VALORADA
VALIDATED LOCAL RISK ACTIONABLE DATA FOR ADAPTATION

CHAMPION STORY #4
APRIL 2026

Supporting Climate Change Risk Management in the Occitanie Region, France

The Challenge

Occitania is the second largest region in metropolitan France covering 72,724 km^2 or about 13.2% of the territory. It includes 13 departments and 4454 municipalities with around 5.83 million inhabitants, making it the 5th most populous region in France. The region boasts a rich variety of landscapes and microclimates, including two mountain ranges, 220km of Mediterranean coastline, as well as two large metropolitan areas, Toulouse (around 1.15 people in 2023[1]) and Montpellier (around 750 000 people in 2023[2]).

The region features a rich variety of landscapes and topographies including Mountains forests, scrublands, plains and coastline all form part of the backdrop to Occitanie / Pyrénées-Méditerranée. The region is framed by two mountain ranges: the Massif Central to the North, and the Pyrenees running along the Spanish border to the South. Occitania is also home to many rivers, such as the Garonne river valley and the Rhône and a portion of its delta, the Camargue. Tens of thousands of hectares of lagoons are dotted around the Mediterranean coastline. Biodiversity is one the region's most exceptional assets, with two National Parks, six regional natural parks, a Marine Natural Park and a number of "natural areas of ecological, floral or faunal interest" (ZNIEFF) which cover about half of the region's landscape.

Figure 1 Location of Occitanie Region, France

The region's main economic activities include agriculture, tourism, aeronautics, and to a lesser extent maritime activities. In terms of employment, it is the second largest agricultural region in France, but the first (also in Europe) when it comes to organic farming. Occitania has placed a particular emphasis on quality labels (AOC/AOP, Red Label, IGP) and is one of the biggest wine-making regions in the world with its 80 appellations. Tourism represents as much as 10% of the Occitania GDP with key tourism centres both in the Mediterranean Sea and the Pyrenees and other mountainous areas.

The region is a patchwork of varying climate conditions. The coast of Languedoc has a Mediterranean climate, while the Aquitaine basin has a slightly warmer ocean climate due to its southern position. The Pyrenees and Massif Central, on the other hand, are subject to more mountainous climate conditions. Whereas, between Toulouse and the Lauragais weir, there is the influence of both ocean and mountain climate conditions. Occitanie is a particularly sunny region, with over 2,200 hours of sunshine per year, and is also a relatively windy region, which provide great conditions for renewable energy infrastructure.

[1] https://www.insee.fr/fr/statistiques/8643952?geo=ARR-313
[2] https://www.insee.fr/fr/statistiques/8643952?geo=ARR-343

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The Occitanie region faces significant climate change challenges, including rising temperatures, changing precipitation patterns, and heightened risk of droughts and heatwaves, particularly near the Mediterranean. These changes are part of France's broader climate challenges, which also involve rising sea levels and severe weather events affecting diverse geographical areas from the Atlantic coast to the Alps. Climate change is leading to an intensification of urban heat islands, exacerbated by more intense, longer, and more frequent heatwaves. These conditions lead to higher temperatures in urban areas compared to surrounding rural areas due to the accumulation of heat from solar radiation and anthropogenic activities, in combination with the lack of vegetation and water features in public spaces. The impact of urban heat islands on the population is considerable, reducing thermal comfort in urban environments, increasing the demand for energy and water during summer months for cooling purposes, and increasing public health risks during heatwaves.

The region's agricultural areas are also particularly affected by climate change. Rising temperatures, prolonged droughts and unpredictable weather patterns threaten agricultural productivity and resource availability. As the climate becomes more volatile, farmers and agricultural cooperatives must address issues such as declining crop yields, water scarcity and soil degradation. These challenges extend beyond individual farms, affecting regional food security, the economic stability of rural communities and the overall sustainability of agricultural practices.

