

Article

Ecotourism as a Catalyst for Sustainable Development: Conservation Governance in Mountain Regions

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Abstract

This study examines the multifaceted impact of ecotourism and conservation initiatives on sustainable development in the Sobrarbe region of Spain, with a particular focus on the role of the Foundation for the Conservation of the Bearded Vulture (FCQ). Using a mixed-methods approach, including comprehensive document analysis and in-depth qualitative interviews, we investigate how ecotourism practices and land stewardship agreements contribute to local economic development, environmental conservation, and social well-being. Our findings suggest that while ecotourism has positively influenced the region's development, significant challenges remain in balancing conservation efforts with tourism growth. The study provides nuanced insights into the complex interactions among conservation organizations, local communities, and tourism stakeholders, offering evidence-based recommendations for sustainable tourism development in rural mountain areas. By analysing the pioneering land stewardship agreement between the FCQ and the Aínsa-Sobrarbe municipality, we shed light on innovative governance models for sustainable regional development. This research contributes to the growing body of literature on social-ecological systems in mountain regions and provides practical implications for policymakers and conservation practitioners.

Keywords: ecotourism; conservation; sustainable development; land stewardship; rural tourism; actor-centered institutionalism; Sobrarbe; Spain



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1. Introduction

The United Nations' declaration of 2022 as the International Year of Sustainable Mountain Development underscores the critical role of mountain ecosystems in global sustainability efforts [1]. This recognition comes at a time when mountain regions worldwide face unprecedented challenges, including climate change, biodiversity loss, and socio-economic pressures [2]. In this context, the interplay among tourism, conservation, and sustainable development in mountain areas has gained increased attention from researchers, policymakers, and practitioners alike.

The Sobrarbe region in Aragon, Spain, as can be seen inside blue rectangle in Figure 1, exemplifies the complex dynamics at play in mountain territories striving for sustainability. Rich in natural and cultural heritage, Sobrarbe has seen a surge in tourism interest, particularly in the wake of the COVID-19 pandemic. Recent trends show tourists increasingly seeking experiences closer to nature and away from mass tourism destinations [3]. This shift has positioned ecotourism and rural tourism as growing economic activities with the

potential to promote sustainable territorial development and address the pressing issue of rural depopulation in both Aragon and Spain more broadly [4].

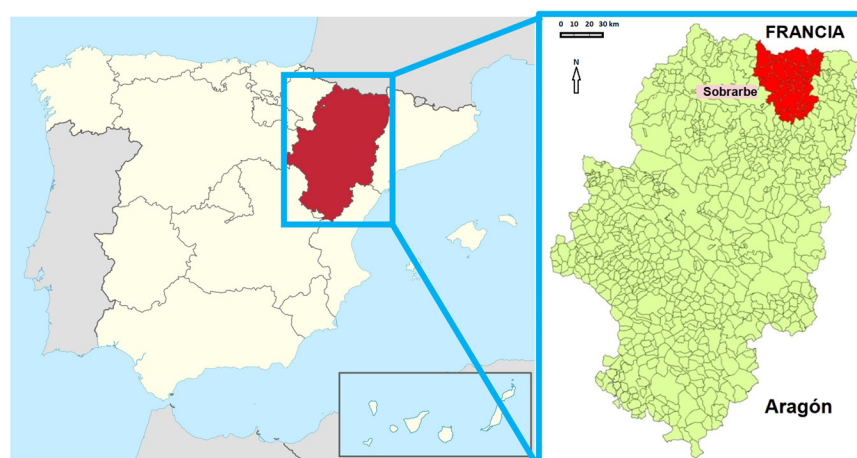


Figure 1. Spain—Aragon—Sobrarbe map. Source: Wikipedia (modified by authors).

The exceptional character of Sobrarbe is evidenced by its numerous UNESCO recognitions, including:

1. The Pyrenees-Monte Perdido territory as a World Heritage Site (1997)
2. Rock Art of the Mediterranean Basin on the Iberian Peninsula (1998)
3. Summer solstice fire festivals in the Pyrenees as Intangible Cultural Heritage of Humanity (2015)
4. The Sobrarbe-Pirineos UNESCO Global Geopark (2006)
5. The Ordesa-Viñamala territory as a Biosphere Reserve (1977)
6. Timber rafting as Intangible Cultural Heritage of Humanity (2022)

These designations not only highlight the region's outstanding universal value but also bring with them responsibilities and challenges in terms of conservation and sustainable development [5].

The exceptional biodiversity, nature and landscapes of the Sobrarbe region are also certified by its extraordinary figures of protected surface area (Source: Europarc España, Gobierno de Aragón):

- 19.1% of its territory is classified under some category included in Protected Natural Areas legislation (one National Park, two Natural Parks and four Natural Monuments), a percentage higher than that of Aragon (3.3%) and Spain (14.7%).
- 50.6% of its territory forms part of the European Union's Natura 2000 Network, well above the figures for Aragon (28.5%) and Spain (27.3%).

Within this rich natural and cultural landscape, the Foundation for the Conservation of the Bearded Vulture (FCQ) has emerged as a key player in promoting conservation projects and sustainable tourism initiatives. The FCQ's activities align closely with the Aragonese Government's Tourism Strategy Plan 2021–2024, extending beyond species conservation to encompass broader social, economic, and political impacts through their own actions and collaborative projects [6].

A cornerstone of the FCQ's work in the region is the land stewardship agreement signed in 2016 with the Aínsa-Sobrarbe municipality, subsequently renewed in 2019 and 2024. This pioneering agreement in Aragon promotes projects directly linked to the social and economic development of the community inhabiting this natural environment. The significance of this agreement lies not only in its scope—covering a substantial number of

hectares—but also in its innovative approach to integrating conservation goals with local development objectives [7].

The present research seeks to analyse this agreement and its impacts through the lens of actor-centered institutionalism [8], a theoretical framework that allows for a nuanced understanding of the complex interactions between institutional structures, actors' strategies, and policy outcomes. By applying this perspective to the case of Sobrarbe, we aim to shed light on the intricate relationships between conservation organizations, local communities, tourism stakeholders, and governmental bodies in shaping the sustainable development trajectory of the region.

Moreover, this study responds to calls in the literature for more integrated approaches to understanding social-ecological systems in mountain regions [9]. By examining the multifaceted impacts of ecotourism and conservation initiatives in Sobrarbe, we contribute to the growing body of knowledge on sustainable mountain development and offer insights that may be applicable to similar contexts globally.

The timeliness of this research is underscored by the pressing challenges facing mountain regions worldwide, including climate change, biodiversity loss, and socio-economic transformations. As Palomo et al. (2021) [10] argue, protected areas and conservation initiatives can serve as catalysts for sustainable regional development when managed through participatory approaches that integrate local knowledge and needs. Our analysis of the FCQ's role in Sobrarbe provides a case study of how such integration can be achieved in practice.

In the following sections, we will outline the specific objectives of this research, provide a comprehensive theoretical framework drawing on relevant literature, detail our methodological approach, present our findings, and discuss their implications for both theory and practice in the fields of ecotourism, conservation, and sustainable mountain development.

The overarching aim of this research is to conduct a comprehensive analysis of the environmental, social, and economic impacts of the actions carried out by the Foundation for the Conservation of the Bearded Vulture (FCQ) in the Sobrarbe region of Huesca province, Spain. We consider the FCQ as a pivotal social actor in the transition towards territorial sustainability, and our analysis focuses particularly on the period since the signing of the first land stewardship agreement with the Aínsa-Sobrarbe Municipality.

To achieve this aim, we have established the specific objectives (Table 1).

Table 1. Objectives and sub-points.

Objective	Sub-Points
1. Examine the FCQ-Aínsa-Sobrarbe Municipality land stewardship agreement	a. Structure and content of the agreement b. Governance mechanisms c. Alignment with broader policies d. Evolution through renewals
2. Assess local community perception	a. Overall development trajectory of Sobrarbe b. FCQ's role in shaping development c. Impacts of specific projects d. Challenges and opportunities of ecotourism growth
3. Analyze economic impacts	a. Job creation and economic diversification b. Changes in tourism patterns and demographics c. Investment in conservation and sustainable development

Table 1. *Cont.*

Objective	Sub-Points
4. Evaluate environmental impacts	a. Biodiversity conservation b. Landscape preservation and management c. Sustainable resource use practices
5. Assess social impacts	a. Changes in local attitudes towards conservation b. Community engagement in initiatives c. Cultural preservation and heritage promotion
6. Examine governance structures and collaborative mechanisms	a. Roles and interactions of stakeholders b. Decision-making processes and power dynamics c. Conflict resolution mechanisms d. Integration of local knowledge in conservation
7. Formulate evidence-based policy proposals	a. Enhancing competitive advantages in sustainable tourism b. Strengthening conservation-development synergies c. Addressing identified challenges
8. Contribute to theoretical understanding	a. Applying actor-centered institutionalism b. Comparing findings with other cases c. Identifying generalizable lessons and best practices

Source: own elaboration.

