

Good Practice in Policy Integration of Nature-based solutions: Catalan Strategy for Adaptation to Climate Change

Short description

The Catalan Strategy for Adaptation to Climate Change 2021-2030 (ESCACC30) sets strategy, objectives, and lines of action for climate adaptation in the region, identifying NbS as a fundamental pillar. All public policies in Catalonia are legally required to align with the strategy's objectives, grounded in law and developed through broad stakeholder participation.

Images



Tossa de Mar, Catalonia (source: [Wikimedia Commons user](#), CC BY-SA 4.0)

Key messages on good practices for policy integration of NbS

1. The climate adaptation strategy prioritizes NbS and ecosystem restoration as central to climate adaptation across all sectors.
2. All public policies in Catalonia are legally required to align with the strategy's objectives, grounded in law and developed through broad stakeholder participation.
3. The strategy commits to participatory monitoring and evaluation, and calls for substantial long-term funding from regional, national, and EU sources, supported by a dedicated Climate Fund.

Type of policy instrument

PLANNING INSTRUMENT

Location and scale

Catalonia, Spain – regional (federal state)

- regional government strategy
- ECONOMIC INSTRUMENT
- climate fund

Description of policy

WHAT

The Catalan Strategy for Adaptation to Climate Change 2021-2030 (ESCACC30) is a planning instrument that both assesses regional vulnerabilities to the risks of climate change and articulates appropriate action through adaptive measures [1]. The policy target is to reduce vulnerability of socioeconomic and territorial systems to the impacts of climate change with the improved condition of natural ecosystems as the basis for all adaptation efforts.

Nature-based solutions (NbS) are characterized as a fundamental pillar to the strategy's approach to climate adaptation, with multiple example actions spanning ecosystem restoration, sustainable land management, and enhancement of ecosystem services included in the document.

WHEN & HOW MUCH

The Government of Catalonia (Generalitat de Catalunya) approved ESCACC30 in January 2023. The ESCACC30 is primarily a planning instrument, setting strategy, objectives, and lines of action. It does not include a direct fund for projects but does identify funding sources (section 6) and provides guidance on how actions can be financed. The strategy does not specify a total sum required for full implementation up to 2030, but highlights the need for significant, sustained investment from multiple sources. (Section 6. Financing). The only dedicated funding stream, Catalonia's Climate Fund (El Fons Climàtic), offered €80 million for their 2022-2025 funding cycle.

HOW

The ESCACC30 is mandated by Law 16/2017 on Climate Change, requiring the Catalan Office for Climate Change (Oficina Catalana del Canvi Climàtic, OCCC) to develop the strategy with input from other ministries and broad stakeholder participation. All ministries in Catalonia are required to integrate the ESCACC30 into their sectoral planning and programming, involving local authorities and relevant actors.

ESCACC30, an evolution of the Catalan Strategy for Adaptation to Climate Change 2013-2020 (ESACC20), presents 76 operational objectives that are developed through a total of 312 measures. The policy presents an analysis of the vulnerability of 17 areas to the risk of climate change (4 natural systems, 10 socioeconomic areas, and 3 territories).

NbS are explicitly mentioned throughout the strategy. Biodiversity Objective 1.4 states "Prioritize the integration of Nature-based solutions and biodiversity in sectoral policies as mechanisms for climate change adaptation". However, the document does not always use NbS as the terminology to refer to measures that represent NbS principles. For example, the strategy has urban planning measures that include the naturalization of urban areas to mitigate urban heat islands.

WHO

The OCCC, the technical instrument of the Catalan Government for climate change policy coordination, developed the ESCACC30. The Government of Catalonia approved the strategy, after the operational objectives and adaptation measures incorporated contributions made through the participation process (2020-2021) were agreed within the Adaptation Working Group of the Interdepartmental Climate Change Commission.

Within the Government of Catalonia, the Ministry of Territory, Housing and Ecological Transition (Departament de Territori, Habitatge i Transició Ecològica) oversees the Secretariat of Ecological Transition (Secretaria de Transició Ecològica) with three Directorates. One of them is the Directorate of Climate Change and Environmental Quality (Direcció General de Canvi Climàtic i Qualitat Ambiental). Under this structure, the OCCC was established in 2006, to promote and coordinate regulatory development, strategies, plans and objectives to address climate change in Catalonia. Law 16/2017 on Climate Change regulates mitigation and adaptation measures. It defines the governance of climate change within the public

administration and includes taxing as a climate mitigation instrument. Under this law, the Climate Fund has been established to support policy implementation. The ESCACC is the Catalan planning element of the CA policies that governs how government departments must develop their corresponding sectorial action plans.