These climate hazards and risks were translated into a "Climate Impact Chain" within the VALORADA project. The Climate Impact chain for the region of Occitanie focused on:

- the **risk posed to agricultural production by increasing temperatures and droughts**,
- the **risk of deterioration of people's health due to urban warming**

In rural contexts, heat and drought risk to exacerbate soil erosion, salinisation, and water scarcity. In Sicoval (Occitanie), stakeholders noted that, in the past, these processes have led to reduced agricultural productivity and increased competition for water use from different sectors (agriculture, tourism and industry), increasing the risk to living standards, safety and security.

In urban areas, dense housing, extensive hard surfaces and limited access to cooling amenities were noted to trap heat, especially at night-potentially compounding physiological strain and affecting residents' mental wellbeing. Extreme heat particularly affects communities with limited resources - especially the elderly - due to financial constraints (e.g., energy costs for air conditioning), limited mobility and reduced social networks. In considering future climate projections, local stakeholders emphasised that these impacts raise important questions about equity and fairness in climate adaptation.

SDG 13: Climate Action calls for urgent action to combat climate change and its impacts by strengthening resilience and adaptive capacity worldwide. It emphasizes the integration of climate measures into national policies, strategies, and planning (Target 13.2), and the need to improve education, awareness, and institutional capacity for climate change mitigation, adaptation, and early warning (Target 13.3).

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How can VALORADA help ?

In response to the increasing climate pressures faced by the Occitania region, the VALORADA project developed a set of climate indicators designed to improve the understanding, and monitoring, of the region's exposure to key climate risks.

The process began with the creation of an initial list of indicators to characterise and quantify the interaction between territorial, environmental and socio-economic factors and changing climatic conditions. These indicators form the backbone of the regional analysis, providing the basis for evidence-based adaptation strategies. From this initial set, the most relevant indicators for Occitania were selected in collaboration with regional stakeholders, reflecting Occitania's specific climatic, geographical and socio-economic characteristics.

The selection process was followed by identifying the local data sources necessary for calculating these indicators. This involved collecting and formatting a wide range of non-climate spatial datasets, including demographic, agricultural and infrastructural information. However, challenges were encountered during this phase, such as restrictions on data access and inconsistencies with INSPIRE compliance standards. To complement the local data, climate projections were obtained from the Copernicus Climate Data Store to ensure a consistent, scientifically robust basis for understanding current and future climatic trends.

For the Occitania region, the VALORADA project focused on two specific territorial entities, Sicoval (south-eastern suburbs of Toulouse) and Montpellier. For the two entities, VALORADA focused on:

- **Agricultural water needs**, to integrate local data and model future scenarios. These scenarios accounted for variables such as crop type, farming practices, climate change, and water availability.
- **Population vulnerability to heat waves**, through specific indicators, to support city authorities in dealing with challenges related to urban heat island effect.

The resulting VALORADA dashboards for Sicoval and Montpellier provide a comprehensive and user-friendly overview of the region's climate and vulnerability indicators. It combines two main types of information. The first type, also available for all the demonstrators, comprises a variety of climate indicators obtained directly from the Climate Data Store, including mean temperature, number of tropical nights, days of extreme precipitation, extreme wind events and flood occurrence. These indicators help to visualise climate trends and potential hazards over time and space. The second group of indicators was specifically requested by, and co-designed with, the regional administrations to address local adaptation priorities and data needs. These include, among others, total agricultural area, irrigation rate, potential crops' water needs (historical and projections), share of green (or canopy) area per capita, accessibility to cooling area, urban vegetation and well-being, population vulnerability to heat waves, and many more.

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Figure 2 VALORADA Dashboard for Sicoval

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The VALORADA dashboards integrate data from multiple sources, including various national and local datasets (e.g., regional urban-climate layers, demographics, agriculture, soil, water resources, detailed land use), Earth Observation and land cover data from the Copernicus services, and historical and projected climate data from the Copernicus Climate Data Store operated by ECMWF which provides the consistent climate baseline and future scenarios needed for indicators (such as mean temperature, tropical nights and other extremes), so that trends can be compared over time and between territories.

By consolidating these diverse data streams, the dashboard becomes a practical tool for the Sicoval and Montpellier administration and local stakeholders. It supports their efforts to identify emerging risks, prioritise adaptation measures and monitor progress in reducing vulnerability over time. Most importantly, it transforms scientific and statistical information into actionable insights, helping decision-makers to strengthen resilience and adaptation policies and actions.