By addressing these objectives, we aim to provide a comprehensive and nuanced understanding of the complex interplay between ecotourism, conservation, and sustainable development in the Sobrarbe region. Our findings will not only contribute to the academic discourse on these topics but also offer practical insights for policymakers, conservation practitioners, and community leaders in Sobrarbe as well as in similar regions worldwide.

1.1. Sustainable Development and Tourism

The concept of sustainable development has been at the forefront of global policy discussions since the late 20th century, marking a paradigm shift in how societies approach economic growth, environmental protection, and social well-being. The definition in the Brundtland Report of sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” [11] continues to guide policy and practice across various sectors, including tourism.

In recent years, the concept of sustainable development has evolved to encompass a more holistic and integrated approach. The United Nations’ 2030 Agenda for Sustainable Development, adopted in 2015, outlines 17 Sustainable Development Goals (SDGs) that recognize the interconnectedness of social, economic, and environmental challenges [12]. This framework has gained increasing influence in shaping policy and practice across various sectors, including tourism.

Tourism, as one of the world’s largest and fastest-growing economic sectors, plays a crucial role in the sustainable development agenda. According to the World Travel & Tourism Council (WTTC), the tourism sector accounted for 10.3% of global GDP and 10.4% of total employment in 2019, before the COVID-19 pandemic [13]. In Spain, the tourism’s significance is even more pronounced, with the National Institute of Statistics (INE) reporting that tourism activity accounted for 12.6% of national GDP and 12.7% of employment in 2022 [14].

The concept of sustainable tourism has evolved in response to growing awareness of the sector’s environmental and social impacts. The United Nations World Tourism

Organization (UNWTO) defines sustainable tourism as “tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities” [15]. This definition underscores the need for a balanced approach that considers the needs of all stakeholders and the long-term viability of destinations.

The Global Code of Ethics for Tourism, adopted by the UNWTO in 1999 and recognized by the UN General Assembly in 2001, provides a comprehensive set of principles designed to guide key players in tourism development. These principles aim to help maximize the sector’s benefits while minimizing its potentially negative impacts on the environment, cultural heritage, and societies across the globe [16]. In 2019, UNWTO launched the Tourism Ethics Convention, further reinforcing commitment to ethical and sustainable tourism practices [16].

In the context of mountain regions like Sobrarbe, sustainable tourism development faces unique challenges and opportunities. Mountain environments are particularly vulnerable to climate change and other environmental pressures, yet they also offer rich biodiversity and cultural heritage that can form the basis for sustainable tourism offerings [2]. The challenge lies in developing tourism models that can contribute to local economic development while preserving the ecological and cultural integrity of these sensitive areas.

Recent research has highlighted the potential of sustainable tourism to contribute to multiple Sustainable Development Goals (SDGs) in mountain regions. For instance, Messerli et al. [17] argue that well-managed tourism can contribute to poverty alleviation (SDG 1), sustainable economic growth (SDG 8), responsible consumption and production (SDG 12), and life on land (SDG 15) in mountain communities. However, they also caution that without proper planning and management, tourism development can exacerbate environmental degradation and social inequalities.

Carrying capacity is a key concept for identifying the sustainable limits of tourism activity in a given destination. It refers to the maximum number of visitors that a place can accommodate without causing irreversible negative impacts on either the environment or the socio-cultural sphere. When tourist flows exceed certain thresholds, two main types of adverse effects may arise: on the one hand, physical and ecological degradation of the area, such as ecosystem deterioration, pollution of natural resources, and infrastructure wear and tear; on the other hand, impacts on the local population, including changes in quality of life, gentrification processes, loss of cultural identity, and overburdening of public services. Exceeding the carrying capacity creates the conditions for the emergence of overtourism.

The concept of overtourism has gained prominence in recent years, highlighting the potential negative impacts of uncontrolled tourism growth on local communities and environments [18]. This has led to increased emphasis on destination management strategies that prioritize quality over quantity and seek to distribute tourism benefits more equitably [19].

In this study, we adopt a holistic view of sustainability that encompasses its economic, environmental, and social dimensions [4]. This approach allows us to examine the multifaceted impacts of ecotourism and conservation initiatives in Sobrarbe, considering not only their economic contributions but also their effects on environmental conservation, social cohesion, and cultural preservation.

1.2. Ecotourism

Ecotourism emerges as a specific form of sustainable tourism that focuses on nature-based experiences and conservation. The International Ecotourism Society (TIES) defines ecotourism as “responsible travelling to natural areas that conserves the environment,

sustains the well-being of the local people, and involves interpretation and education” [20]. This definition highlights three key components of ecotourism: (1) Environmental conservation; (2) Community well-being; (3) Educational experiences. Honey [21] expands on this definition, identifying seven characteristics of ecotourism (Table 2)

Table 2. Principles of ecotourism.

Principles of Ecotourism:
Travel to natural destinations
Minimizes impact
Builds environmental awareness
Provides direct financial benefits for conservation
Provides financial benefits and empowerment for local people
Respects local culture
Supports human rights and democratic movements

Source: based on [21].

These characteristics underscore the potential of ecotourism to serve as a tool for both conservation and community development, aligning closely with the broader goals of sustainable development.

In recent years, the concept of ecotourism has evolved to encompass a broader range of activities and approaches. For example, Fennell [22] argues for a more critical and nuanced understanding of ecotourism that considers its political, ethical, and social dimensions. This expanded view of ecotourism recognizes the complex power dynamics and potential for both positive and negative impacts on local communities and ecosystems.

The growth of ecotourism reflects broader global trends towards more sustainable and responsible forms of travel. According to UNWTO, nature-based tourism, which includes ecotourism, grew three times faster than the tourism industry as a whole before the COVID-19 pandemic [16]. The pandemic has further accelerated interest in nature-based and sustainable forms of tourism, as travelers seek out less crowded destinations and meaningful experiences [23].

In Spain, the development of ecotourism has gained momentum in recent years, with the creation of the Spanish Ecotourism Association in 2010 and the launch of the “Soy Ecoturista” (I am an Ecotourist) brand. These initiatives aim to promote Spain as an ecotourism destination and to ensure the quality and sustainability of ecotourism offerings. The establishment of the Spanish Ecotourism Observatory in 2017, a joint effort of the Spanish Ecotourism Association and the Secretary of State for Tourism, marked a significant step in gathering data and monitoring the development of the sector [24].

However, the development of ecotourism is not empty of challenges. Critics have pointed out that poorly managed ecotourism can lead to negative impacts on ecosystems and local communities, a phenomenon sometimes referred to as “green washing” [25]. There are also concerns about the capacity of local communities to benefit equitably from ecotourism development, particularly in remote or economically marginalized areas [26,27].

Recent research has also highlighted the importance of considering the carbon footprint of ecotourism, particularly when it involves long-distance travel to remote destinations [28]. This has led to increased interest in “slow tourism” and more localized forms of ecotourism that minimize travel-related emissions [29].

In the context of Sobrarbe, the development of ecotourism presents both opportunities and challenges. The region’s rich natural and cultural heritage provides a strong foundation for ecotourism offerings. However, as our study will explore, careful planning and man-

agement are necessary to ensure that ecotourism development aligns with conservation goals and contributes to the well-being of local communities.

1.3. Land Stewardship and Governance

Land stewardship represents an innovative approach to conservation that emphasizes collaboration between landowners, land users, and conservation organizations. The Network Land Stewardship defines it as “a range of voluntary strategies used by landowners and conservation organizations to protect and manage land, water, and related resources” [30].

In Spain, the concept of land stewardship (*custodia del territorio*) has gained traction as a tool for conservation and sustainable land management. The Spanish Platform for Land Stewardship defines it as “a set of strategies and instruments that aim to involve owners and users in the conservation and proper use of natural, cultural, and landscape values and resources” [31].

Land stewardship agreements, such as the one between the FCQ and the Aínsa-Sobrarbe municipality, represent a form of collaborative governance that connects private and public interests in land management. These agreements are characterized by their voluntary nature and their focus on long-term conservation goals.