Other involved partners:

- Interdepartmental Climate Change Commission and its Adaptation Working Group: The multi-sectoral body includes representatives from various government departments to coordinate cross-sectoral policies and measures.
- Local authorities: Municipalities play a vital role in implementing adaptation measures on the ground and tailoring actions to local vulnerabilities.
- Universities and research centres: i.e. the Centre of Ecological Research and Forestry Applications (CREAF) contributed studies on ecosystems services and forest management impacts.

Main actions

The strategy covers the following areas of action [2]:

1. Governance, Integration, and Legislative Alignment
 - Integration of adaptation goals and measures into sectoral government policies and planning
 - Legislative review and reform to eliminate regulations that favour emissions and hinder adaptation
 - Establishment of adaptation working group within the Inter-ministerial Commissions for Climate Change
2. Strategy for Concrete Adaptation Measures and Sectoral Actions
 - Plans implementation of 312 specific adaption measures targeting natural systems, socioeconomic activities, and territories
 - Plans sector-specific adaptation actions (i.e. drought management, flood risk plans, forestry management, water resource protection)
 - Specific operational goals and measures for Inland, Coastal and Mountain Areas.
3. Participation, Monitoring, and Evaluation
 - Participatory process involving technical experts, scientists, and stakeholders to ensure scientific grounding
 - Annual parliamentary review sessions on climate change impacts and progress
 - Mechanisms for effective monitoring, evaluation, and follow-up of the strategy's implementation.

Network Nature theme	Types of NbS
Climate Adaptation, Mitigation and Resilience	Many, including: Green infrastructure, Silvo pastoralism, agroforestry to reduce wildfire risk, wetland restoration, river corridor restoration.

Policy Good Practice Criteria

NbS mainstreamed in policy text and/or NbS are a central component of policy response	NbS are characterized as a fundamental pillar to the strategy's approach to climate adaptation, with multiple example actions spanning ecosystem restoration, sustainable land management, and enhancement of ecosystem services included in the document.
Societal challenge(s) are addressed and human wellbeing outcomes are identified	Identifies cross-cutting impacts and vulnerabilities in natural systems, socioeconomic sectors, and geographic regions [1]: <ul style="list-style-type: none"> • Natural systems <ul style="list-style-type: none"> ○ Changing abundance and distribution of species, risks of extinction/extirpation of vulnerable species ○ Fragmentation of habitats ○ Reduction of water availability and increase in frequency and intensity of droughts ○ Increased risk of forest fires • Socioeconomic sectors [4]

	<ul style="list-style-type: none"> ○ Decrease in crop yields, irrigation water, and suitable crops for <u>agriculture</u>. ○ Expansion of pests and diseases, and forest fires in <u>forestry</u>. ○ Reduction in fish stock and essential marine habitats in <u>fisheries</u>. ○ Reduction in attractiveness of certain <u>tourism</u> destinations due to heat, drought, and forest fires. And damage to tourism infrastructure due to extreme weather events and coastal erosion. ○ Heatwaves, worsening air quality, and expansion of disease vectors (mosquitos, ticks), create new stresses for the <u>health sector</u>. ○ Damage to transportation <u>infrastructure</u>, energy supply, and water availability for supply and sanitation.
Dedicated budget and/or funding stream	<p>The ESCACC30 states that it does not specify a total sum required for full implementation up to 2030, but highlights the need for significant, sustained investment from multiple sources (Section 6. Financing).</p> <p>Regional funding The Climate Fund (El Fons Climàtic) is a financing instrument for climate policies in Catalonia, both mitigation and adaptation. Since the launch of the strategy (December 2021), the Climate Fund had so far financed over 500 projects for local authorities, totalling approximately €80 million to support ESCACC30 goals.</p> <p>National funding The ESCACC30 does not specify any dedicated funding from National Funds. It acknowledges that the National Adaptation Plan (PNACC) has various funding instruments like CLIMA Projects (Proyectos CLIMA), but access will depend on coordination and collaboration between authorities.</p> <p>European funding - ERDF The Catalonia ERDF programme for 2021-2027 was revised in 2024 to include objective 2.4 funding for climate adaptation in line with the strategy [5]. Other options for EU funding include the Just Transition Programme Spain 2021-2027 and LIFE projects, but the strategy notes that access to these funds will depend on Catalonia's "capacity to present competitive projects aligned with European Priorities".</p>
Indicators of impact and evaluation framework	<p>ESCACC30 (Section 5) details the monitoring and evaluation methods. It states that evaluation of impact will be coordinated by the Catalan Office for Climate Change (OCCC), and periodic reports will be prepared to identify strengths, weaknesses, opportunities, and threats in the implementation of the ESCACC30.</p> <p>As of July 2025, no evaluation or monitoring report of the ESCACC30 plan has been published. However, an assessment of the ESACC20 (2013-2020), was published in 2017, and likely offers a framework for future evaluations [5]. For example, the 2017 assessment recorded 148 measures, with 106 having already began implementation. The evaluation [6] recorded information on every individual project, result metrics (hectares modernized, water savings achieved, studies completed), and links to project websites, reports, and legal documents for verification.</p> <p>In addition to global indicators, the strategy involves specific indicators to measure policy effectiveness; each goal is measured by multiple indicators and there are over 90 indicators total being assessed. The indicators are designed to measure the success of intended impacts. In the most recent update, two new metrics have been introduced. The first is a measure of climate justice to evaluate social impact. The second is health benefits.</p>

