At this point, a total of 15 publication and dissemination actions has been completed.
Number of articles in regional media mentioning the project: 2 press releases (minimum).	In Phase 1: one press release published. Any press releases in Phase 2. At this point, a total of 1 press released has been publised.
Number of workflows successfully applien on Deliverable 1 (at least 2 workflows, to ensure flexibility but to obtain a full vision about the most important risks for Quart de Poblet)	2 workflows applied succesfully in D1: heatwaves and floods.
Number of workflows successfully applien on Deliverable 2 (3 to ensure a full risk assessment and that all relevant hazards are addressed)	3 workflows applied succesfully in D2: heatwaves, floods and heavy rainfall.

Table 4-2 Overview milestones

Milestones	*Progress*
M1: External services hired	Completed
M2: Test of the workflow Phase 1 made	Completed
M3: Workflow Phase 2 successfully applied	Completed
M4: Stakeholders meeting done	Completed
M5: Attend the CLIMAAX workshop held in Barcelona	Completed
M6: Correct Assessment of the Workflow Phase 3	Not yet

Milestones	*Progress*
M7: Publication of the press releases (1 at Phase 1: beginning of the project; 1 at Phase 3: end of the project)	Completed publication of phase 1 press release
M8: Publication of graphic material (Phase 2)	Completed
M9: Video Upload to the website (Phase 3)	Not yet
M10: Presentation of the results to policy and decision makers in the municipality of Quart the Poblet (Phase 3)	Not yet
M11: Attend the CLIMAAX workshop held in Brussels	Not yet

5 Supporting documentation

This deliverable includes:

- The present main report.
- A supporting documentation file (*2.CLIMAAX-QCATI-Supporting_Doc_D2*) containing various visual outputs from the analyses performed, as well as the communication outputs generated during this phase of work.
- A folder of files (*Inputs*) containing the modified JupyterLab notebooks used for the analyses, as well as various Excel files (.xlsx) with data that the team worked with during this phase.

6 References

[1] Camarasa-Belmonte, A.M.; Caballero López, M.P. Lluvias in situ en la Comunidad Valenciana. Relación entre indicadores pluviométricos, llamadas al centro de coordinación de emergencias (112) y relación de daños durante el episodio de 26–30 de noviembre de 2016. In El Clima: Aire, Agua, Tierra y Fuego; Montávez Gómez, J.P., Ed.; Asociación Española de Climatología; Agencia Estatal de Meteorología: Madrid, Spain, 2018; pp. 233–244

[2] Camarasa-Belmonte, A.M.; Rubio, M.; Salas, J. Rainfall events and climate change in Mediterranean environments: an alarming shift from resource to risk in Eastern Spain. Nat Hazards 2020, 103, pp. 423-445. https://doi.org/10.1007/s11069-020-03994-x

[3] Miró, J.J.; Estrela, M.J.; Olcina-Cantos, J.; Martin-Vide, J. Future Projection of Precipitation Changes in the Júcar and Segura River Basins (Iberian Peninsula) by CMIP5 GCMs Local Downscaling. Atmosphere 2021, 12, 879. https://doi.org/10.3390/atmos12070879

[4] Miró, J.J.; Estrela, M.J.; Olcina-Cantos, J. Statistical downscaling and attribution of air temperature change patterns in the Valencia region (1948–2011). Atmospheric Research 2015, 156, pp. 189-212. https://doi.org/10.1016/j.atmosres.2015.01.003

[5] Plan Hidrológico de la Demarcación Hidrográfica del Júcar. Memoria. Ciclo de planificación hidrológica 2022-2027. Confederación Hidrográfica del Júcar, Ministerio para la Transición Ecológica y el Reto Demográfico 2022.

[6] Impact of Climate Change on maximum rainfall in Spain. Hydrographic Studies Centre (CEDEX), 2021. Available at: https://ceh.cedex.es/web/Imp_CClimatico_Pmax.htm

Deliverable Phase 2 – Supporting Documentation

QCATI (Climate Adaptation Toolbox Implementation)

Spain, Quart de Poblet

Version 1.0 | January 2026

HORIZON-MISS-2021-CLIMA-02-01 - Development of climate change risk assessments in European regions and communities based on a transparent and harmonised Climate Risk Assessment approach

Funded by
the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101093864. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Climate, Infrastructure and Environment Executive Agency (CINEA). Neither the European Union nor the granting authority can be held responsible for them.

Supporting Documentation

1. List of figures

2. List of tables

SPATIAL CONTEXTUALIZATION

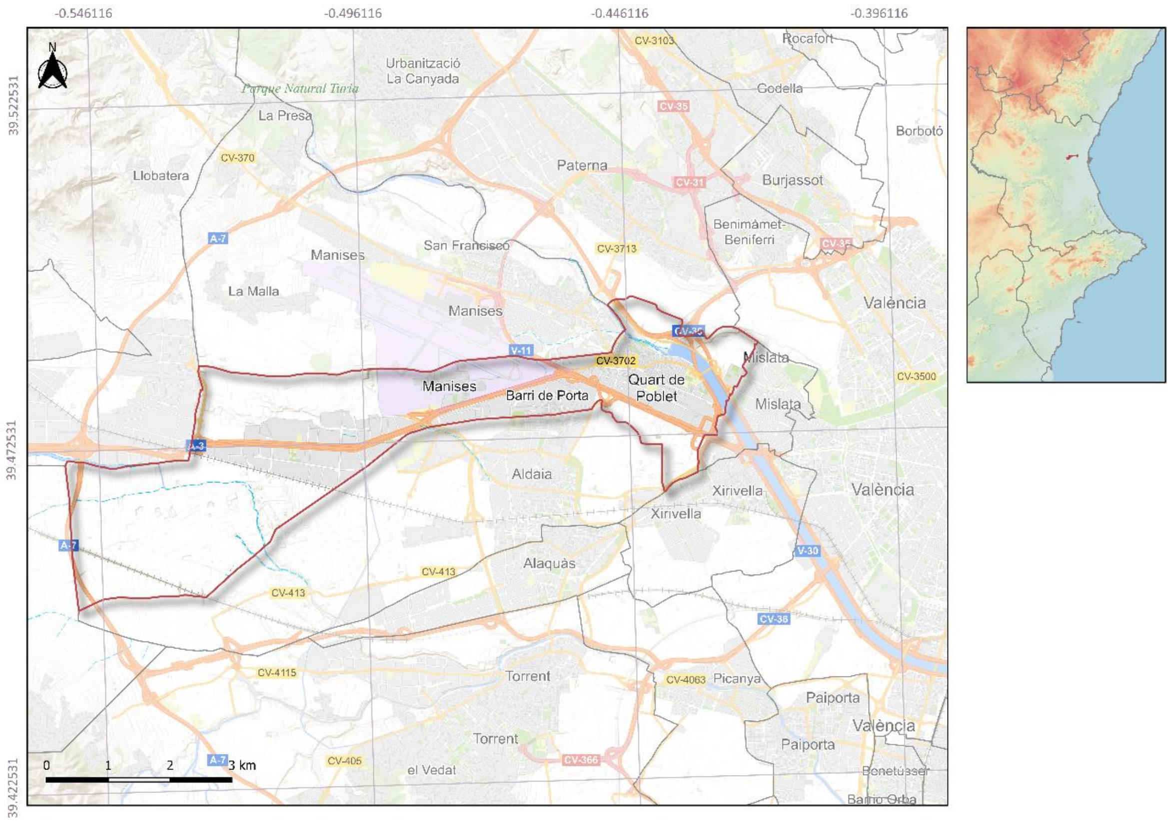


Figure S - 1 Location of Quart de Poblet in the Valencian region (Spain).

FLUVIAL FLOODS RISK ASSESSMENT RELATED

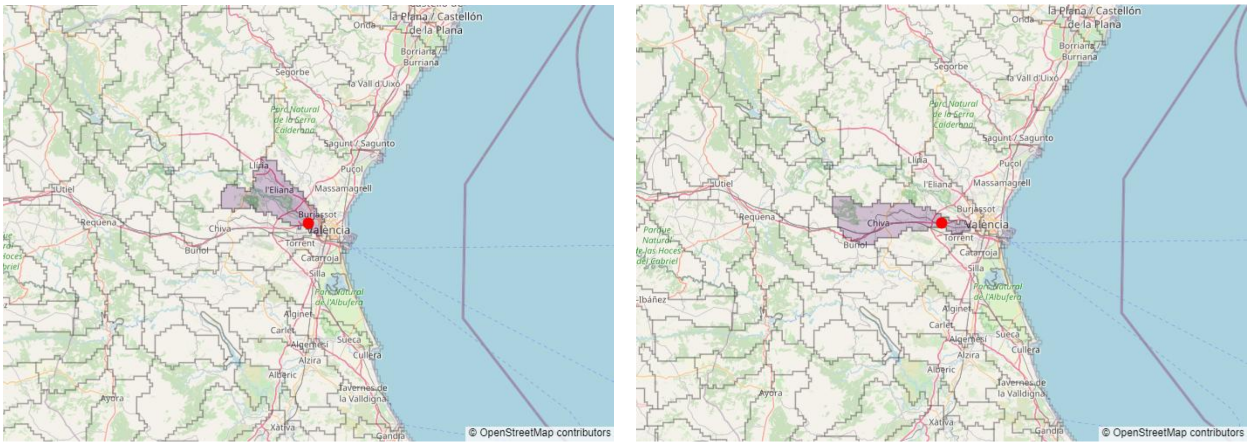


Figure S - 2 Catchments used for Turia river and Poyo/Saleta ravines hazard assessment (River Discharge Workflow).

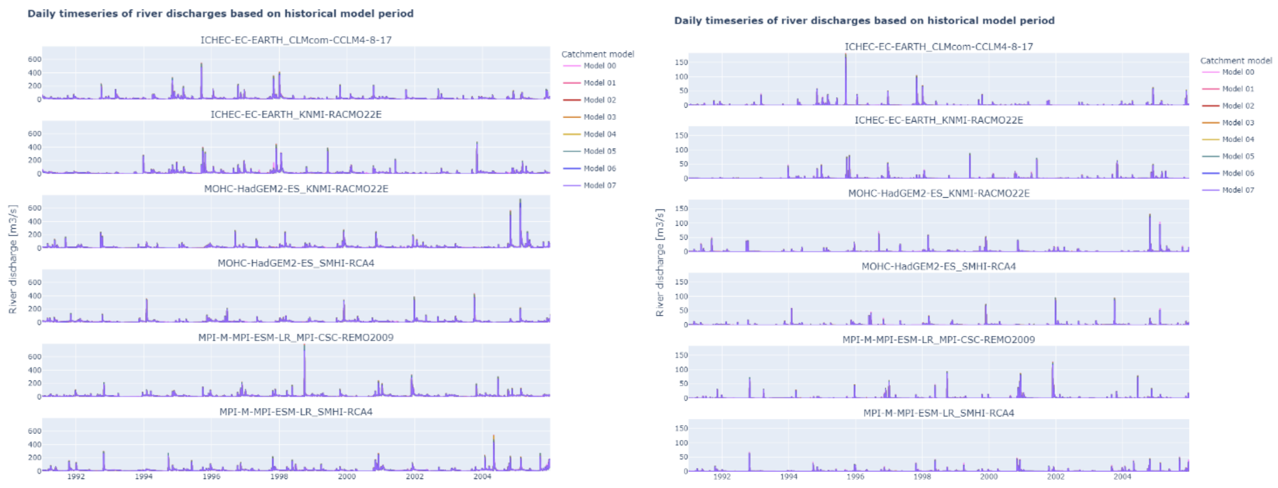


Figure S - 3 Daily timeseries of river discharges (m3/s) under different climatic and hydrological models. Turia river (left) and Poyo/Saleta ravines (right).