The theoretical underpinnings of land stewardship can be found in the literature on environmental governance and collaborative natural resource management. Ostrom’s [32] seminal work on “governing the commons” provides a foundation for understanding how local communities can effectively manage shared resources. Building on this, Folke et al. [33] emphasize the importance of adaptive co-management approaches that integrate different knowledge systems and allow for learning and adaptation over time.

In recent years, the concept of land stewardship has evolved to encompass a broader range of approaches and contexts. For example, Plieninger et al. [34] argue that land stewardship can play a crucial role in preserving cultural landscapes, where human activities have shaped ecosystems over centuries and where conservation goals must be balanced with local livelihoods and cultural practices. This perspective is particularly relevant to regions like Sobrarbe, where traditional land use practices have contributed to the creation and maintenance of unique landscapes.

The land stewardship agreement between the FCQ and the Aínsa-Sobrarbe municipality represents an example of what Borrini-Feyerabend et al. [35] term “collaborative governance” in protected areas. This approach recognizes that effective conservation requires the involvement of multiple stakeholders and the integration of diverse forms of knowledge and values. Recent research by Díaz-Christiansen et al. [36] on community-based tourism in Ecuador further underscores the importance of collaborative governance in achieving sustainable development outcomes in rural and protected areas.

In the context of protected areas and conservation, land stewardship agreements can serve as a bridge between formal protected area management and broader landscape-level conservation efforts. This aligns with the growing recognition of the need for landscape-scale approaches to conservation, as highlighted by DeFries and Nagendra [37]. Such approaches acknowledge the interconnectedness of ecosystems and the importance of maintaining ecological connectivity beyond the boundaries of protected areas.

Furthermore, the concept of land stewardship resonates with recent developments in conservation science, particularly the “Half-Earth” proposal advocated by Wilson [38] and the “Nature Needs Half” movement [39]. These initiatives call for the protection of at least half of the Earth’s land and sea to safeguard biodiversity and ecosystem services. While ambitious, these goals underscore the need for innovative conservation strategies that can reconcile human needs with ecological imperatives.

The implementation of land stewardship agreements also intersects with broader discussions about environmental justice and the rights of local and indigenous communities. As Asiyambi and Lund [40] argue, conservation initiatives must be sensitive to issues of power, equity, and local rights to be truly sustainable and effective. This perspective highlights the importance of ensuring that land stewardship agreements are not only ecologically sound but also socially just and inclusive.

1.4. Actor-Centered Institutionalism

To analyze the complex interactions between different stakeholders in the context of the land stewardship agreement and ecotourism development in Sobrarbe, we draw on the theory of Actor-Centered Institutionalism (ACI) developed by Scharpf [8]. This theoretical framework provides a nuanced approach to understanding how institutional structures shape the actions of individual and collective actors, while also recognizing the agency of these actors in influencing institutional change.

ACI posits that policy outcomes are the result of interactions among purposeful actors with specific capabilities, orientations, and preferences, operating within institutional settings that both constrain and enable certain courses of action. The framework distinguishes between the institutional setting, the actors, and the actor constellations that emerge in specific policy situations.

Key elements of the ACI framework:

1. Institutional setting: The formal and informal rules that structure the opportunities and constraints for actors. In the case of Sobrarbe, this includes legal frameworks governing protected areas and tourism regulations.
2. Actors: Individual and collective entities with specific capabilities and action orientations. In our study, these include the FCQ, local government bodies, tourism businesses, and local communities.
3. Actor orientations: The perceptions and preferences of actors, which are shaped by the institutional context but also by their individual or organizational identities and interests.
4. Actor constellations: The set of actors involved in a particular policy interaction, their strategy options, the outcomes associated with strategy combinations, and the preferences of actors over these outcomes.
5. Modes of interaction: The ways in which actors interact within the given institutional structure, ranging from unilateral action to negotiated agreement and majority vote. and the formal structure of the land stewardship agreement.

Applying ACI to the case of Sobrarbe allows us to examine how the institutional framework of the land stewardship agreement structures the interactions between the FCQ, local government, and other stakeholders. It also enables us to analyze how these actors' orientations and capabilities influence the implementation of conservation and ecotourism initiatives.

Moreover, ACI provides a framework for understanding how institutional change can occur through the strategic actions of actors. This is particularly relevant in the context of innovative governance arrangements like the land stewardship agreement, which represents a departure from traditional top-down conservation approaches.

Recent applications of ACI in environmental governance research have demonstrated its utility in understanding complex socio-ecological systems. For example, Bitschi [41] used ACI to analyze collaborative water governance in Switzerland, highlighting how institutional settings shape actor constellations and interaction modes in water management. Similarly, Kirschke et al. [42] applied ACI to examine the implementation of the EU

Water Framework Directive, demonstrating how actor constellations and their strategic interactions influence policy outcomes.

Building on these applications, recent studies have further expanded the use of ACI in environmental governance contexts. For instance, Klenk et al. [43] employed ACI to analyze the governance of nature-based solutions in urban settings, revealing how different institutional arrangements can facilitate or hinder the implementation of green infrastructure projects. Their work underscores the importance of considering both formal and informal institutions in shaping actor behaviors and policy outcomes.

Furthermore, Paavola [44] has argued for the integration of ACI with other theoretical approaches, such as the Institutional Analysis and Development (IAD) framework, to provide a more comprehensive understanding of environmental governance processes. This integrative approach allows for a more nuanced analysis of the interplay between institutions, actors, and ecological systems. In the context of our study, ACI allows us to: (1) Identify the key actors involved in ecotourism development and conservation in Sobrarbe, their capabilities, and their orientations; (2) Analyse how the institutional setting of the land stewardship agreement shapes the opportunities and constraints for these actors; (3) Examine the actor constellations that emerge around specific issues, such as the development of new ecotourism initiatives or the implementation of conservation measures; (4) Understand the modes of interaction between actors and how these influence policy outcomes; and (5) Explore how actors can strategically act to influence institutional change, potentially leading to more effective and equitable approaches to sustainable development in the region.

By applying ACI to the case of Sobrarbe, we aim to contribute to the growing body of literature on collaborative environmental governance in protected areas and cultural landscapes. Our analysis will provide insights into how innovative institutional arrangements like land stewardship agreements can facilitate more integrated approaches to conservation and sustainable development in mountain regions.

Moreover, our application of ACI in this context responds to calls for more empirical research on the effectiveness of collaborative governance arrangements in achieving conservation and sustainable development goals [45]. By examining the specific mechanisms through which the land stewardship agreement in Sobrarbe influences actor behaviors and policy outcomes, we can contribute to a more nuanced understanding of the conditions under which such arrangements are likely to succeed.

2. Materials and Methods

We developed a detailed case study of specific ecotourism initiative and conservation projects in the Sobrarbe region. We followed Yin's [46] guidelines for case study research, ensuring rigorous data collection and analysis procedures. We combine qualitative technique and documentary analysis to provide a deep view of the impact of ecotourism and conservation initiatives in the Sobrarbe region. This methodology allows us to triangulate data from multiple sources, enhancing the validity and reliability of our findings.

2.1. Documentary Analysis

We conducted a thorough review and analysis of relevant documents, including:

1. The land stewardship agreements between the FCQ and Aínsa-Sobrarbe municipality (2016, 2019, and 2024 versions). The land stewardship agreement between the FCQ and Aínsa-Sobrarbe municipality, first signed in 2016 and subsequently renewed in 2019 and 2024, represents an innovative approach to collaborative conservational governance
2. Reports and publications by the FCQ and other relevant organizations

3. Academic literature on ecotourism, conservation, and sustainable development in mountain regions.

This document analysis provided a foundation for understanding the institutional context and the evolution of conservation and tourism initiatives in the region. We used a content analysis approach, as described by Krippendorff [47], to systematically identify themes and patterns in the documents.

2.2. Semi-Structured Interview

We conducted in-depth, semi-structured interviews with key stakeholders in the Sobrarbe region. Interviewees included:

1. Representatives from the FCQ (n = 1).
2. Local government officials from Aínsa-Sobrarbe and other municipalities in Sobrarbe (n = 3).
3. Tourism business owners and operators (n = 4).
4. Representatives from local community organizations (n = 4).
5. Mountain sport technicians and researchers (n = 1).

A total of 13 interviews were conducted, each lasting approximately 60–90 min. The interviews were recorded, transcribed, and coded for analysis. The interview guide was designed to elicit information on:

1. Perceptions of ecotourism development in the region.
2. Impacts of the FCQ actions, some of them included in the land stewardship agreement.
3. Challenges and opportunities in balancing conservation and development.
4. Governance processes and stakeholder interactions.