	<p>Evaluation happens every four or five years, but monitoring schemes are put in place at the beginning of the project to collect baseline data, with the goal of objectively quantifying impacts relative to the starting point.</p>
Inclusivity and stakeholder engagement	<p>The ESCACC30 was developed through a transversal and integrative perspective, promoting the participation of different sectors and levels of government, as well as social and economic actions (Section 4.2). This was achieved through a series of workshops, seminars, and specific consultations with local governments, universities and research centres, business organizations, trade unions, and third sector entities (Section 2.2) [7].</p> <p>The strategy foresees that monitoring and evaluation of ESCACC30 objectives will include the participation of social and economic actors to ensure transparency and accountability. A panel with all stakeholders is involved in following the process of implementation from the beginning and throughout the reporting.</p> <p>The strategy states that it places special emphasis on including the social and territorial perspective to promoting specific adaption measures for especially vulnerable groups and territories. Any aspect of the project must go through the established stakeholder feedback channels.</p>
Consistency within policy mix	<p>National Plan for Adaptation to Climate Change (PNACC) 2021-2030 Approved: 2020</p> <ul style="list-style-type: none"> National-level framework for climate adaptation <p>Natural Heritage and Biodiversity Strategy of Catalonia 2030 Approved: 2018</p> <ul style="list-style-type: none"> A framework document to guide the Government of Catalonia's nature conservation work until 2030. Designed to increase number of actions which can be funded by Programme Catalonia ERDF 2021-2027. <p>The Climate Change Law (16/2017) Enacted: 2017</p>
Knowledge development and transmission	<p>Section 4.2 (Strategic objectives), states that the ESCACC30 is committed to the generation and transfer of knowledge a cross-cutting axis of all adaptation policies.</p> <p>Other sections illustrate measures to promote applied research and the transfer of knowledge to sectors affected by climate change, to develop training and capacity-building programs for technicians and managers and promote information systems and observations for monitoring and disseminating knowledge.</p> <ul style="list-style-type: none"> One measure that illustrates this is the creation the Tera Alta Drought Observatory (OSTA) in southern Catalonia. This project monitors the status of vineyards, olive, and almond trees, and publishes a weekly bulletin to inform farmers of suitable times and allocations for irrigation.
Success Factors/Uptake/Impact	
<p>With no evaluation or monitoring report yet published, it is difficult to judge the full impact of the strategy in promoting NbS and success factors of the strategy. However, its legal mandate to require all sectoral public policies to align with adaptation objectives, including those that feature NbS, ensures that government-driven actions will follow the strategy.</p> <ul style="list-style-type: none"> The well-designed participatory approach, and inclusion of scientists and other technical experts in the design phase, has clearly contributed to its success, giving it scientific grounding and a higher chance of broad public support [8]. 	

- As Catalonia's second adaptation strategy, the ESCACC30 builds directly on the lessons and proven monitoring and assessment mechanism of the ESCACC20.
- The RESIST project [9] references ESCACC30 as mechanism that has helped catalysed better coordination between regional and local authorities for emergency management, due to the strategy including several operational goals for the Natural Risk and Civil Protection sector.
- The strategy's engagement of all relevant sectors—climate change, agriculture, food systems, water management—and commitment to collaboration with these sectors in their development process, has both made this strategy well-integrated but also created widespread recognition of the benefits of NbS in these various sectors. It is recognized that NbS are cheaper, socially accepted, and adaptable.

Detailed below is one example of a measure promoted by the policy. This EU LIFE funded project falls under the operational objective to define and promote forest management that increases the resistance of forests to the risks of climate change (especially forest fires), considering the conservation of biodiversity and local characteristics.

Fire prevention through agro-forestry management in vineyards within Cap de Creus Natural Park - [LIFE MIDMACC](#) [10].