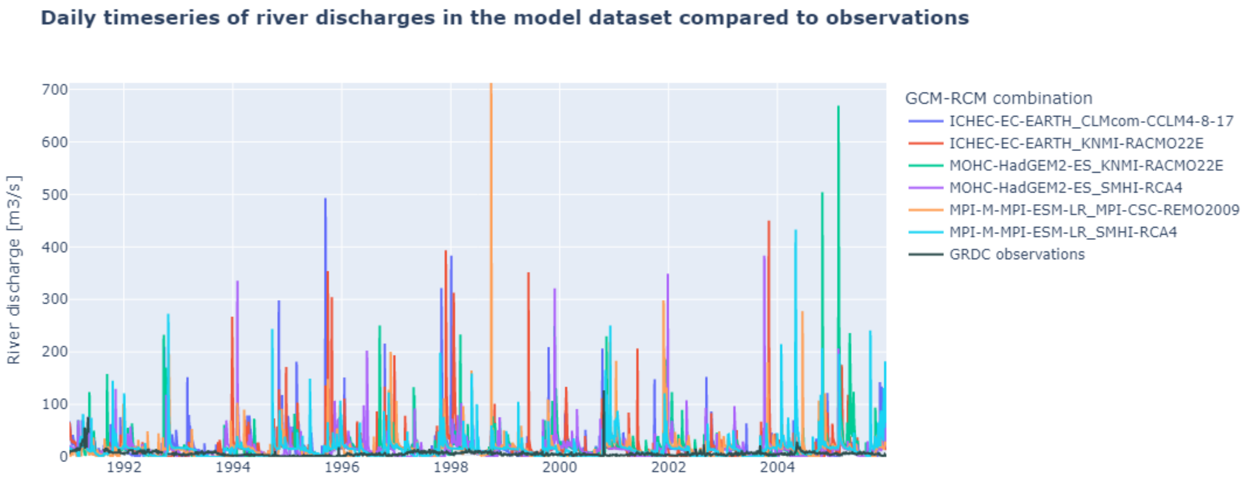


Figure S - 4 Validation of the daily timeseries of river discharges (m3/s) for the Turia river (La Presa station, GRDC).

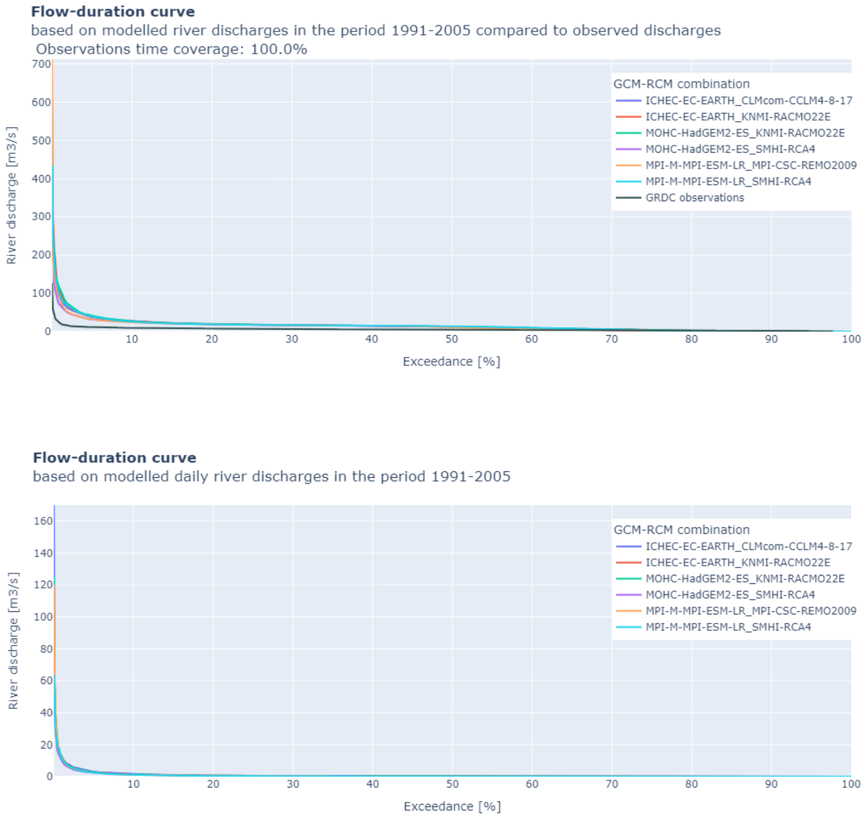


Figure S - 5 Flow-duration curve of the catchments in Quart de Poblet. Turia river (upper) and Poyo/Saleta ravines (lower).

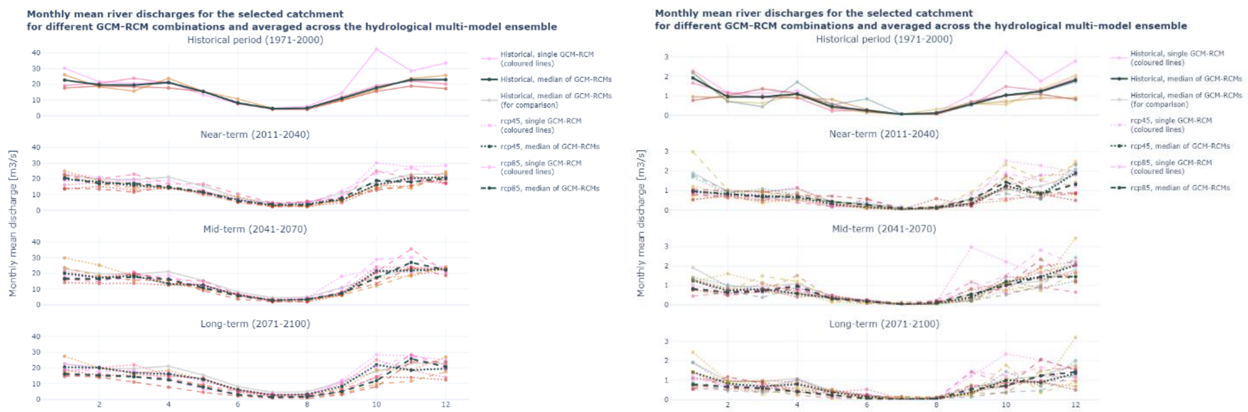


Figure S - 6 Monthly variation in discharges in the Quart de Poblet sub-basins for different GCM-RCM combinations, under a historical period and three future periods. Turia river (left) and Poyo/Saleta ravines (right).

Table S - 1 Percentage variation of discharges at significant points in the river network by trimester. Source: Hydrological Basin Plan 2021-2027, CHJ.

Exploitation system	*Discharge point*	*RCP 4.5*				*RCP 8.5*			
		O-D	*J-M*	*A-J*	*J-S*	*O-D*	*J-M*	*A-J*	*J-S*
Turia	*Manises (La Presa)*	*-8%*	*-2%*	*-4%*	*-6%*	*-15%*	*-11%*	*-14%*	*-13%*

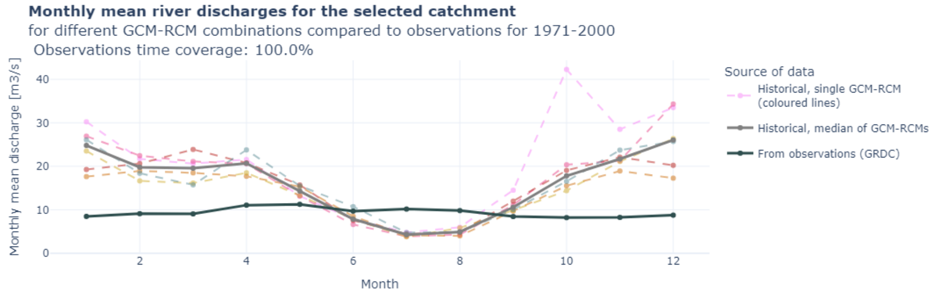


Figure S - 7 Validation of the monthly mean river discharges under observational data: Turia river.

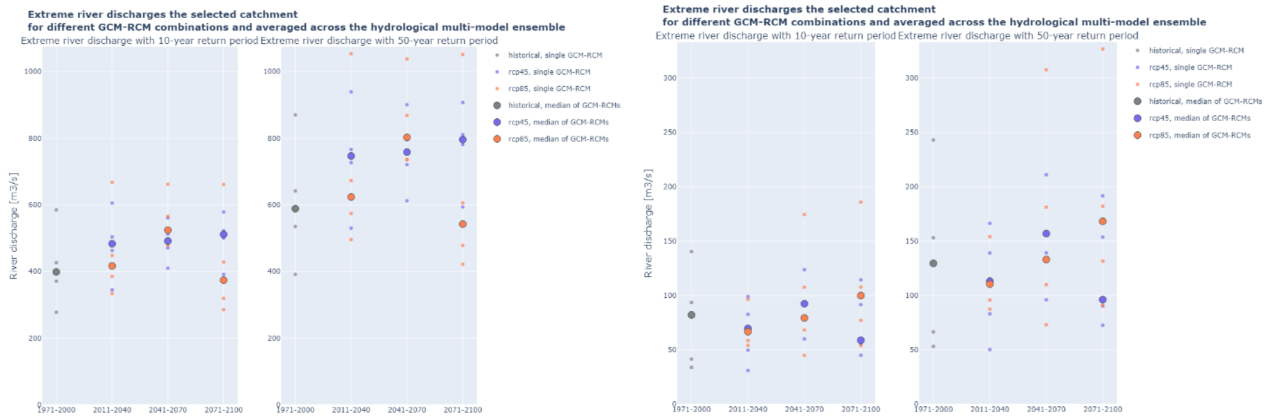


Figure S - 8 Absolute values of extreme river discharge for 10 and 50-year return periods, under RCP 4.5 and 8.5. Turia river (left) and Poyo/Saleta ravines (right).

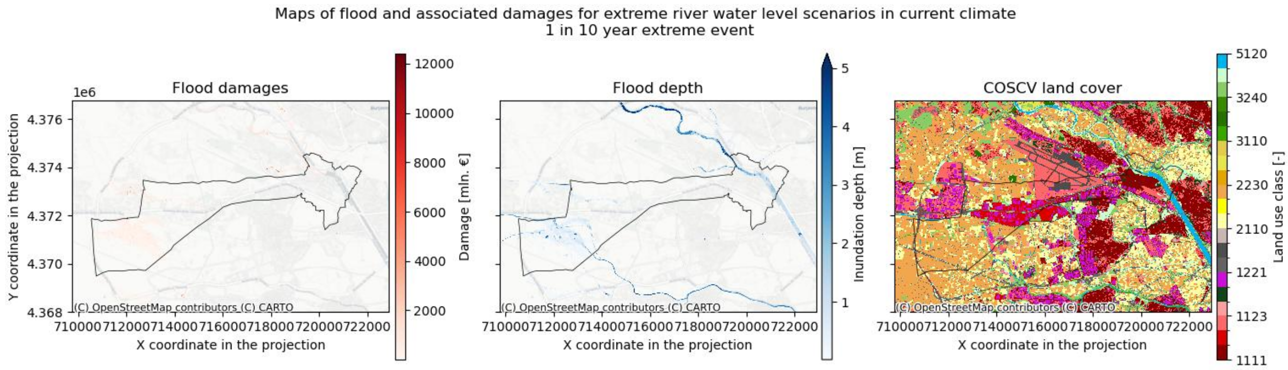


Figure S - 9 Flood damages in Quart de Poblet for a 10 year return period.