We used a purposive sampling strategy to ensure representation from diverse stakeholder groups, following the recommendations of Patton [48] for qualitative research. The interview process continued until theoretical saturation was reached, as described by Saunders et al. [49] and taking into account the high level of representativeness and heterogeneity of the selected sample.

2.3. Data Analysis

Qualitative data from interviews as well as document analysis were coded and analyzed using thematic analysis approach, as described by Braun and Clarke [50], identifying key themes and patterns in the data.

We used the Actor-Centered Institutionalism framework to guide our analysis, focusing on:

1. Identifying key actors and their orientations
2. Analyzing the institutional context
3. Examining actor constellations and modes of interaction
4. Assessing policy outcomes and institutional change

3. Results

Our analysis of the land stewardship agreements and its impacts in the Sobrarbe region revealed several key findings, which we present here structurally according to our research objectives.

3.1. Analysis of the FCQ-Aínsa-Sobrarbe Municipality Land Stewardship Agreement

Our analysis of the agreement documents and interviews with key stakeholders revealed the following:

Structure and Content:

- The agreement covers approximately 15,000 hectares of land, including critical habitat for the bearded vulture and other protected species.

- It outlines specific conservation goals, ecotourism development objectives, and mechanisms for collaboration between the FCQ, the municipality, and local stakeholders.

Governance Mechanisms:

- The agreement establishes a joint management committee with representatives from the FCQ, the municipality, and local community organizations.

- Decision-making processes are based on consensus, with provisions for conflict resolution through mediation.

Alignment with Broader Policies:

- The agreement aligns closely with regional and national conservation strategies, as well as with UNESCO guidelines for the management of World Heritage Sites and Geoparks.

- It also supports the implementation of the European Landscape Convention at the local level.

Evolution through Renewals:

- The 2019 renewal expanded the scope of ecotourism activities and strengthened provisions for community benefit-sharing.

- The 2024 renewal introduced new measures for climate adaptive measures and increased emphasis on scientific research and monitoring.

Table A1: Land stewardship agreements and aligned actions (Source: Own elaboration based on land stewardship agreement and activity reports provided by FCQ) (Find in Appendix A)

3.2. Local Community Perceptions

Our interviews with local community members revealed complex and nuanced perspectives regarding ecotourism development and the FCQ's role in the region. The majority of respondents perceived positive economic impacts from ecotourism growth, recognizing its contribution to local prosperity and development. However, a substantial portion of community members expressed concerns about potential overreliance on tourism as the primary economic driver, emphasizing the critical need for economic diversification to ensure long-term sustainability and resilience of the local economy.

Regarding the FCQ's institutional role, community perceptions were predominantly favorable, with respondents particularly appreciating the organization's contributions to species conservation and environmental education initiatives. The organization's scientific and educational work garnered widespread community support and recognition for its positive environmental impact.

Specific FCQ-led projects received varied community responses, reflecting the complexity of local stakeholder interests. The Pirineos Bird Center, an ecotourism initiative developed by the FCQ, received widespread community approval for its significant educational value and meaningful contribution to local employment opportunities. In contrast, the reintroduction of traditional livestock practices generated mixed feedback, with strong support from environmental advocacy groups but some members of the farming community expressed skepticism. Tourism business owners consistently identified seasonality as a major operational challenge, while multiple stakeholders highlighted promising opportunities for developing year-round ecotourism activities and creating innovative integrations between tourism and traditional agricultural practices.

In order to facilitate the understanding of the results obtained, a summary table of the main conclusions has been developed and is presented in Appendix B: Table A2 (Synthesis of content extracted from the interviews)

3.3. Economic Impacts

The Ordesa and Monte Perdido National Park is situated entirely within the Sobrarbe comarca; however, its surface area is distributed across the municipalities of Broto, Bielsa, Fanlo, Puértolas, Tella-Sin, and Torla-Ordesa. The park does not encompass territory within the municipal boundaries of Aínsa-Sobrarbe, as can be seen in Figure 2, although Aínsa does not constitute part of the park proper, its strategic location renders it an optimal departure point for exploring the park's various zones. From Aínsa, visitors can readily access specific sectors of the park, including the Añisclo canyon and the Escuaín gorges.

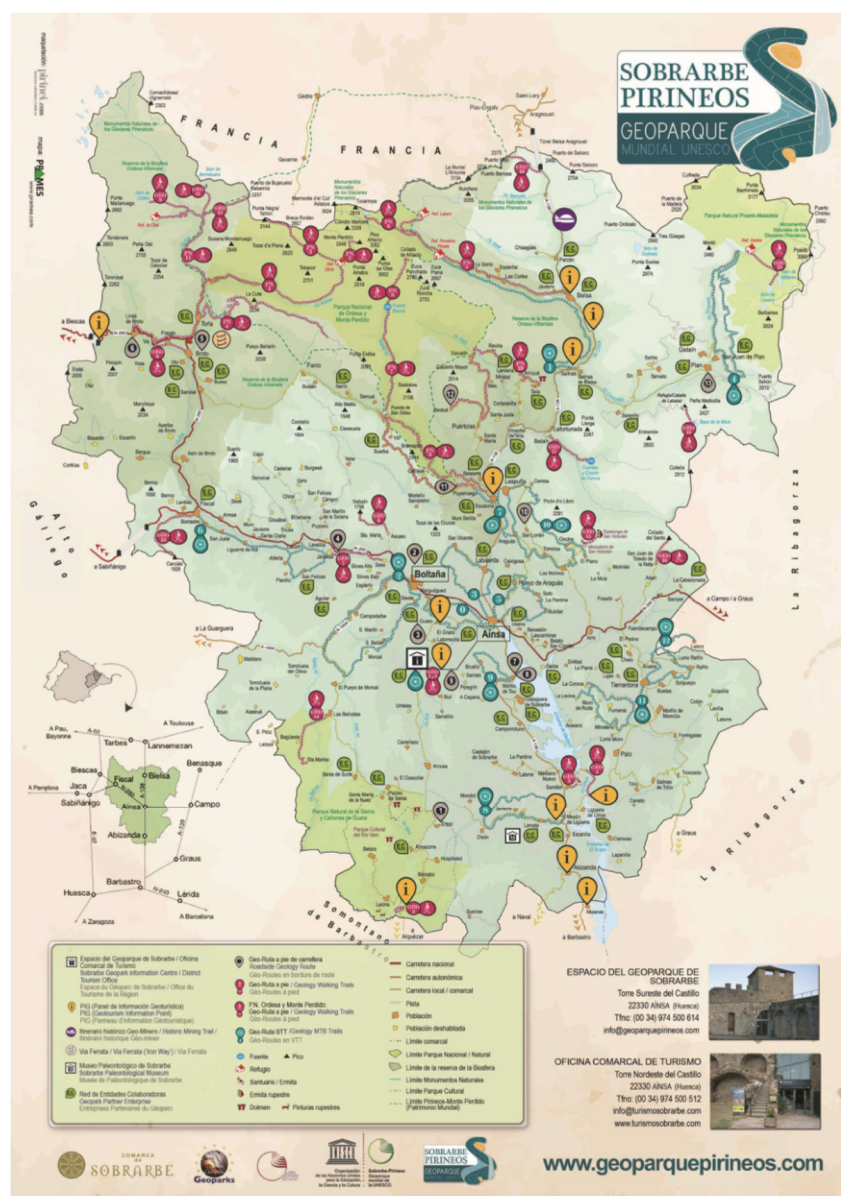


Figure 2. Map of tourist resources in Sobrarbe. Source: <https://www.geoparquepireneos.com> (accessed on 28 June 2025). (modified by authors).

Based on the comprehensive socioeconomic impact study of Ordesa and Monte Perdido National Park conducted by Universidad Rey Juan Carlos [51], the tourism sector generates substantial economic benefits for the Sobrarbe region. The research reveals that visitor expenditure creates a total production effect of approximately 222 million euros annually within the Sobrarbe comarca, with 124 million euros representing direct spending by tourists. This economic activity supports 1799 full-time equivalent jobs in the region,

demonstrating tourism's role as the primary economic driver in an area where the service sector accounts for over 80% of economic activity in some municipalities, particularly those activities related to hospitality, retail, and cultural services.

The multiplier effects of tourism spending extend well beyond direct expenditure, creating significant indirect and induced economic impacts throughout the regional economy. The study indicates that for every euro spent directly by visitors, additional economic activity is generated through supply chain relationships and household consumption, resulting in a total economic multiplier effect of 1.79 for the Sobrarbe region [51]. The tourism infrastructure supports a diverse accommodation sector including hotels, rural tourism properties, campsites, and tourist apartments, which collectively provide 8387 accommodation places across the six municipalities within the park's area of socioeconomic influence. This infrastructure generates substantial employment in hospitality and related services, with tourism-related jobs representing nearly half of all employment created by visitor spending.