Figure 3 VALORADA Dashboard for Montpellier

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Who is concerned?

The Montpellier and Sicoval administrations are the key public authorities responsible for coordinating and implementing local climate adaptation policies. Acting as the interface between the local (municipal) and regional, national and European governance frameworks, the Montpellier and Sicoval administrations play a central role in translating policy frameworks into strategies that address the specific vulnerabilities of their territories. In France, climate adaptation is coordinated primarily by the State, under the authority of the Ministry for Ecological Transition. The national framework establishes strategic direction, while regions and inter-municipalities are responsible for territorial implementation. he core of the national adaptation strategy is laid out in the National Plan for Climate Adaptation (PNACC), now on its third iteration, which includes actions to better map the risks associated with climate change, improve water management, anticipate the gradual increase in exposure to natural hazards and extreme heat, and integrate adaptation issues into all government and regional actions.

The PNACCs are based on several national legislations, including: the "National Low-Carbon Strategy (SNBC) (Stratégie Nationale Bas-Carbone)", which sets the trajectory toward carbon neutrality by 2050; The Energy and Climate Law (2019), which legally enshrines climate neutrality and reinforces planning obligations; and the Climate and Resilience Law (2021) (Loi Climat et Résilience), which strengthens integration of climate risks in urban planning, coastal management and land-use policies. These laws are themselves aligned with the EU level framework, including: the EU Strategy on Adaptation to Climate Change (2021), which calls for all regions and cities to become more resilient by 2050, emphasising improved data, risk assessment and cross-sectoral coordination[1] the European Climate Law (Regulation (EU) 2021/1119) which establishes adaptation as a legal obligation, requiring Member States to develop coherent national and regional adaptation strategies and to report regularly on progress to support climate-resilient development in line with the Paris Agreement; and the Regulation on the Governance of the Energy Union and Climate Action (EU) 2018/1999 which imposes reporting obligations that require regions to contribute data and updates on adaptation policies, actions, and observed impacts[4].

At regional level, the Occitania region, has developed regional schemes such as the Schéma Régional d'Aménagement, de Développement Durable et d'Égalité des Territoires (SRADDET), which is the main regional spatial and sustainability planning framework. It tackles climate adaptation, water resource management, biodiversity protection, risk prevention (floods, wildfires, coastal erosion), and sustainable mobility. As well as the "Région à Énergie Positive (REPOS)" strategy which aims to achieve a positive energy balance by 2050, it tackles topics such as: agricultural resilience, forest fire prevention, water management under increasing drought conditions and coastal adaptation along the Mediterranean shoreline

Finally, coming back to the more local level with Montpellier and Sicoval, they operationalise the regional and national frameworks. They both have had to adopt a PCAET (Plan Climat-Air-Énergie Territorial), which includes key measures on climate mitigation and adaptation, air quality, and energy transition

[3] This strategy will be complemented by a new integrated framework for European climate resilience and risk management, which should be adopted by the end of 2026. This new framework aims to overcome existing barriers to climate adaptation and acknowledge the different nature of climate risks and impacts between EU members states and their regions.
[4] This information is then fed into national submissions to the European Environment Agency (EEA) and the European Commission. The regulation should be revised in 2026 to ensure an adequate response to the increasing impacts from climate change and other crises while fostering and supporting regional cooperation.

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The plans reflect common issues and challenges, such as flood prevention, preparedness for heatwaves, water resource pressure and optimisation, biodiversity protection and restoration. They also reflect more specific measures linked to the local vulnerabilities, such as urban heat island reduction and urban greening for Montpellier, and agricultural. vulnerability and agroecological transition support for Sicoval. In the urban settings, such as Montpellier, specific urban planning documents also play a role, such as the Plan Local d'Urbanisme Intercommunal (PLUi), which defines urban planning conditions and how land is used, and the Schéma de Cohérence Territoriale (SCoT), which providers a longer-term vision for territorial and spatial planning.