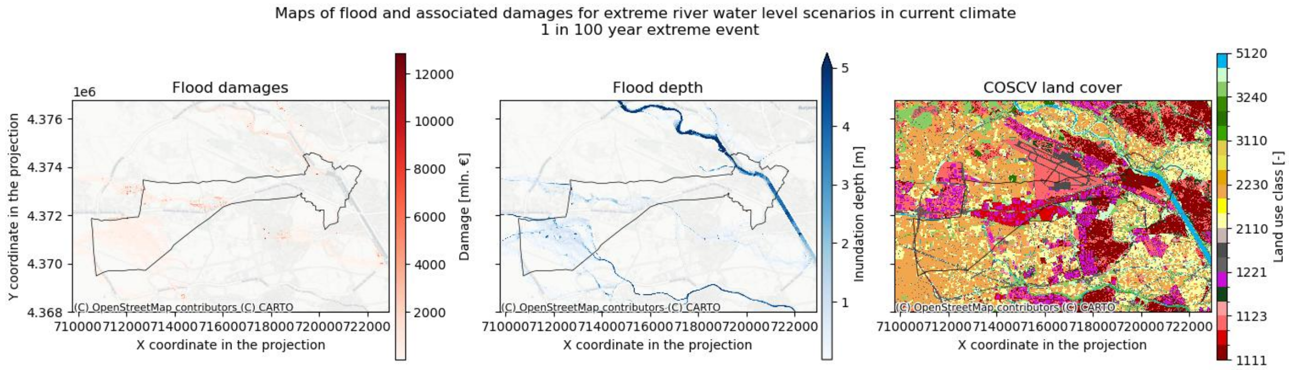


Figure S - 10 Flood damages in Quart de Poblet for a 100 year return period.

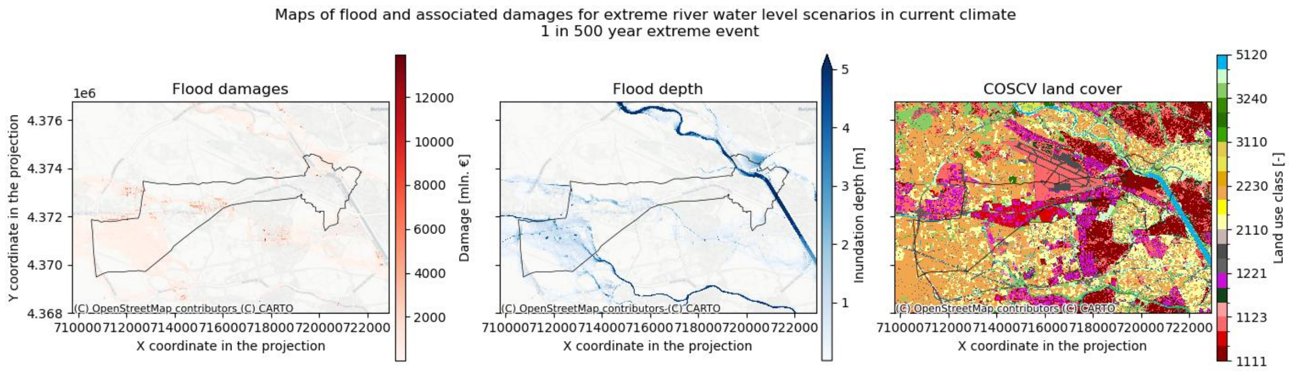


Figure S - 11 Flood damages in Quart de Poblet for a 500 year return period.

HEATWAVES RISK ASSESSMENT RELATED

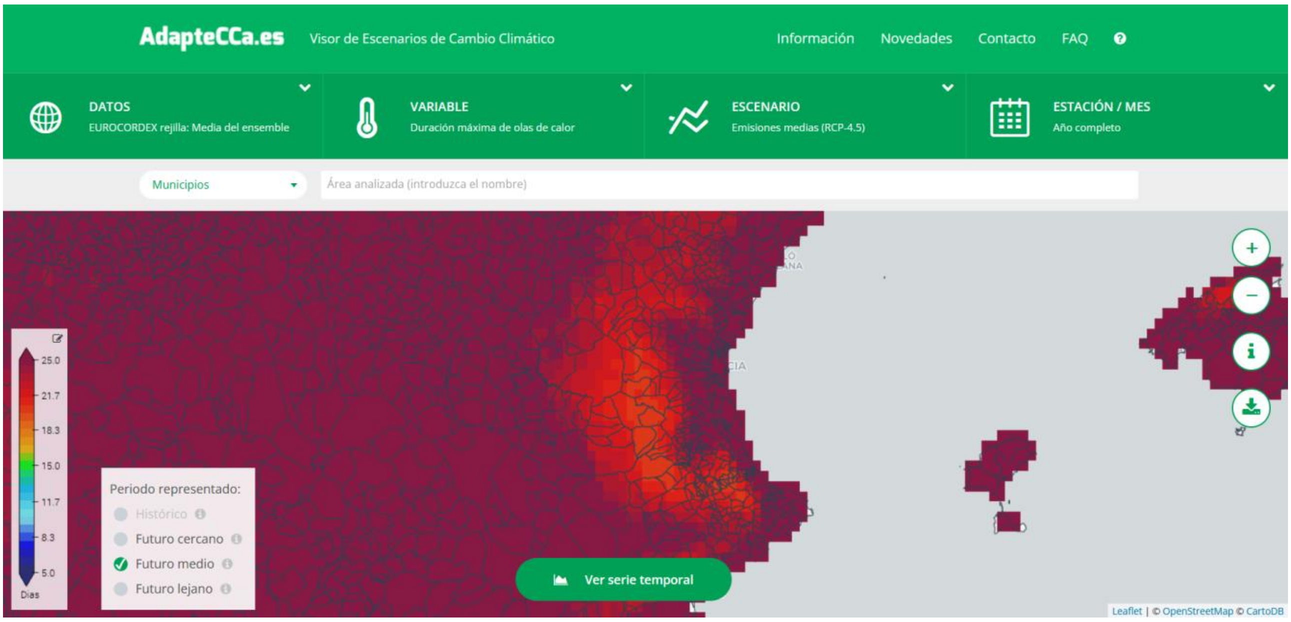


Figure S - 12 AdapteCCa viewer: an institutional source of open data about climate projections in Spain. Source: escenarios.adaptecca.es

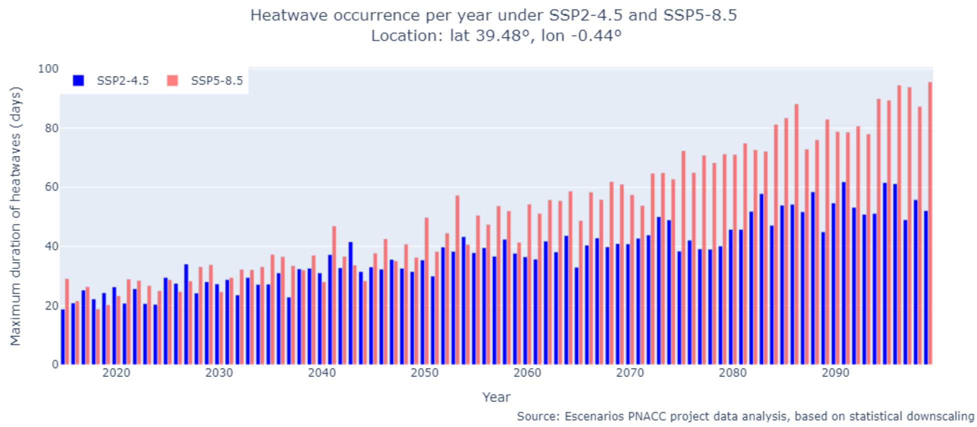


Figure S - 13 Evolution of the maximum duration of heat waves under the SSP2-4.5 and SSP5-8.5 scenarios, using statistical regionalization (ESD-RegBA method), period 2015-2100. Plotting by selection on map.

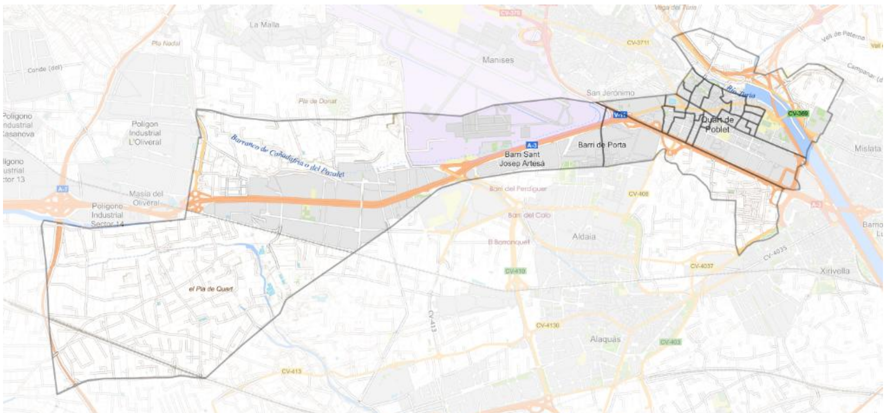


Figure S - 14 Census tracts used for population over 65 distribution analysis in Quart de Poblet. Source: National Institute of Statistics (INE).

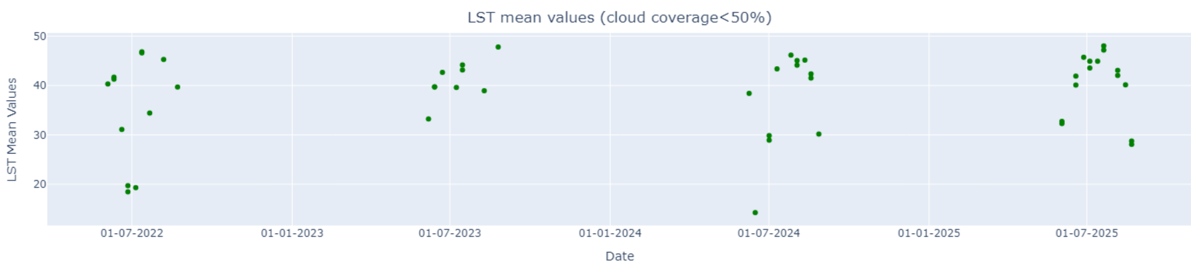


Figure S - 15 Land surface temperature mean values for the selected area, per Landsat image, for a cloud coverage under 50%.

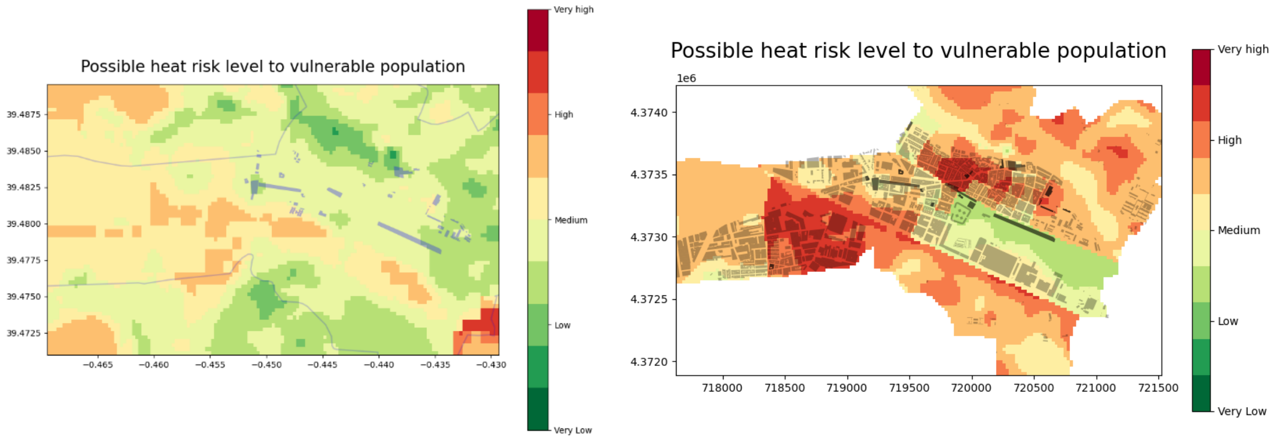


Figure S - 16 Comparison of the Heatwave Risk analysis results from Phase 1 (left) and Phase 2 (right).