However, the study also identifies significant challenges related to the highly seasonal nature of tourism in the region, with 62% of annual visits concentrated in just four months (June through September), and August alone accounting for 25.3% of total annual visitors [51]. This seasonality creates operational difficulties for tourism businesses and represents a key opportunity cost, as many establishments must remain closed for substantial portions of the year while depending on summer revenues for annual sustainability. The research suggests that addressing this seasonality through the development of year-round tourism activities, while maintaining compatibility with conservation objectives, could significantly enhance the economic benefits of tourism for the Sobrarbe region.

3.4. Environmental Impacts

According to data provided by the FCQ to the authors, the Eco-Museum Visitor Center Castillo de Aínsa (Huesca)/Pirineos Bird Center, owned by the Spanish Ministry of Culture and Sport and managed by the FCQ since 1996, has experienced a steady increase in visitor numbers, receiving approximately 21,327 visitors in 2023 and 25,883 in 2024. These figures reflect growing public interest in nature-based tourism and environmental education.

Furthermore, the FCQ reports that the Aínsa-Sobrarbe supplementary feeding station for scavenger birds prevents the annual emission of approximately 224,000 kg of CO₂ into the atmosphere. This initiative exemplifies the climate mitigation potential of biodiversity conservation through ecosystem services.

Conservation efforts in the region have also yielded significant outcomes for endangered species. The breeding population of bearded vultures in the Pyrenees is currently the largest in the European Union, with most pairs concentrated in the central Spanish Pyrenees. In Aragon, between 1988 and 2023, the breeding population grew at an average annual rate of 6.4%, increasing from 27 to 88 territorial units.

While residents perceived improvements in landscape quality attributed to active conservation efforts, a minority expressed concerns regarding the visual impacts of new tourism infrastructure development. This dichotomy suggests that, although conservation initiatives have achieved measurable success in habitat restoration and species protection, the integration of tourism infrastructure requires more careful consideration of landscape compatibility and community acceptance to maintain the social license for continued development.

3.5. Social Impacts

The interview data revealed substantial shifts in community attitudes toward conservation and environmental stewardship over the study period. Interview participants

indicated a growing recognition among residents of the interconnection between conservation efforts and economic opportunities, suggesting that community understanding has evolved beyond viewing conservation as a constraint on development to recognizing it as a foundation for sustainable economic growth.

Most of the community representatives interviewed believed that ecotourism initiatives had contributed to the revitalisation of local traditions and crafts. However, this cultural renaissance was tempered by concerns expressed by one respondent regarding the potential commodification and exploitation of local culture for tourism purposes. These findings indicate that while ecotourism has created opportunities for cultural preservation and economic benefit, careful management is required to ensure authentic cultural expression, while avoiding the superficial presentation of traditions solely for visitor consumption.

Ornithological tourism, ecotourism initiatives, and scientific tourism are regarded as potential mechanisms for deseasonalizing tourism activity and represent opportunities for long-term sustainability.

3.6. Governance Structures and Collaborative Mechanisms

Our analysis of governance processes revealed a mixed picture of collaborative management effectiveness, with notable improvements in stakeholder coordination alongside persistent structural challenges. The land stewardship agreement successfully facilitated regular interaction between the FCQ, local government, and community representatives, creating institutional mechanisms for ongoing dialogue that had previously been absent. Interview participants reported improved communication and trust between different stakeholder groups, suggesting that the formalization of collaborative processes has enhanced working relationships across traditional sectoral boundaries.

The integration of local knowledge represented a particularly successful aspect of the collaborative approach, with FCQ projects systematically incorporating elements of traditional ecological knowledge into conservation planning and implementation. Local shepherds and farmers reported increased recognition of their expertise in conservation contexts, indicating a meaningful shift from top-down conservation approaches toward more participatory models that value indigenous and traditional knowledge systems. This integration appears to have strengthened both the scientific basis of conservation interventions and the legitimacy of the collaborative governance process among local communities, though continued attention to knowledge co-production and equitable participation remains essential for sustaining these improvements.

4. Discussion

The results of our study provide rich insights into the complex dynamics of ecotourism development and conservation governance in the Sobrarbe region. Here, we interpret our findings through the lens of Actor-Centered Institutionalism (ACI) and discuss their implications in the context of broader literature on sustainable mountain development.

4.1. Innovative Governance and Institutional Change

The land stewardship agreement between the FCQ and Aínsa-Sobrarbe municipality represents a significant institutional innovation in conservation governance. Consistent with [8] ACI framework, our findings demonstrate how this new institutional arrangement has reshaped the constellation of actors and their modes of interaction in regional development processes.

The establishment of the land stewardship agreement in particular has created a new forum for negotiation and collaboration among diverse stakeholders. This aligns with

recent research by Newig et al. [52] on collaborative environmental governance, which emphasizes the importance of creating spaces for multi-actor deliberation and decision-making. However, the perceived need for greater representation of some local groups (e.g., small-scale farmers) in this process highlights the ongoing challenge of ensuring truly inclusive governance, as noted by Cleaver and Whaley [53] in their work on institutional bricolage in natural resource management.

The evolution of the agreement through its renewals in 2019 and 2024 demonstrates the dynamic nature of institutional arrangements. The incorporation of new elements, such as climate change adaptation measures and increased emphasis on scientific research, reflects what Mahoney and Thelen [54] describe as “layering” in processes of gradual institutional change. This adaptive approach to governance aligns with calls for more flexible and responsive institutional frameworks in the face of complex social-ecological challenges [55].

4.2. Ecotourism as a Catalyst for Sustainable Development

Our findings on the economic, environmental, and social impacts of ecotourism development in Sobrarbe provide empirical support for the potential of ecotourism as a catalyst for sustainable mountain development. The observed increase in employment, diversification of the local economy, and improvements in environmental indicators align with the theoretical benefits of ecotourism outlined by Honey [21] and others.

However, the results also highlight the complexities and potential contradictions inherent in ecotourism development. The concerns expressed by some stakeholders about over-reliance on tourism and potential commodification of culture echo critiques raised by scholars such as Fletcher [56] regarding the limitations and potential pitfalls of market-based approaches to conservation and development.

The success of initiatives like the Pirineos Bird Center in generating both conservation outcomes and local economic benefits demonstrates the potential for what Naidoo and Adamowicz [57] term “win-win” scenarios in conservation.

4.3. Balancing Conservation and Development

The challenge of balancing conservation goals with local development needs is a recurring theme in our findings. The increased positive attitudes towards conservation among local residents suggest progress in aligning conservation and development objectives. This supports the argument made by Berkes [58] that conservation can be more effective when it is seen as congruent with local livelihood interests.

However, the concerns expressed about the visual impacts of tourism infrastructure and potential overexploitation of natural resources highlight the delicate balance required in sustainable tourism development. This tension reflects broader debates in the literature on the relationship between tourism and conservation in protected areas [59].

The role of the FCQ as a bridging organization, facilitating connections between conservation science, policy, and local communities, emerges as a crucial factor in navigating these complex trade-offs. This aligns with recent research on the importance of boundary organizations in adaptive co-management of social-ecological systems [33,60].

4.4. Governance Challenges and Opportunities

The improvements in stakeholder communication and trust reported by many interviewees suggest that the collaborative governance approach embedded in the land stewardship agreement has been largely successful. This supports arguments made by Ansell and Gash [61] about the potential of collaborative governance to build social capital and enhance the legitimacy of decision-making processes.

However, the perceived underrepresentation of certain groups and concerns about power imbalances in decision-making processes highlight ongoing challenges in achieving truly inclusive governance. This reflects broader issues of equity and representation in environmental governance noted by scholars such as Corbera et al. [62].

The successful integration of local ecological knowledge in conservation planning represents a positive step towards more inclusive and culturally appropriate conservation practices. This aligns with growing recognition in the literature of the value of integrating diverse knowledge systems in environmental management [63].

4.5. Theoretical Implications

Our application of the ACI framework to the case of Sobrarbe demonstrates its utility in analyzing complex governance arrangements in social-ecological systems. The framework's emphasis on the interplay between institutional structures and actor strategies proved particularly valuable in understanding how the land stewardship agreement has reshaped patterns of interaction and decision-making in the region.

However, our findings also suggest potential areas for expanding the ACI framework. In particular, the importance of social learning processes and the role of bridging organizations in facilitating knowledge exchange and trust-building point to the need for greater consideration of these factors in institutional analysis. This aligns with recent calls for integrating insights from social learning theory into institutional approaches to environmental governance [64].