The indicators and dashboards developed under the VALORADA project can directly feed the Sicoval and Montpellier local authorities, and their respective climate adaptation and mitigation strategies, as well as urban and spatial planning actions. They can also inform regional and national policy making, as well as benefit, further down the line other actors such as farmers and other local economic actors. Finally, as an indirect consequence, they can contribute to sustainable economic development and a healthier environment for citizens.

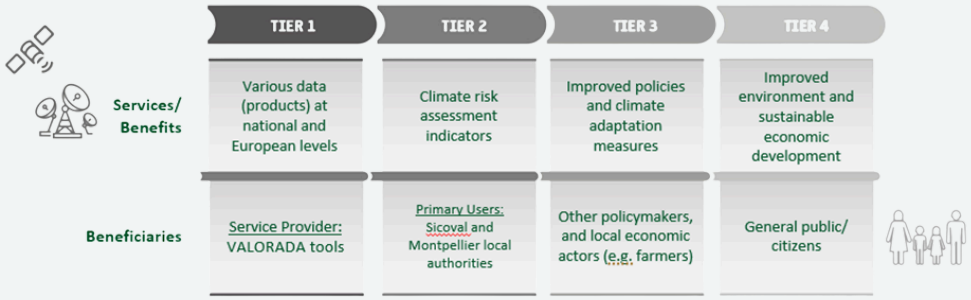

Figure 4 Value chain for Occitanie

What are the benefits?

Using the VALORADA tools generates a wide range of scientific, regulatory, societal, economic and environmental benefits, strengthening the capacity and required insights for climate adaptation across the Occitania region. By combining validated EO inputs with stakeholder-driven indicators and accessible dashboards, the tools improve the availability and usability of climate risk information. This supports more informed decision-making, more efficient governance processes and more climate-resilient regional development. The following are the key benefits:

Environmental

- No direct environmental benefits evidenced (pollution, biodiversity, resource depletion) as the tool informs decisions but does not directly change environmental outcomes

Economic

- Efficiency gains (time/material saved) by improving availability and usability of climate data (Primary user: authorities)

Scientific

- Supports academic publication(s) linked to the service actors; Service provider: TerraNIS//VALORADA

Innovative/entrepreunarial

- No evidence of changed business practice linked to the platform (limited impact; mainly supports planning awareness)
- No evidence of start-up creation or patents linked to the platform

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Societal

- Supports civil security by providing risk awareness (Secondary beneficiary: communities)
- Supportsborader political or strategic goals in alignement with EU/national climate adaptation objectives (primary user : communities)
- Supports public awareness through accessible dashboards (General public, communities)
- Supports community & quality of life indirectly through resilience awareness (Secondary beneficiary: communities)
- Improves oversight/coordination via shared data and a common operational picture (Primary user: authorities)

Regulatory

- Supports better regulations by enabling evidence-based policy design (Primary user: authorities)
- Supports improved monitoring through visualisation of flood, land, forest and social indicators (Primary user: authorities)
- Raises awareness of climate risks among stakeholders and the public (General public, communities)
- Supports policy evaluation by providing data to evaluate policy outcomes (Primary user: authorities)
- Strengthens accountability/transparency through EO-based visualisation (Primary user: authorities; General public)

Extended impact

The two dashboards provide a tested setup that the administrations can extend to other communes and inter-municipalities by reusing the same indicator logic (heat, vulnerability, green/canopy access; agricultural water stress and irrigation needs) and plugging in locally available datasets, rather than starting from scratch each time.
The dashboards can be embedded in real planning routines: annual or seasonal updates can directly support PCAET follow-up, urban greening and heat-action planning in Montpellier and water-demand management and agricultural adaptation planning in Sicoval, with the same indicators used to track progress over time.

Occitanie also benefits from clearer data governance by noting which datasets are open, which are restricted (for example some agriculture inputs) and which simple proxies can be used when access is limited (such as OpenStreetMap or tailored vegetation masks), so the region can scale the approach faster and reduce delays and effort when reporting or auditing adaptation actions.

The Occitanie demonstrator can therefore easily be replicated at the regional level, but also for other areas in France and other European regions with comparable vulnerabilities. Technically, the dashboard's open architecture and Copernicus-based data make some of the indicators easily replicable and sustainable.

Contact us

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