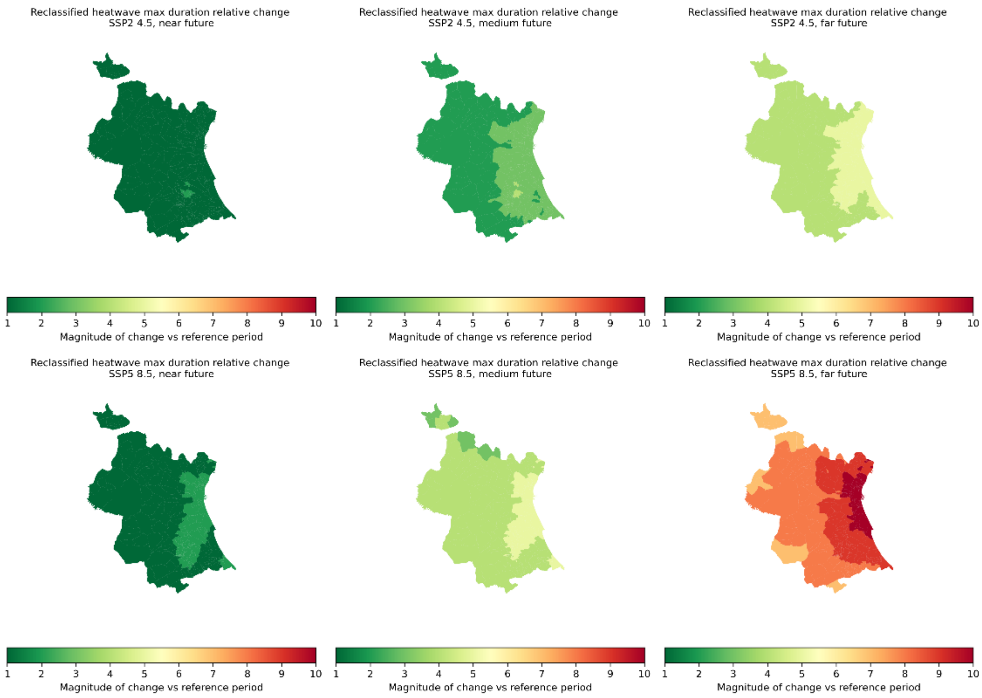


Figure S - 17 Heatwave duration magnitude of change versus baseline scenario (1971-2000), for scenarios SSP2-4.5 and SSP5-8.5, time periods 2011-2040, 2041-2070 and 2071-2100, Valencia province.

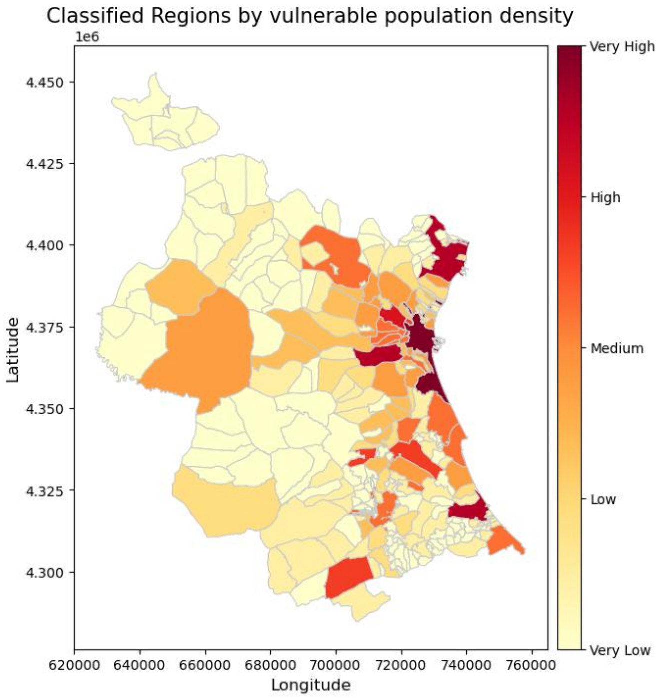


Figure S - 18 Vulnerable population (<5 and >65 years old) density for the valencian municipalities.

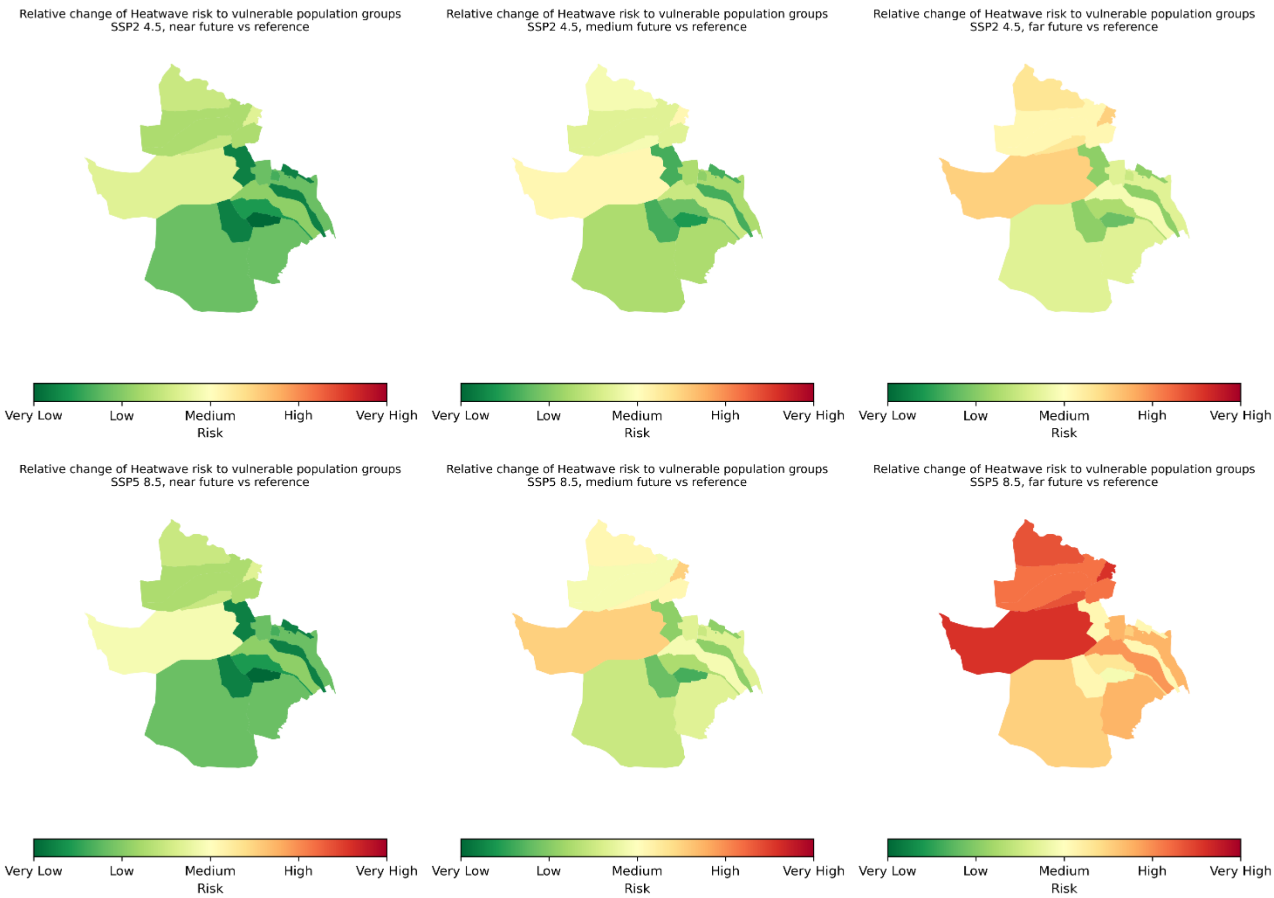


Figure S - 19 Relative change of heatwave risk (duration of heatwaves) for the municipalities of l'Horta Sud, for scenarios SSP2-4.5 and SSP5-8.5, time periods 2011-2040, 2041-2070 and 2071-2100.

HEAVY RAINFALL RISK ASSESSMENT RELATED

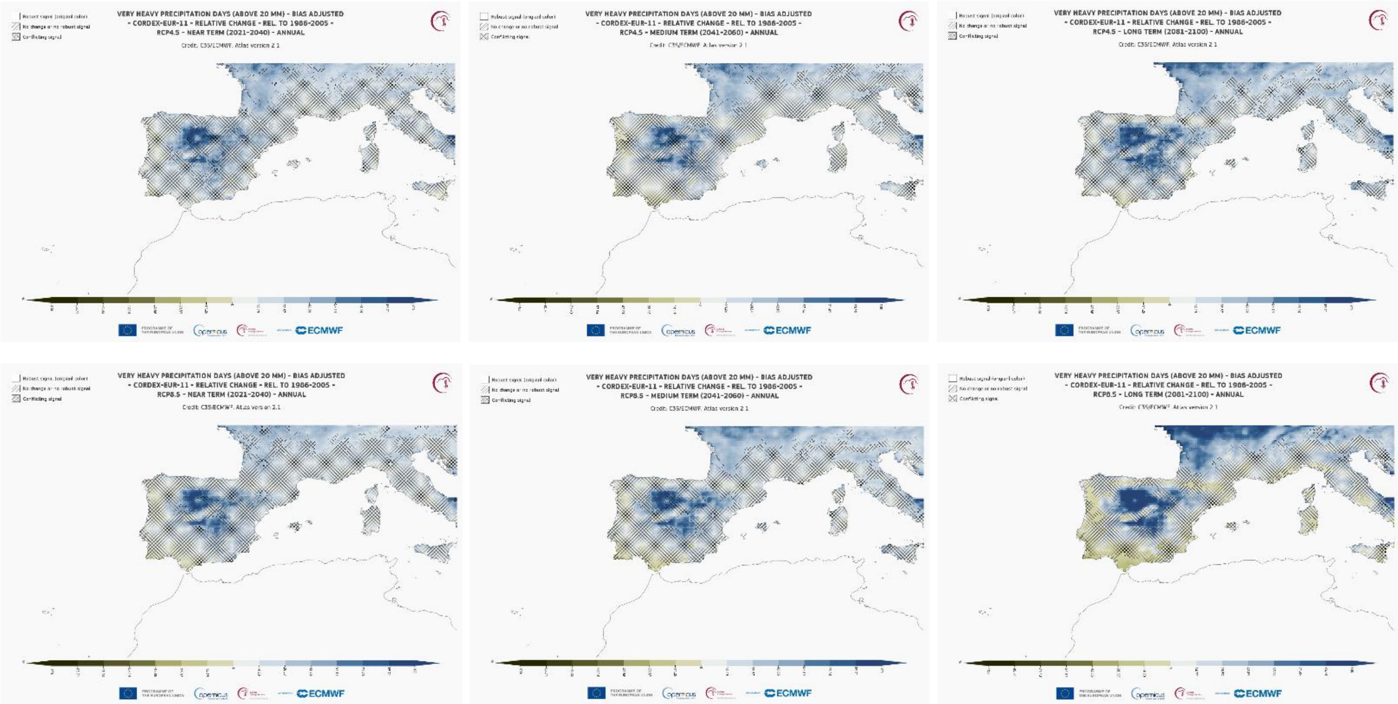


Figure S - 20 Heavy rainfall relative change projections (EURO-CORDEX) for scenarios RCP 4.5 and 8.5 and three future periods related to the reference period (1986-2005). Source: Copernicus Atlas.