Our findings align with and extend previous research on collaborative conservation governance in mountain regions. Similar to the case studies reported by Borrini-Feyerabend et al. [35] in their analysis of protected area governance, the Sobrarbe land stewardship agreement demonstrates how collaborative arrangements can bridge conservation and development goals. However, our case differs from traditional co-management approaches (such as those documented by Folke et al. [33]) in its explicit integration of ecotourism as both a conservation tool and economic development strategy.

Comparing our results with Díaz-Christiansen et al.'s [36] study of community-based tourism in Ecuador reveals both similarities and contextual differences. While both cases show positive community attitudes toward conservation-tourism linkages, the Sobrarbe case demonstrates greater institutional formalization through the land stewardship agreement, suggesting that legal frameworks may enhance the sustainability of collaborative arrangements."

"Several generalizable lessons emerge from the Sobrarbe case: (i) adaptive institutional design: The evolution of the land stewardship agreement through renewals (2016, 2019, 2024) demonstrates the importance of building flexibility into governance arrangements, allowing for adaptation to emerging challenges such as climate change; (ii) multi-stakeholder engagement: Success requires meaningful participation from diverse actors, though our findings suggest that ensuring truly inclusive representation remains an ongoing challenge requiring continuous attention; (iii) knowledge integration mechanisms: the systematic incorporation of local ecological knowledge into conservation planning provides a model for other regions, though power dynamics in knowledge production must be carefully managed and (iv) economic diversification strategies: While ecotourism can serve as a catalyst for sustainable development, over-reliance on tourism presents risks that require complementary economic strategies.

4.6. Practical Implications

Our findings have several important implications for policymakers and practitioners involved in ecotourism development and conservation governance in mountain regions:

(i) adaptive governance: The success of the land stewardship agreement in evolving to address new challenges (e.g., climate change adaptation) underscores the importance of building flexibility into governance arrangements. This supports arguments made by Chaffin et al. [55] for adaptive governance in social-ecological systems; (ii) inclusive participation: The perceived underrepresentation of certain stakeholder groups highlights the need for ongoing efforts to ensure inclusive participation in decision-making processes. This may require targeted outreach and capacity-building efforts, as suggested by Reed et al. [65] in their work on stakeholder engagement in environmental management; (iii) diversification strategies: Concerns about over-reliance on tourism suggest the need for economic diversification strategies that complement ecotourism development. This aligns with recommendations by Sharpley [66] for more integrated approaches to rural development in tourism-dependent regions; (iv) knowledge integration: The successful integration of local ecological knowledge in conservation planning provides a model for other regions. However, it also requires careful attention to issues of power and representation in knowledge production processes, as highlighted by Nadasdy [67] in his critique of traditional ecological knowledge integration in resource management and (v) monitoring and evaluation: The positive outcomes observed in biodiversity conservation and economic indicators underscore the importance of robust monitoring and evaluation systems. This supports calls by Stem et al. [68] for more rigorous impact assessment in conservation and development projects.

5. Conclusions

This study has examined the multifaceted impact of ecotourism and conservation initiatives on sustainable development in the Sobrarbe region of Spain, with a particular focus on the role of the FCQ and the innovative land stewardship agreement. Our findings reveal both the potential and challenges of using ecotourism as a catalyst for sustainable development in mountain regions.

5.1. SWOT Analysis

5.1.1. Strengths

Governance and Institutional Framework

The Sobrarbe region has established an innovative collaborative governance model through the FCQ-Aínsa-Sobrarbe land stewardship agreement that serves as a pioneering example of effective environmental governance. The Foundation for the Conservation of the Bearded Vulture (FCQ) operates as an effective bridging organization, successfully facilitating connections between conservation science, policy implementation, and local community engagement. The governance framework demonstrates remarkable adaptability through its successful evolution across multiple agreement renewals in 2016, 2019, and 2024, each incorporating new elements such as climate change adaptation measures and enhanced scientific research components. The established consensus-based decision-making processes, supported by robust conflict resolution mechanisms, have created a foundation for sustainable stakeholder collaboration that balances diverse interests while maintaining focus on conservation and development objectives.

Natural and Cultural Heritage

The region's exceptional status is evidenced by its six UNESCO recognitions, including designations as a World Heritage Site, Global Geopark, and Biosphere Reserve, which provide international validation of its outstanding universal value. Sobrarbe has achieved remarkable biodiversity conservation success, hosting the largest breeding population of bearded vultures in the European Union with documented population growth of 6.4%

annually between 1988 and 2023. The territory maintains an impressive conservation profile with 19.1% of its area classified under Protected Natural Areas legislation and 50.6% forming part of the EU's Natura 2000 Network, significantly exceeding national and regional averages. The region's rich cultural heritage, including traditional practices such as timber rafting and summer solstice fire festivals, has been successfully revitalized through tourism initiatives, creating authentic experiences while preserving cultural authenticity and community identity.

Economic Performance

Tourism generates substantial economic benefits for the Sobrarbe region, creating a total production effect of approximately €222 million annually within the comarca, with €124 million representing direct tourist expenditure. This economic activity supports 1799 full-time equivalent jobs, demonstrating tourism's role as the primary economic driver in a region where the service sector accounts for over 80% of economic activity in some municipalities. The sector demonstrates a strong economic multiplier effect of 1.79, meaning that every euro spent directly by visitors generates additional economic activity throughout the regional economy through supply chain relationships and household consumption. The development of ecotourism has contributed to economic diversification beyond traditional agricultural activities, creating new opportunities for local entrepreneurship and business development while maintaining compatibility with conservation objectives.

Environmental Achievements

The region has demonstrated measurable conservation outcomes, most notably the 6.4% annual growth rate in the bearded vulture breeding population from 27 to 88 territorial units between 1988 and 2023. Conservation initiatives provide significant climate mitigation benefits, with the Aínsa-Sobrarbe supplementary feeding station for scavenger birds preventing approximately 224,000 kg of CO₂ emissions annually through ecosystem service provision. Local residents have perceived improvements in landscape quality attributed to active conservation efforts, indicating that environmental stewardship has enhanced rather than compromised the region's aesthetic and ecological values. The successful integration of conservation goals with tourism development has created a model where environmental protection and economic development reinforce each other, demonstrating that conservation can serve as a foundation for sustainable economic growth rather than a constraint on development.

5.1.2. Weaknesses

Economic Vulnerabilities

The region faces significant challenges related to extreme tourism seasonality, with 62% of annual visits concentrated in just four months (June through September) and August alone accounting for 25.3% of total annual visitors. This seasonal concentration creates operational difficulties for tourism businesses, forcing many establishments to remain closed for substantial portions of the year while depending entirely on summer revenues for annual sustainability. The economy demonstrates concerning over-dependence on tourism as the primary economic driver, creating vulnerability to external shocks such as pandemics, economic crises, or changes in tourism patterns. Despite tourism growth, economic benefits are not equitably distributed across all community members, with some groups, particularly small-scale farmers and traditional workers, experiencing limited access to tourism-related opportunities and income generation.

Social and Cultural Challenges

The growth of tourism has generated concerns about the potential commodification and exploitation of local culture, with 25% of community respondents expressing worries about the superficial presentation of traditions solely for visitor consumption rather than authentic cultural expression. The influx of tourists and seasonal workers presents challenges for community cohesion, potentially altering social dynamics and creating tensions between permanent residents and temporary populations. Governance processes, while generally collaborative, suffer from underrepresentation of certain stakeholder groups, particularly small-scale farmers and traditional land users, whose voices may be overshadowed by more organized tourism and conservation interests. Power imbalances persist in decision-making processes, where some community members may lack the resources, knowledge, or organizational capacity to participate effectively in collaborative governance mechanisms.

Infrastructure and Capacity Limitations

Despite overall positive reception of conservation efforts, a minority of residents have expressed concerns about the visual impacts of new tourism infrastructure development, suggesting that growth has not always been compatible with landscape preservation values. The region faces accommodation capacity constraints during peak seasons, limiting the ability to capture maximum economic benefits while potentially encouraging overdevelopment that could compromise environmental and aesthetic values. Many tourism-related jobs remain seasonal, providing insufficient year-round employment opportunities for local residents who seek stable, long-term career prospects within their home communities. Critical infrastructure gaps exist in waste management and water treatment systems, which require substantial investment to handle increased visitor loads while maintaining environmental standards and protecting sensitive ecosystems.