A pilot test, the project combines wine activity with the restoration of natural systems and the landscape, fire prevention, and species recovery programs. Fires were prevented because of two primary measures introduced: extensive transhumance livestock and vineyard, olive, and cereal agriculture. This mosaic also promotes biodiversity.

The location of the vineyard estate has very strong north winds, named *Tramuntana*, which are known to precede forest fires. Therefore, the livestock were placed in the northern part of the property to remove flammable biomass. Strips of vineyards were then placed behind them to further protect the local cork oak forests. These measures were put to the test when forest fires hit the region in 2022. The resistance of the vineyard to fire propagation was decisive in controlling the fire and prevent it from reaching nearby urban areas. The production of valuable, high-quality wine is recognized as key to sustaining the management of this territory. Upon review, it was recognized that collaboration between farmers, technicians, scientists and firefighters was critical to the success of this project, and it will be replicated.

Barriers and Challenges

Lack of dedicated long-term funding

The absence of a dedicated long-term funding source for NbS for climate adaptation limits the scale of measures aligned with the ESCACC30.

Integration and coordination challenges

The complexity of coordinating actions was highlighted in an assessment of the challenges presented by multi-level governance for climate adaptation [11]. Challenges to achieving the targeted fundamental behavioural shift in the tourism sector, whilst meeting the needs of diverse stakeholders, were highlighted by research [12].

Gaps in risk assessment – flash floods

A RESIST assessment funded by the EU highlighted that the ESCACC30 “does not assess risks from flash floods, which represents a significant gap in the analysis” [13]. The report then states that “it is essential to rectify this discrepancy in future adaptation strategies”. Flash flooding is a common occurrence in Catalonia, and this issue was also largely omitted in the ESCACC30, demonstrating a continuity of analytical gaps that could prevent important risks from being addressed.

Potential for Replication or Upscaling

ESCACC30 is among the first strategy of its kind in Southern Europe and has had the impact of serving as a reference point for other regions developing adaptation strategies that feature NbS [8]. Because of the strategy's strong alignment with existing policies and objectives—both within Catalonia, Spain at large, and the EU—the strategy is being used as an example and model for replication in other regions. For example, the RESIST project has piloted the transfer of Catalonia's climate adaptation solutions to regions like Puglia and Baixo Alentejo [9].

The legal mandate that supports the strategy is a key strength that guarantees a degree of impact and uptake. The participatory process is a valuable lesson for other regions; broad stakeholder involvement

improves the effectiveness of the adaptation measures. Also, a commitment to ongoing assessment and flexibility using five-year work programs and continuous monitoring should be a template for other regions.

More Information & Sources

- [1] [ESCACC30 Website \(Overview and all documents\)](#)
- [2] [ESCACC30 executive summary](#) (english version) - PDF
- [3] ESCACC30 Strategy Presentation: [Presentació de l'Estratègia Catalana d'Adaptació al Canvi Climàtic 2022-2030](#)
- [4] Regions4SustainableDevelopment (2025) Overview of other related measures: The Catalan Strategy for Adaptation to Climate Change 2021-2030. Available at: <https://regions4.org/actions/the-catalan-strategy-for-adaptation-to-climate-change-2021-2030/>
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- [7] Oficina Catalana del Canvi Climàtic (2021) ESCACC30 Procés Participatiu. Informe de Resultats Executiu. Available: https://canviclimatic.gencat.cat/web/.content/03_AMBITS/adaptacio/ESCACC_2021_2030/Informe_ESCACC30_resum_executiu.pdf
- [8] Interview with Leo Bejarano Manjón, head of the Catalan Office for Climate Change (OCCC), August 2025.
- [9] RESIST Project: [RESIST - Transferability plans - Catalonia to Puglia and Baixo Alentejo.pdf](#)
- [10] LIFE MIDMACC Projects: [Life MIDMACC – Mid-mountain adaptation to climate change](#)
- [11] IMPETUS (2022) Multi-level governance assessment in the demo sites: governance challenges for climate change solutions. Available at: https://climate-impetus.eu/wp-content/uploads/2023/10/D1.3-Assessment-of-the-capacities-of-multi-level-policy-and-governance-institutions_FINAL.pdf
- [12] Boqué-Ciurana et al (2024) Driving Change: User Engagement and Governance in Climate Adaptation for Coastal Destinations. Abstract for the 2024 European Metrological Society annual meeting. Available at: <https://meetingorganizer.copernicus.org/EMS2024/EMS2024-523.html>
- [13] RESIST Project: [RESIST_D1.11-Needs-Assessment-for-Leading-and-Twinning-Regions.pdf](#) (p.127)

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