Table S - 2 Heavy rainfall risk assessment results for the specific location of Quart de Poblet

Historical	1976-2005		
Intensity	98mm/24h		
Duration	24 hours		
Frequency	5 years	Location	Quart de Poblet
GCM/RCM: ec-earth/racmo22e			
RCP4.5	**Scenario 2011-2040**	**Scenario 2041-2070**	**Scenario 2071-2100**
Change in magnitude	-4%	11%	5%
Change in frequency	6 years	5 years	5 years
RCP8.5	**Scenario 2011-2040**	**Scenario 2041-2070**	**Scenario 2071-2100**
Change in magnitude	2%	26%	11%
Change in frequency	5 years	4 years	4 years
GCM/RCM: hadgem2-es/racmo22e			
RCP4.5	**Scenario 2011-2040**	**Scenario 2041-2070**	**Scenario 2071-2100**
Change in magnitude	-12%	7%	-14%
Change in frequency	7 years	5 years	8 years
RCP8.5	**Scenario 2011-2040**	**Scenario 2041-2070**	**Scenario 2071-2100**

Change in magnitude	-3%	-16%	15%
Change in frequency	6 years	8 years	4 years
GCM/RCM: mpi-esm-lr/rca4			
RCP4.5	**Scenario 2011-2040**	**Scenario 2041-2070**	**Scenario 2071-2100**
Change in magnitude	20%	-3%	4%
Change in frequency	4 years	6 years	5 years
RCP8.5	**Scenario 2011-2040**	**Scenario 2041-2070**	**Scenario 2071-2100**
Change in magnitude	17%	-1%	-12%
Change in frequency	4 years	6 years	7 years

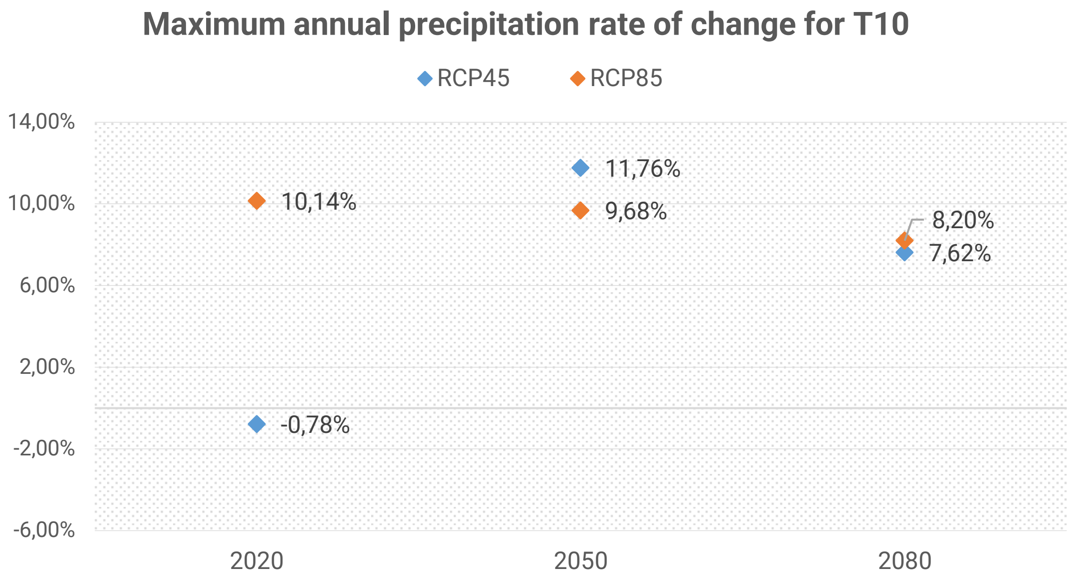


Figure S - 21 Average rates of change in annual maximum daily precipitation for a 10 year return period in Quart de Poblet. Source: Prepared by the author based on CEDEX (2021).

COMMUNICATION OUTPUTS

QCATI WEBSITE

Link: https://www.quartclimaax.eu/

Information pills

Pill I: Why are we talking about Climate Change?

Pill II: How is the future of the climate predicted?

Pill III: What are Climate Models?

Pill IV: What are Climate Change scenarios?

Pill V: What use do we make of Climate Change studies?

CLIMAAX WEBSITE

Link: https://www.climaax.eu/quart-de-poblet-climate-risk-analysis-qcati-project/

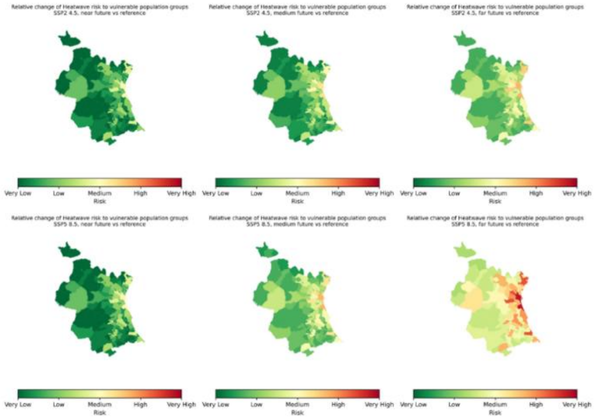
Quart de Poblet Advances Local Climate Risk Analysis through QCATI Project

November 14, 2025

QCATI advances its second phase, refining climate risk assessments with updated datasets and improved modeling for heatwaves and flood hazards.

In **Quart de Poblet, Spain**, the QCATI team is advancing into the second phase of its work under the CLIMAAX framework, refining **Climate Risk Assessments (CRAs)** through the integration of local datasets and **updated climate projections**.

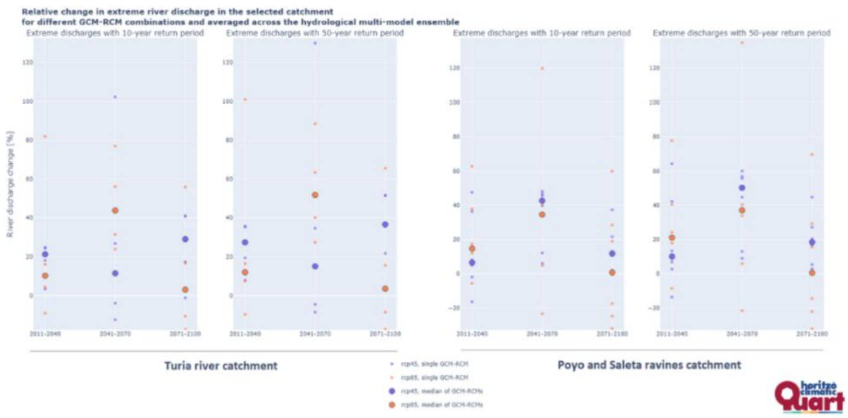
Recent efforts have focused on **heatwave workflows**, using high-resolution data from the Spanish Meteorological Agency (AEMET) and incorporating demographic information on the **elderly population (65+)** to map urban heat island vulnerabilities by census tract. An upcoming **participatory session** with senior citizens will share these findings and raise local awareness about heat risks and adaptation options.



At the same time, the team is enhancing the **river flood risk analysis** using new flood maps from the Júcar River Basin Authority (CHJ) and updated regional land use data. The comparison between modeled flood events—such as the **T=500 return period scenario**—and the observed **October 2024 flood** provides valuable insight into local hydrological dynamics and climate trends affecting the area.

Risk Risk Risk

At the same time, the team is enhancing the **river flood risk analysis** using new flood maps from the Júcar River Basin Authority (CHJ) and updated regional land use data. The comparison between modeled flood events—such as the **T=500 return period scenario**—and the observed **October 2024 flood** provides valuable insight into local hydrological dynamics and climate trends affecting the area.



Looking ahead, the project aims to expand community participation, engaging local **environmental, agricultural, and sustainability associations** to strengthen climate resilience and promote collective action toward a more sustainable future for Quart de Poblet.

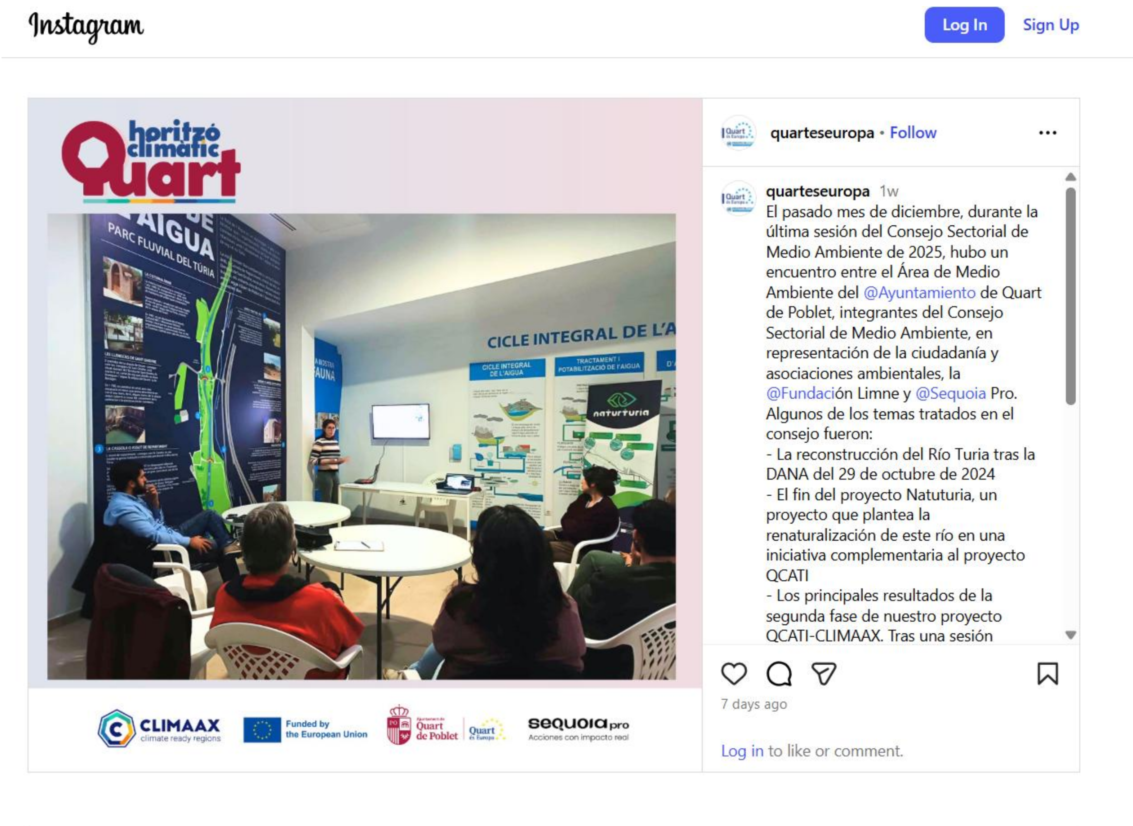
Instagram

Link; https://www.instagram.com/quart_de_poblet/:

Link: https://www.instagram.com/quarteseuropa/p/DTcS4SIjZjo/

Link: https://www.instagram.com/quarteseuropa/p/DTe4jI5jQB7/

Link: https://www.instagram.com/quarteseuropa/p/DTPhIIgjRVs/

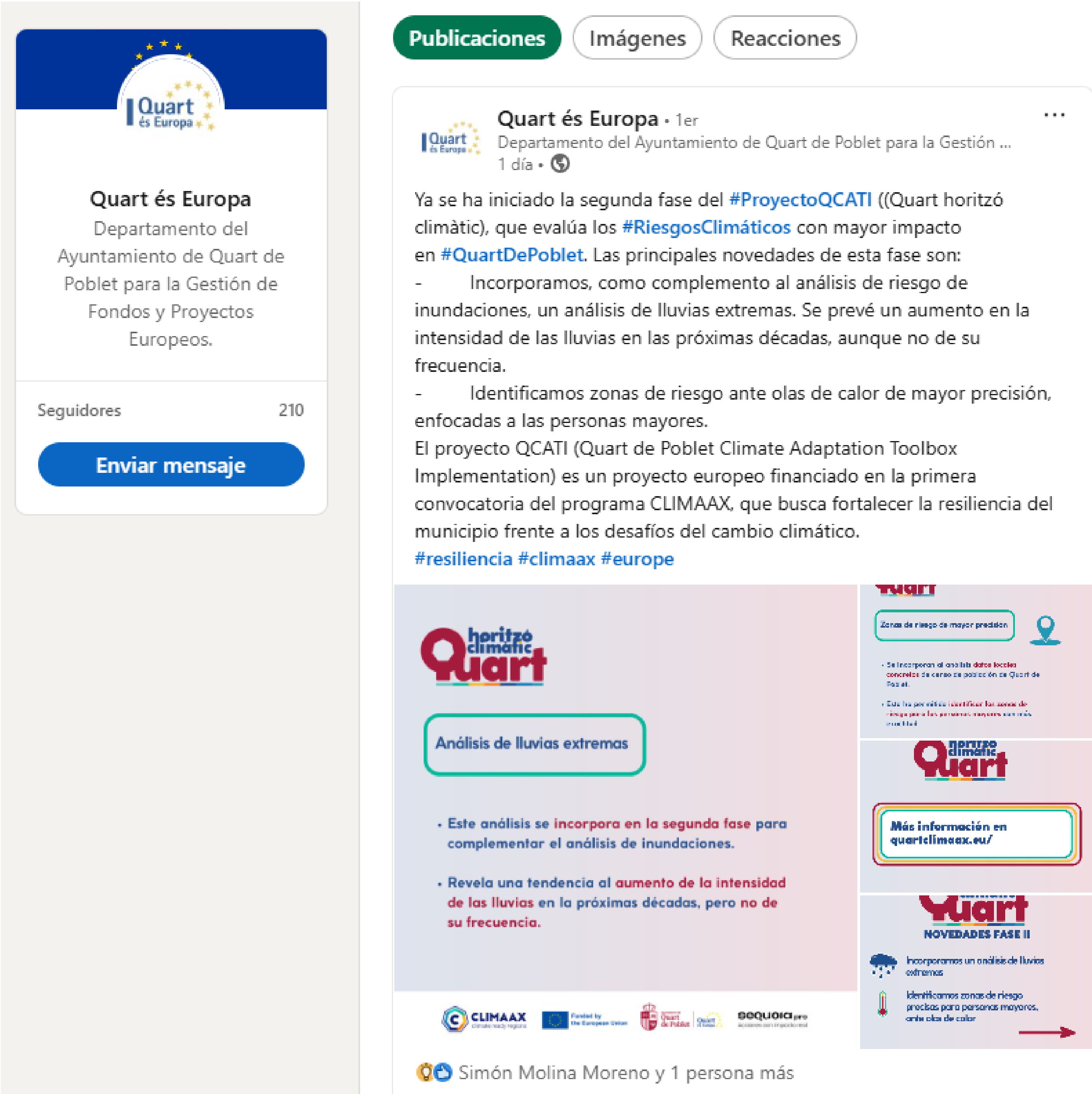


Link: https://www.instagram.com/quarteseuropa/p/DTZywB7DXU7/

Link: https://www.instagram.com/quarteseuropa/p/DTR_SVlDZyu/

LinkedIn

Link: https://www.linkedin.com/in/quarteseuropa/recent-activity/all/



Quart és Europa
Departamento del Ayuntamiento de Quart de Poblet para la Gestión de Fondos y Proyectos Europeos.

Seguidores 210

Enviar mensaje

Publicaciones Imágenes Reacciones

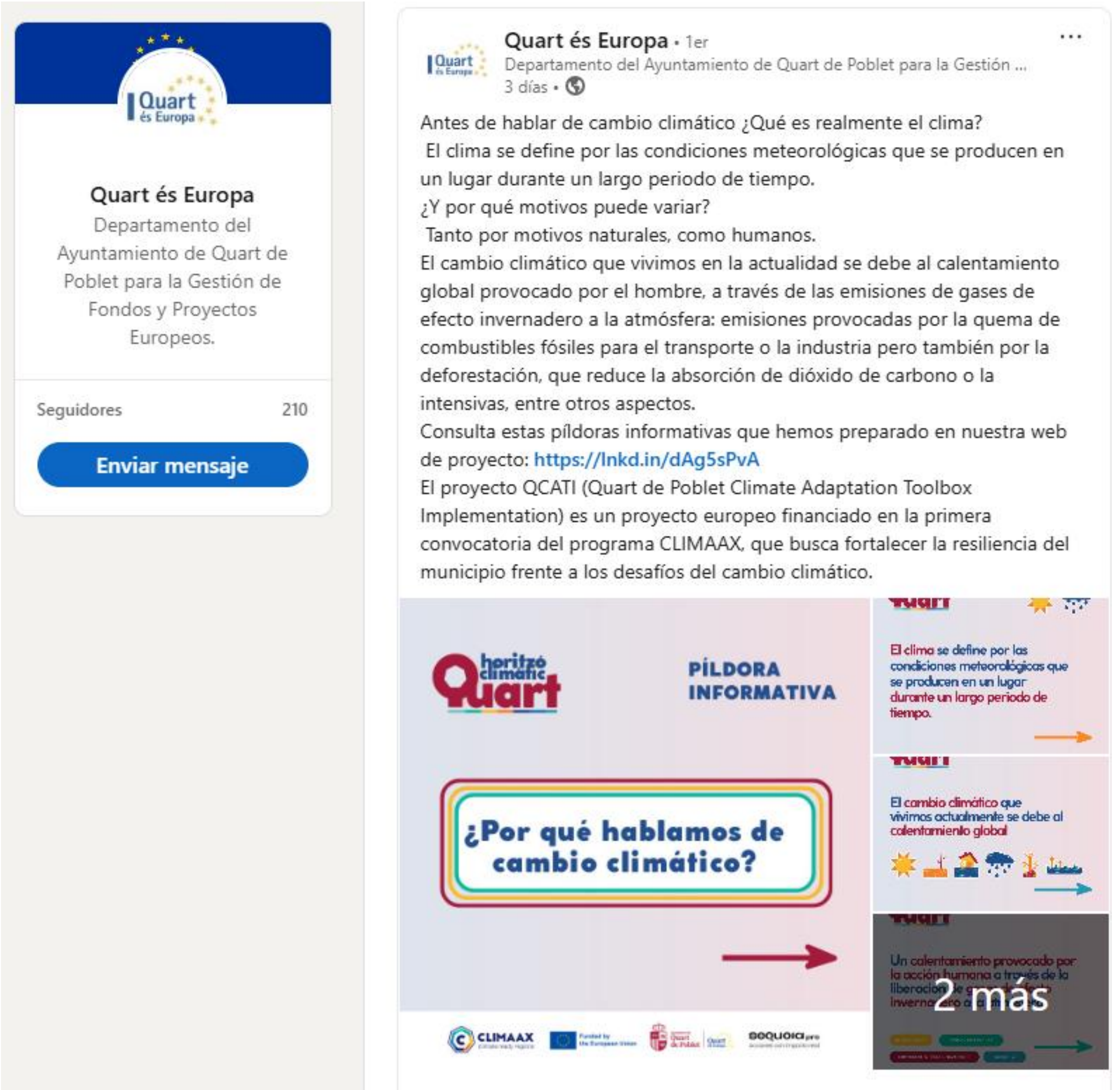
Quart és Europa • 1er
Departamento del Ayuntamiento de Quart de Poblet para la Gestión ...
1 día •

Ya se ha iniciado la segunda fase del #ProyectoQCATI ((Quart horitzó climàtic), que evalúa los #RiesgosClimáticos con mayor impacto en #QuartDePoblet. Las principales novedades de esta fase son:

- Incorporamos, como complemento al análisis de riesgo de inundaciones, un análisis de lluvias extremas. Se prevé un aumento en la intensidad de las lluvias en las próximas décadas, aunque no de su frecuencia.
- Identificamos zonas de riesgo ante olas de calor de mayor precisión, enfocadas a las personas mayores.

El proyecto QCATI (Quart de Poblet Climate Adaptation Toolbox Implementation) es un proyecto europeo financiado en la primera convocatoria del programa CLIMAAX, que busca fortalecer la resiliencia del municipio frente a los desafíos del cambio climático.
#resiliencia #climaax #europe

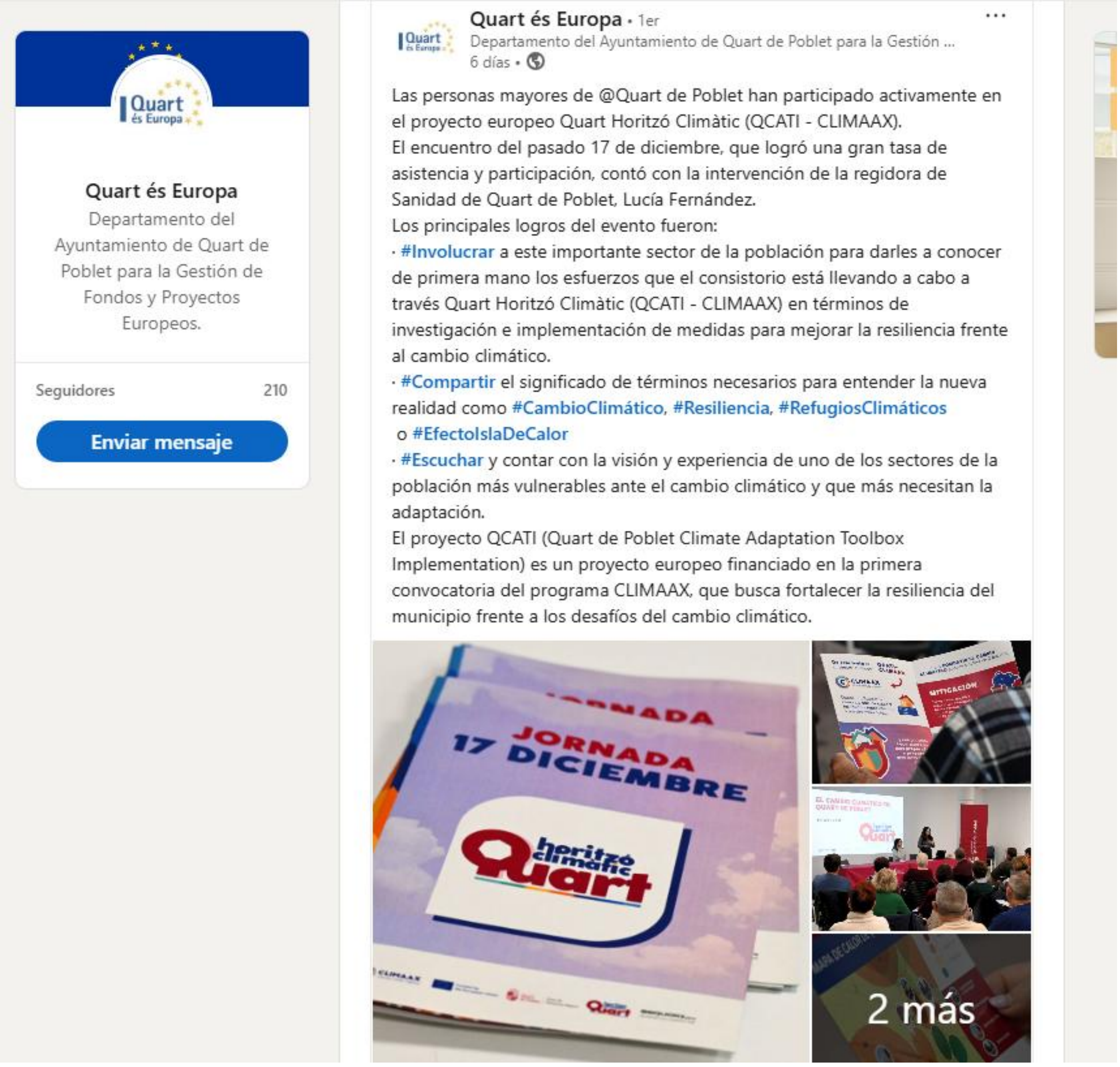
Simón Molina Moreno y 1 persona más


Quart és Europa
Departamento del Ayuntamiento de Quart de Poblet para la Gestión de Fondos y Proyectos Europeos.
Seguidores 210
Enviar mensaje