Governance Gaps

Current collaborative governance processes, while innovative, do not yet achieve complete stakeholder inclusion, particularly regarding representation of marginalized or less organized community groups who may have different perspectives on development priorities. The region lacks comprehensive long-term monitoring systems for assessing the cumulative impacts of tourism and conservation initiatives, making it difficult to track progress toward sustainability goals and adapt management strategies based on empirical evidence. Integration of traditional knowledge systems remains incomplete, with some forms of indigenous and local ecological knowledge not yet fully incorporated into conservation planning and tourism development processes. Decision-making mechanisms, while consensus-based, may not adequately address underlying power disparities that could influence the authenticity and effectiveness of collaborative outcomes.

5.1.3. Opportunities

Market and Tourism Development

Global tourism trends are increasingly favoring nature-based and sustainable tourism experiences, creating expanding market opportunities for destinations like Sobrarbe that can offer authentic environmental and cultural experiences. The COVID-19 pandemic has accelerated consumer preferences toward outdoor destinations and less crowded, nature-focused travel experiences, positioning mountain regions with strong conservation credentials as highly desirable alternatives to mass tourism destinations. Significant potential exists for developing year-round tourism through diversified offerings that could address the region's seasonality challenges, including winter activities, cultural events,

and educational programs that appeal to different market segments throughout the year. Emerging niche markets such as scientific tourism, ornithological tourism, and specialized ecotourism experiences represent promising opportunities for deseasonalizing tourism activity while attracting higher-value visitors who contribute more substantially to local economic development and are more likely to respect environmental and cultural values.

Innovation and Technology

Rapid advances in digital technology create opportunities for enhanced conservation monitoring, visitor management, and tourist experience development that could improve both environmental protection and visitor satisfaction. Digital solutions, including mobile applications, virtual reality experiences, and smart tourism platforms, offer potential for enhancing tourist experiences while simultaneously protecting sensitive environments through better visitor distribution and impact management. Emerging technologies such as blockchain for sustainable tourism certification and artificial intelligence for predictive management of visitor flows represent cutting-edge opportunities for establishing Sobrarbe as a leader in sustainable tourism innovation. The growing trend toward remote work and digital nomadism creates opportunities for developing infrastructure and services that could attract long-term visitors who contribute to local economies while reducing the pressure of mass seasonal tourism.

Collaboration and Expansion

Significant potential exists for regional cooperation across the broader Pyrenees region to create integrated ecotourism routes and shared marketing initiatives that could enhance the attractiveness and economic viability of sustainable tourism throughout the mountain range. The success of the Sobrarbe model creates valuable opportunities for knowledge transfer and technical cooperation with other mountain regions globally, potentially generating revenue through consulting services while enhancing international recognition and reputation. The region's innovative governance approach and documented conservation successes position it well for enhanced international recognition through awards, research partnerships, and policy leadership roles that could attract additional investment and support. The land stewardship model developed in Sobrarbe has demonstrated effectiveness that could be expanded to other areas within Aragon and Spain, creating opportunities for scaling successful approaches and developing regional networks of sustainable destinations.

Policy and Funding

Growing international focus on sustainability and climate change creates expanding opportunities for accessing funding from European Union programs, international development agencies, and climate finance mechanisms that support nature-based solutions and sustainable development initiatives. The region's alignment with global sustainability agendas, including the UN Sustainable Development Goals and international climate targets, positions it favorably for participating in large-scale funding programs and policy initiatives that reward demonstrated environmental and social performance. Increasing policy support for nature-based solutions and ecosystem service approaches creates opportunities for developing innovative financing mechanisms that could provide sustainable long-term funding for conservation and community development activities. The growing recognition of the economic value of ecosystem services and biodiversity conservation creates opportunities for developing payment for ecosystem services schemes and other innovative financing approaches that could provide alternative revenue streams for local communities and conservation organizations.

5.1.4. Threats

Environmental and Climate Risks

Climate change poses fundamental threats to mountain ecosystems and species populations that form the foundation of Sobrarbe's ecotourism appeal, with potential impacts including altered precipitation patterns, temperature increases, and shifts in species distributions that could undermine conservation achievements and tourism attractiveness. The growing popularity of the region creates risks of environmental degradation through overcrowding, trail erosion, habitat disturbance, and infrastructure pressure that could compromise the very natural values that attract visitors and justify conservation efforts. Ecosystem fragmentation represents a long-term threat if tourism development is not carefully managed, potentially isolating wildlife populations and degrading landscape connectivity that is essential for species survival and ecosystem resilience. Traditional cultural landscapes that contribute to the region's appeal face threats from abandonment of traditional land use practices, as younger generations migrate to urban areas and traditional agricultural and pastoral activities become economically unviable despite their cultural and ecological importance.

Economic and Social Pressures

Despite tourism development and conservation successes, the region continues to face persistent rural depopulation as younger residents migrate to urban areas seeking diverse career opportunities and modern amenities that are not available in rural mountain communities. The tourism economy has created a housing affordability crisis for local workers and seasonal employees, as property values and rental costs increase due to tourism demand while local wages remain relatively low, potentially displacing long-term residents and undermining community social fabric. Economic dependence on tourism creates vulnerability to external shocks such as pandemics, economic recessions, or geopolitical events that can rapidly eliminate tourism revenue and leave communities without alternative economic foundations. The tourism industry faces potential consolidation pressures as larger companies and external investors may acquire local businesses, potentially reducing local ownership and community control over tourism development while extracting profits from the region rather than reinvesting them locally.

Governance and Institutional Risks

Successful tourism development may lead to institutional capture by powerful tourism interests that could gradually shift priorities away from conservation and community well-being toward short-term profit maximization, potentially undermining the collaborative governance model that has been central to current successes. Growing economic pressure from tourism stakeholders could lead to weakening of conservation priorities and environmental standards, particularly during economic downturns when immediate revenue needs may override long-term sustainability considerations. The collaborative governance model faces potential fragmentation as stakeholder interests diverge and conflicts become more difficult to resolve through consensus-based approaches, particularly as the scale and complexity of tourism development increases. Communities may experience loss of local control over development decisions as regional, national, and international interests become more involved in tourism planning and investment, potentially marginalizing local voices and priorities in favor of external economic and political agendas.

Competitive and Market Threats

Sobrarbe faces increasing competition from other mountain destinations worldwide that are developing similar sustainable tourism offerings, potentially saturating niche

markets and reducing the region's competitive advantages in attracting environmentally conscious travelers. Tourism markets are subject to rapidly changing preferences and demographic shifts that could reduce demand for the types of experiences that Sobrarbe currently offers, requiring continuous adaptation and innovation to maintain market relevance. Economic downturns and financial crises can dramatically reduce discretionary travel spending, particularly for the international and higher-income domestic tourists who are most likely to choose sustainable tourism options over cheaper mass tourism alternatives. Regulatory changes at national or European Union levels affecting tourism operations, environmental standards, or funding programs could create compliance costs and operational constraints that undermine the economic viability of current tourism and conservation initiatives.

This SWOT analysis reveals that while Sobrarbe has developed strong foundations for sustainable ecotourism through innovative governance and exceptional natural heritage, success depends on addressing key vulnerabilities around economic diversification, inclusive governance, and infrastructure development while capitalizing on growing market opportunities for sustainable tourism.

5.2. Recommendations

1. **Enhance Participatory Governance:** Further strengthen collaborative decision-making processes, ensuring representation of all stakeholder groups, including marginalized communities. Consider establishing a regional ecotourism council to coordinate efforts.
2. **Diversify Economic Opportunities:** While continuing to develop sustainable tourism, invest in complementary sectors such as sustainable agriculture, renewable energy, and remote work infrastructure to create a more resilient local economy.
3. **Implement Carrying Capacity Measures:** Develop and enforce visitor management strategies to prevent overcrowding and environmental degradation. This could include timed entry systems for popular sites and promoting less-visited areas.
4. **Invest in Local Capacity Building:** Provide training and support for local residents to participate in and benefit from the ecotourism sector, focusing on skills such as guiding, hospitality management, and sustainable business practices.
5. **Enhance Monitoring and Adaptive Management:** Implement comprehensive monitoring systems for both ecological and socio-economic indicators. Use this data to inform adaptive management strategies, allowing for quick responses to emerging challenges.
6. **Strengthen Cultural Preservation Efforts:** Develop programs to document and preserve local traditions, languages, and practices. Ensure that tourism development respects and enhances, rather than dilutes, local cultural identity.
7. **Address Rural Depopulation:** Creation of a system of access to housing at affordable prices for workers. Those who come seasonally and want to settle permanently in the territory need to have decent accommodation in line with their salary level.
8. **Leverage Technology:** Explore innovative uses of technology for conservation monitoring, visitor management, and enhancing tourist experiences without compromising the natural environment.
9. **Promote Year-Round Tourism:** Develop strategies to reduce seasonality in tourism, such as promoting winter activities or cultural events in off-peak seasons, to provide more stable employment and reduce pressure during peak periods.
10. **Enhance Regional Cooperation:** Foster collaboration with neighboring regions and across the Pyrenees to create integrated ecotourism routes and share best practices in sustainable mountain tourism development.
11. **Construction of treatment plants and control of water use.**

12. Improved management of waste separation and collection for correct recycling or disposal.

By implementing these recommendations, Sobrarbe can further strengthen its position as a model for sustainable mountain tourism development. The experiences and lessons learned from this region can provide valuable insights for other mountain destinations worldwide grappling with similar challenges of balancing conservation, economic development, and community well-being.