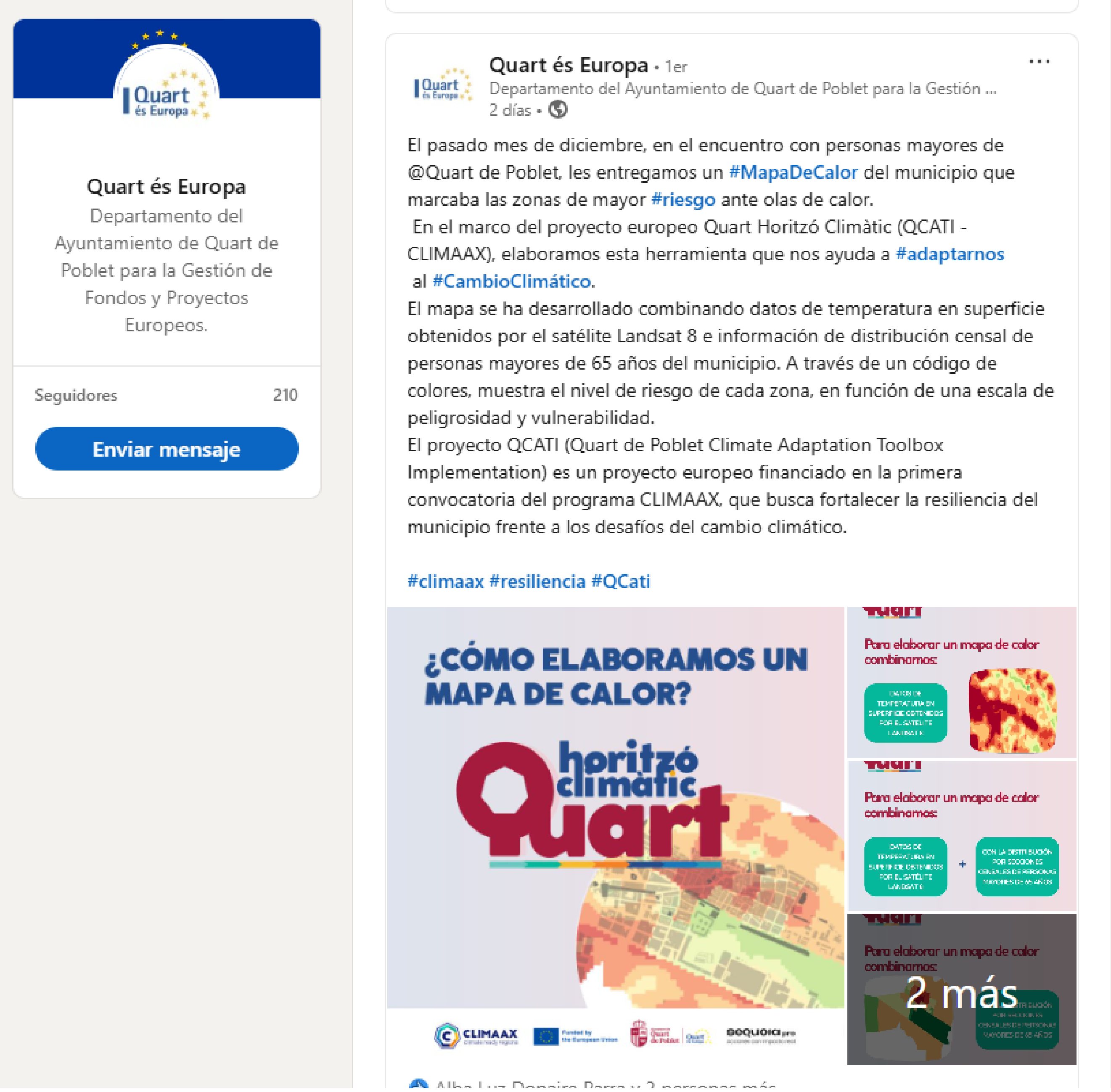
Quart és Europa • 1er
Departamento del Ayuntamiento de Quart de Poblet para la Gestión ...
3 días •

Antes de hablar de cambio climático ¿Qué es realmente el clima?
El clima se define por las condiciones meteorológicas que se producen en un lugar durante un largo periodo de tiempo.
¿Y por qué motivos puede variar?
Tanto por motivos naturales, como humanos.
El cambio climático que vivimos en la actualidad se debe al calentamiento global provocado por el hombre, a través de las emisiones de gases de efecto invernadero a la atmósfera: emisiones provocadas por la quema de combustibles fósiles para el transporte o la industria pero también por la deforestación, que reduce la absorción de dióxido de carbono o la intensivas, entre otros aspectos.
Consulta estas píldoras informativas que hemos preparado en nuestra web de proyecto: https://lnkd.in/dAg5sPvA
El proyecto QCATI (Quart de Poblet Climate Adaptation Toolbox Implementation) es un proyecto europeo financiado en la primera convocatoria del programa CLIMAAX, que busca fortalecer la resiliencia del municipio frente a los desafíos del cambio climático.

Link: https://www.linkedin.com/in/quarteseuropa/recent-activity/all/

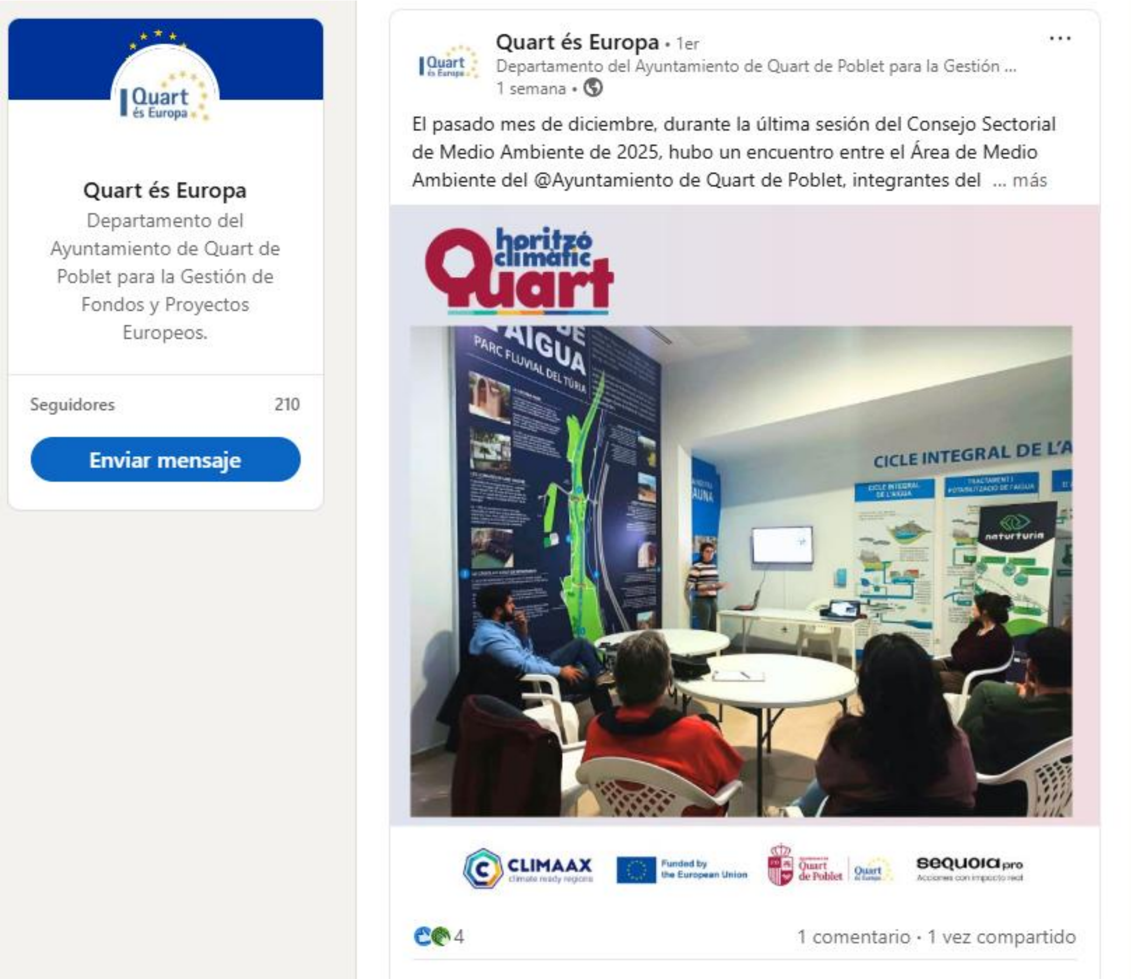


Link: https://www.linkedin.com/in/quarteseuropa/recent-activity/all/


Quart és Europa
Departamento del Ayuntamiento de Quart de Poblet para la Gestión de Fondos y Proyectos Europeos.
Seguidores 210
Enviar mensaje
Quart és Europa • 1er
Departamento del Ayuntamiento de Quart de Poblet para la Gestión ...
2 días •
El pasado mes de diciembre, en el encuentro con personas mayores de @Quart de Poblet, les entregamos un #MapaDeCalor del municipio que marcaba las zonas de mayor #riesgo ante olas de calor.
En el marco del proyecto europeo Quart Horitzó Climàtic (QCATI - CLIMAAX), elaboramos esta herramienta que nos ayuda a #adaptarnos al #CambioClimático.
El mapa se ha desarrollado combinando datos de temperatura en superficie obtenidos por el satélite Landsat 8 e información de distribución censal de personas mayores de 65 años del municipio. A través de un código de colores, muestra el nivel de riesgo de cada zona, en función de una escala de peligrosidad y vulnerabilidad.
El proyecto QCATI (Quart de Poblet Climate Adaptation Toolbox Implementation) es un proyecto europeo financiado en la primera convocatoria del programa CLIMAAX, que busca fortalecer la resiliencia del municipio frente a los desafíos del cambio climático.
#climaax #resiliencia #QCati
¿CÓMO ELABORAMOS UN MAPA DE CALOR?
horitzó climàtic Quart
Para elaborar un mapa de calor combinamos:
Para elaborar un mapa de calor combinamos:
Para elaborar un mapa de calor combinamos:
2 más

ELDERLY PEOPLE WORKSHOP (17-12-2025)


Lluvias extremas e inundaciones
¿Cómo podemos protegernos?
Vigilancia y avisos (GVA, AEMET, CHJ)
Planificación ante emergencias



Facebook

Link: https://www.facebook.com/quarteseuropa/


Quart és Europa
3d ·
Antes de hablar de cambio climático ¿Qué es realmente el clima?
El clima se define por las condiciones meteorológicas que se producen en un lugar durante un largo peri... Mostra'n més...
horitzó climàtic Quart
PÍLDORA INFORMATIVA
¿Por qué hablamos de cambio climático?
El clima se define por las condiciones meteorológicas que se producen en un lugar durante un largo periodo de tiempo.
El cambio climático que vivimos actualmente se debe al calentamiento global
Un calentamiento provocado por la acción humana a través de la liberación de gases de efecto invernadero a la atmósfera.
La iniciativa CLIMAAX ayuda a comprender cómo los riesgos que conlleva este cambio climático afectan a cada territorio
+2
M'agrada
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Quart és Europa
6d ·
Las personas mayores de @Quart de Poblet han participado activamente en el proyecto europeo Quart Horitzó Climàtic (QCATI - CLIMAAX).
El encuentro del pasado 17 de dici... Mostra'n més...
JORNADA
17 DICIEMBRE
horitzó climàtic Quart
MITIGACIÓN
MAPA DE CALOR DE QUART DE POBLET
+2
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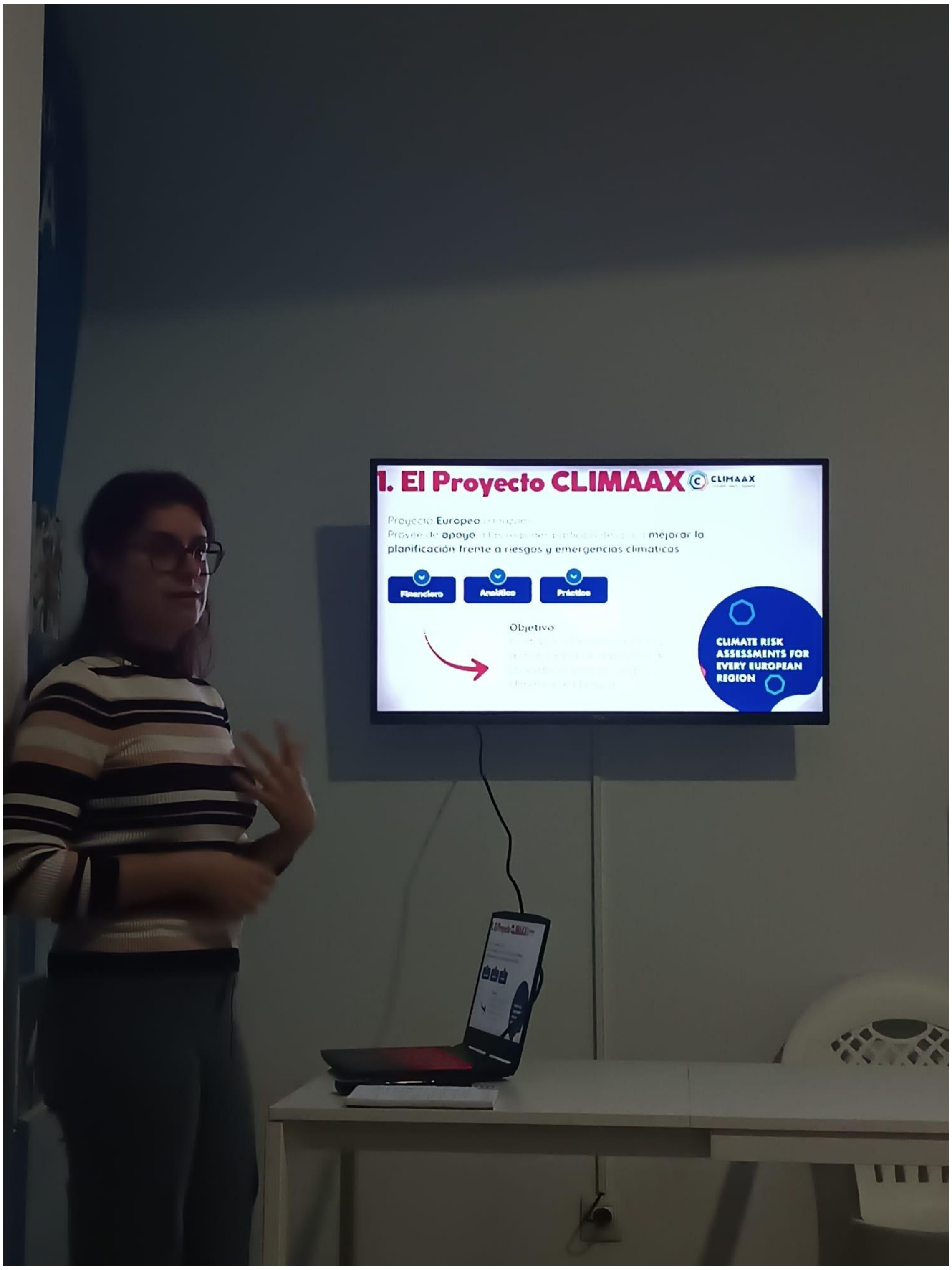
Quart és Europa
1d ·
Ya se ha iniciado la segunda fase del #ProyectoQCATI ((Quart horitzó climàtic), que evalúa los #RiesgosClimáticos con mayor impacto en #QuartDePoblet. Las principales n... Mostra'n més...
horitzó climàtic Quart
NOVEDADES FASE II
Incorporamos un análisis de lluvias extremas
Identificamos zonas de riesgo precisas para personas mayores, ante olas de calor
Análisis de lluvias extremas
• Este análisis se incorpora en la segunda fase para complementar el análisis de inundaciones.
• Revela una tendencia al aumento de la intensidad de las lluvias en la próximas décadas, pero no de su frecuencia.
Zonas de riesgo de mayor precisión
• Se incorporan al análisis datos locales concretos de censo de población de Quart de Poblet.
• Esto ha permitido identificar las zonas de riesgo para las personas mayores con más exactitud
Más información en quartclimaax.eu/
M'agrada
Comenta

LOCAL ENVIRONMENTAL WORKING TABLE IMAGES (11/12/2025)


PARC FLUVIAL DEL TÚRIA
CICLE INTEGRAL DE L'AI
CICLE INTEGRAL DE L'AIGUA
TRACTAMENT I POTABILITZACIÓ DE L'AIGUA
naturturia

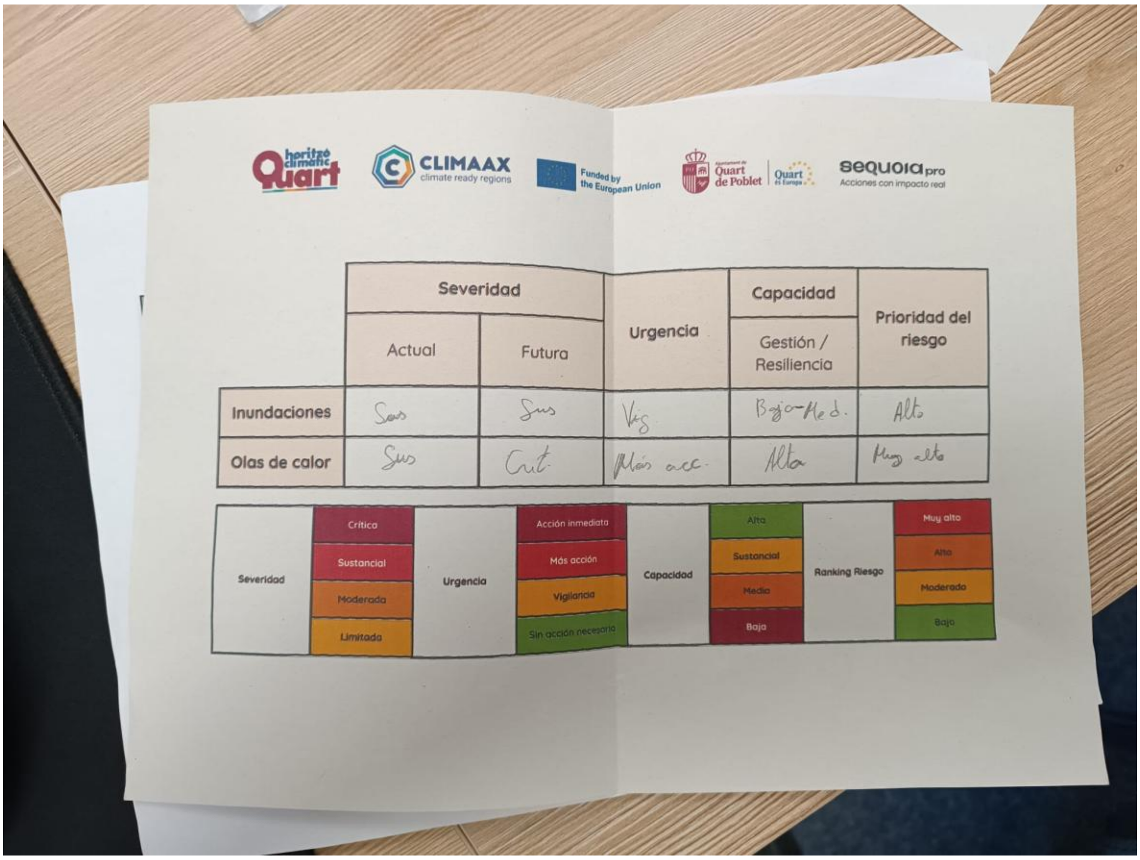

3. Resultados obtenidos
RIESGO DE OLAS DE CALOR


1. El Proyecto CLIMAAX
CLIMAAX
Proyecto Europeo
planificación frente a riesgos y emergencias climáticas
Objetivo
CLIMATE RISK ASSESSMENTS FOR EVERY EUROPEAN REGION


3. Resultados obtenidos
RIESGO DE OLAS DE CALOR


3. Resultados obtenidos
RIESGO DE OLAS DE CALOR

Work table sheet



Working table with the environment sector council

11-12-2025

Severidad	Olas de calor	Temperaturas alcanzadas, récords de calor, aumento de las noches tropicales, proyecciones de aumento de duración de las olas de calor, posibles efectos en cadena (DANAS, sequías, plagas)
	Inundaciones Lluvias extremas	Fenómenos recurrentes en el otoño, con especial ocurrencia de eventos extraordinarios (DANA 2024), aumento de la intensidad de las lluvias en las áreas litorales, impactos actuales y zonas afectadas, posible aumento de los caudales extremos e intensidad de las lluvias según las proyecciones
Urgencia	Olas de calor	El cambio está en marcha y los efectos son notables, aumento progresivo de las temperaturas, efectos en la salud, bienestar, consumo energético, isla de calor urbana, afecciones agrícolas…
	Inundaciones Lluvias extremas	Necesidad de responder a problemáticas actuales y prepararse para posibles cambios en el futuro próximo y medio
Capacidad	Olas de calor	Posibilidades mediante adaptación urbanística (refugios climáticos, adaptación edificios públicos, jardines y zonas de sombra), avisos y consejos a la población. ¿Qué otras necesidades se pueden cubrir? ¿Cuáles no?
	Inundaciones Lluvias extremas	Previsión del riesgo mediante predicciones y avisos, actuaciones de adaptación de cuencas, soluciones grises y verdes, actuaciones ya implementadas a nivel municipal (NaTURTURia, SUDS, planes de emergencia). ¿Qué otras cosas se pueden hacer? ¿Cuáles son las limitaciones?

3.- RESULTADOS

Con esta mesa de trabajo se consiguió una evaluación de los riesgos para Quart de Poblet bajo la perspectiva de las personas que conforman el Consejo Sectorial de Medio Ambiente, con los siguientes resultados:

	Severity		Urgency	Capacity	Risk Priority
	Current	*Future*		*Climate risk management - Resilience*	
River flooding					High
Heatwaves					Very high
Heavy rainfall					Moderate

Severity	Urgency	Resilience Capacity	Risk Ranking
Critical	Immediate action needed	High	Very high
Substantial	More action needed	Substantial	High
Moderate	Watching brief	Medium	Moderate
Limited	No action needed	Low	Low

El Consejo de Medio Ambiente consideró que la mayor severidad actual y futura corresponde a las olas de calor, dando un papel más moderado a los riesgos hídricos, aunque atendiendo a su posible aumento de intensidad en las próximas décadas. En consecuencia, consideraron que es necesaria una acción inmediata respecto al riesgo por calor, más acción respecto a inundaciones y una vigilancia del riesgo de lluvias extremas. Bajo su punto de vista, existe una capacidad alta para actuar a nivel municipal respecto a las olas de calor y a las inundaciones, teniendo en cuenta las competencias sobre urbanismo y sobre el tramo municipal del río Turia. Sobre el riesgo de lluvias extremas consideraron una capacidad media debido a la ocurrencia más súbita de estos fenómenos y al tiempo para gestionar a nivel local los avisos meteorológicos que emite AEMET. La prioridad más alta se otorgó al riesgo de olas de calor, seguido de inundaciones (con especial atención a la rambla de Poyo) y, en tercer lugar, a las lluvias pesadas. Esta valoración se ha tenido en cuenta para realizar la evaluación de riesgos climáticos final de la segunda fase del proyecto QCATI.

También se obtuvo feedback sobre la metodología utilizada para el análisis de los riesgos, con aportación de ideas para mejorar el análisis del riesgo de inundaciones.


horitzó climàtic
Quart
Evaluación de riesgos climáticos
en Quart de Poblet
CLIMAAX
climate ready regions
Funded by
the European Union
Quart de Poblet
sequoia pro
Acciones con impacto real


3ª Mesa de trabajo
Proyecto
QCATI-CLIMAAX
Resultados 2ª Fase
y Evaluación de Riesgos
CLIMAAX
climate ready regions
Funded by
the European Union
Quart de Poblet
sequoia pro
Acciones con impacto real