5.3. Future Research Directions

1. Longitudinal Studies: Conduct long-term studies to track the ecological and socio-economic impacts of ecotourism initiatives over extended periods.

2. Comparative Analysis: Undertake comparative studies with other mountain regions to identify transferable lessons and context-specific factors in sustainable tourism development.

3. Governance Innovations: Investigate new models of collaborative governance that can address power imbalances and ensure a equitable participation in decision-making processes.

4. Climate Change Adaptation: Explore strategies for enhancing the resilience of mountain communities and ecosystems to climate change impacts through sustainable tourism and conservation initiatives.

5. Technology Integration: Examine the potential of emerging technologies (e.g., blockchain, artificial intelligence) in enhancing conservation efforts and sustainable tourism management in remote mountain regions.

As global interest in sustainable and nature-based tourism continues to grow, the innovative approaches developed in Sobrarbe have the potential to inform broader policy and practice in the field of sustainable tourism and conservation. By continuing to refine and adapt these approaches, mountain regions can play a crucial role in demonstrating pathways towards more sustainable and equitable forms of development in the face of global environmental change.

5.4. Limitations of the Research

While our mixed-methods approach provides a comprehensive understanding of the issues at hand, we acknowledge several limitations: (i) the study focuses on a single region, which may limit the generalization of findings to other contexts; (ii) the reliance on stakeholder perspective in interviews may introduce bias, although we have attempted to mitigate this through triangulation with other data sources and (iii) the timeframe of the study (2016–2024) may not capture long-term trends and impacts that extend beyond this period.

Despite these limitations, we believe that our rigorous methodological approach provides valuable insights into the complex dynamics of ecotourism and conservation in the Sobrarbe region in Spain as a representative case study.

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Informed Consent Statement: We as researchers at the University of Zaragoza declare that: (1) have obtained the oral informed consent of all individuals who participated in the semi-structured interviews conducted for this study; (2) prior to each interview, we clearly and comprehensibly informed participants about: The objectives of the study. The voluntary nature of their participation and their right to withdraw at any time without consequences. The confidentiality and anonymity of the information provided. The intended use of the data, as well as any potential risks or benefits associated with their participation. We confirm that no personally identifiable information was collected without consent, and that all audio recordings and transcripts have been anonymised and securely stored in compliance with applicable data protection regulations (General Data Protection Regulation—GDPR and the Spanish Organic Law 3/2018 on Data Protection and Digital Rights—LOPD-GDD). This research has been conducted in accordance with the principles of the Code of Good Research Practices of the University of Zaragoza, and in line with the guidance provided by the University of Zaragoza Research Ethics Committee (CEIN).

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Conflicts of Interest: The authors declare no conflicts of interest.

Appendix A

Table A1. Land stewardship agreements and aligned actions.

Objectives	I Agreement, 2016_19	II Agreement 2019_23	III Agreement 2023_27
Preservation of natural values	Biodiver Aínsa: campaign to raise awareness and enhance the value of the biodiversity of Aínsa. Municipality of Aínsa-Sobrarbe (2017–2018)	1. Organization of first Autumn Fair of the Pyrenees ‘Follarasca’. 2. Climatic Festival	Bio-For-Piri project: fire prevention plan and development of six forest routes
Dissemination of natural values	1. Environmental education with schoolchildren in Aínsa. 2. Participation in the Aínsa Fair and Sobrarbe Expoferia (2016–2018)	1. Maintenance and management of the Pyrenees Bird Center ecomuseum. 2. Premiere of ‘La Quebranta’ at the Festival del Castillo de Aínsa.	1. Maintenance and management of the Pyrenees Bird Center ecomuseum. 2. Pequevisitas, The Bearded Vulture Sentinels (Scientific Ecotourism EECE)
Promote the sustainable use of natural resources, heritage, fish, hunting, forestry, livestock...	1. Integral management of the necrophagous bird feeder, use of slaughterhouse leftovers as feed. 2. Project Sobrarbe Autochthonous and Sustainable Sobrarbe 3. Proposal for the preliminary draft of a law on direct sales of agri-food products. (2016–2017). 4. Meeting with the Sobrarbe Fishermen’s Association (2016)	1. Integral management of the necrophagous bird feeder, use of slaughterhouse leftovers as feed. 2. Awareness day on local sales in Aragon. 3. Participation in the Annual Meeting of the Network of Municipalities for Agroecology.	1. Integral management of the feeding trough for necrophagous birds use of slaughterhouse leftovers as feed. 2. Creation of an information point on the Natura 2000 Network in the municipality.

Table A1. Cont.

Objectives	I Agreement, 2016_19	II Agreement 2019_23	III Agreement 2023_27
Encouraging respectful and quality tourism activities	Pyrenees Bird Center: Integral management of the necrophagous bird feeder. Guided tours and photographic hides. Gypsobarbe ecotourism routes.	Pyrenees Bird Center: Integral management of the necrophagous bird feeder. Guided tours and photographic hides.	1. Pyrenees Bird Center: Integral management of the necrophagous bird feeder. 2. Guided tours and photo hides. Within the EEE (scientific ecotourism) creation of a national FCQ ‘Story telling’ route.
Consulting on environmental issues and conservation	Adequacy and repair of the materials of the Green Corridor of the Ara River, between Ainsa and Boltaña (2017)	1. Correction of the power line between Paules de la Sarsa and Las Bellostas. 2. Talks at the Sobrarbe Fair Expo.	1. Management of Natura 2000 Network Grants. 2. Ara river wetland protection.
Management of Ainsa Municipal Slaughterhouse (Circular Economy)		Management agreement signed in 2021 Improvements	Improvements, management of new investments.

Source: Own elaboration based on land stewardship agreement and activity reports provided by FCQ.

Appendix B

Table A2. Synthesis of content extracted from the interviews.

Underlying Contents	Economic Impacts	Environmental Impacts	Social Impacts
Development of ecotourism	[+] Sustainable economic development, reduction of tourism seasonality [–] Lack of planned investment in essential infrastructure: wastewater treatment and waste management	[+] Environmental sustainability [–] Not identified	[+] Increased awareness among residents regarding nature conservation and potential for population retention [–] Significant effort required from small businesses to adapt their tourism offerings
Impact of the COVID-19 pandemic	[+] Emergence of a new visitor profile interested in nature tourism after the pandemic, broadening of the target audience [–] Interruption of tourism-related economic activity during lockdown	[+] Natural recovery due to the cessation of tourism activity [–] Environmental sustainability issues caused by overcrowding after the pandemic	[+] Increased awareness among residents of the territory’s dependence on the tourism sector [–] Serious difficulties in maintaining small entrepreneurial businesses in the area
Role of public institutions	[+] Existence of public-private management agreements for economic activities, with the municipal slaughterhouse of Ainsa being a key example [–] Actions more focused on mass tourism development (e.g., car access to isolated and fragile sites), rather than promoting sustainability	[+] Improved management of some protected natural areas through public-private agreements [–] Limited institutional involvement in environmental conservation	[+] Preservation of traditional livestock farming enabled by the management of the Ainsa slaughterhouse [–] Lack of solutions for the limited housing accessibility for potential new residents

Table A2. Cont.

Underlying Contents	Economic Impacts	Environmental Impacts	Social Impacts
Influence of the FCQ (Fundación para la Conservación del Quebrantahuesos)	[+] Strong support for livestock activity and gastronomic tourism through the provision of high-quality, local meat via the slaughterhouse [−] Challenges in reconciling certain economic or tourism activities with the foundation's conservation-oriented mission	[+] Promotion of birdwatching and sustainable tourism; contribution to the development of ecotourism [−] Uneven influence across different areas of the region	[+] Preservation of traditional livestock farming supported by the slaughterhouse management [−] Many of the foundation's projects remain unknown to the local social environment

Source: Author's own elaboration based on content analysis of the interview data.

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