

BOOK OF ABSTRACTS

This Book of Abstracts provides a comprehensive overview of the session content and is structured into three main sections:

- I. **Session Description** – an introduction to each session, including its objectives and expected outputs
- II. **Session Program** – a detailed schedule for each session, including speakers and timing
- III. **List of Abstracts** – a complete compilation of all accepted abstracts

I. SESSION DESCRIPTION

ID: B3

Sustainable forest development as biodiversity indicator: role of Nature-based Solutions (NbS) in the rural communities

Hosts:

	Name	Organisation	E-mail
Host (s):	Diaz-Maroto Ignacio J.	Higher Polytechnic School of Engineering, University of Santiago de Compostela, 27002 Lugo, Spain	ignacio.diazmaroto@usc.es

Abstract:

The session's topic, "sustainable development as biodiversity indicator", is complex because it involves socioeconomic, political and environmental aspects, making it necessary for the coordination between all stakeholders involved. On one hand, the population is growing at a rate, so that it will require livelihoods two or three times higher than it is today. On the other hand, the multifunctional of forests promotes markets for forest products other than wood, which could generate capital to finance forest management linked to rural development. Policymakers, private owners and the individual's capacity to recognize different opportunities are essential factors in the making of growth possibilities for communities. Feedback from all experts suggest a need for training programs, aiming to show occasions offered by the forestry sector. Most recent assessments of forest ecosystems prioritize the economic benefits; however, many ecosystem services valuations ignore the nonmaterial values. For example, the spiritual and cultural worth of forests is not only critical in scope but also implies having great potential for significant international conservation actions, given that several billion people respect their forests because of their spiritual significance.

Goals and objectives of the session:

The goal is to promote a debate, through assessment and analysis, on the role that Nature-based Solutions (NbS), as an indicator of biodiversity, play in the sustainable forest development of rural communities.

Planned output / Deliverables:

Based on the communications submitted, the possibility of publishing a special issue in an international scientific journal will be evaluated.

Session format:

Presentation of individual communications, final discussion, and conclusions. Active audience participation is required for success and the proper development of the session. The idea is to facilitate interaction and contribute to the development of competences. It is planned to publish a special issue on the proposed topic in an indexed international journal.

Related to ESP Working Group:

[BWG 3 - Forests & Woodlands](#)

II. SESSION PROGRAM

Room: A2

Date of session: Friday 22, May 2026

Time of session: 09:00 – 12:30

Timetable speakers:

Time	First name	Surname	Organization	Title of presentation
9:00 – 9:10	Ignacio J.	Diaz-Maroto	University of Santiago de Compostela, Spain	Session presentation
9:10 – 9:25	Ignacio J.	Diaz-Maroto	University of Santiago de Compostela, Spain	The role of Forest Certification in the biodiversity conservation and ecosystem services of Atlantic oak forests, northwestern Spain
9:25 – 9:40	Marcos	Aragón Pizarro	Instituto Pirenaico de Ecología, CSIC, Spain	Effects of forest management regimes on ecosystem services coproduction in Mediterranean mountain forests
9:40 - 9:55	Kato	Van Ruymbeke	Department of Earth and Environmental Sciences, KU Leuven, Belgium	Citizen preferences for forest ecosystem services across a north-south and east-west European gradient
9:55 – 10:10	Miglena	Zhiyanski	Forest Research Institute, Bulgarian Academy of Sciences, Bulgaria	From indicator-based assessment to recommendations for Sustainable Forest Development
10:10 -10:25	Garima	Mishra	Biodiversity and Climate Change Division, Indian Council of Forestry Research and Education, India	From carbon to biodiversity: evaluating agroforestry as a Nature-based Solution (NbS) for Sustainable Forest Development
10:25 – 10:40	Shipra	Singh	International Institute for Applied Systems Analysis, Laxenburg, Austria	Perceived ecosystem services flows and trends under climate and land-use change in the Western Indian Himalaya
10:40 – 11:00	---	---	---	Pause/Coffee break
11:00 – 11:15	Jahnavi	Sharma	K.J. Somaiya Institute of Management, India	Climate adaption strategies using socio-ecological linkages for grassland wetland ecotones in India

11:15 – 11:30	Elisabeth	Wiegele	UNESCO Chair on Sustainable Management of Conservation Areas, Carinthia University of Applied Sciences, Austria	ForestConnect: Climate-resilient ecological corridors for large carnivores in the Balkan–Carpathian–Dinaric region
11:30 – 11:45	Pooja	Chaudhary	Shri Guru Ram Rai University, Patel Nagar, Dehradun, Uttarakhand, India	Potential of ecosystem services of a natural forest “Sacred grove” and Community-managed forest of Rudraprayag, Uttarakhand, India
11:45 – 12:00	Yaw Agyeman	Boafo	Centre for Climate Change and Sustainability Studies, University of Ghana	Participation over awareness: community engagement as the primary driver of Nature-based Solutions (NbS) effectiveness in semi-arid northern Ghana
12:00 – 12:15	Milena	Sokolova	Department of Agricultural, Forestry, Food and Environmental Sciences, University of Basilicata, Potenza, Italy	Mapping cultural ecosystem services to support Nature-based Solutions (NbS) for Sustainable Forest Development in rural areas
12:15 – 12:30	Ignacio J.	Diaz-Maroto	University of Santiago de Compostela, Spain	Cultural ecosystem services of temperate mountain forests in the northwest of the Iberian Peninsula: livelihoods, human well-being and cultural-spiritual values

III. ABSTRACTS

The first author is the presenting author unless indicated otherwise

1. The role of Forest Certification in the biodiversity conservation and ecosystem services of Atlantic oak forests, northwestern Spain

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Due to the exponential increase in society's demand for certified forest products, forest owners, aware of this requirement are receptive to the certification of their forests because know the important advantages. Thus, on the one hand, Sustainable Forest Management (SFM) seeks to ensure proper environmental and socioeconomic performance of forest ecosystems. On the other hand, the growing importance given to the biodiversity conservation and ecosystem services is recognized, as it sustains and enables all the goods and/or services of forest ecosystems, promoting both their resilience and human well-being. However, the current state of ecosystem services is worrying in numerous regions, and many vital services are expected to deteriorate and even disappear during this century. Some recent research has linked the effectiveness of conservation actions and plans to political guidelines, although their real influence is still very limited. In this framework, Forest Certification is a voluntary procedure through which an independent third party evaluates the sustainable management and traceability of forest products, both timber and non-timber, from environmental, social and economic perspectives. The process is based on a series of predetermined standards by a public or private certification organization, many of which consist of Nature-based Solutions (NbS). Most forest certification systems promote both sustainable management and the assessment of ecosystem services; all of them aimed at ensuring forest owners obtain added value from forest products given the benefits for our well-being. Our research analyses the possibility of implementing a forest certification system valid for small oak stands in Galicia, northwestern Spain. This process is led by the Regional Forestry Certification and Chain of Custody Groups as regional certification



institutions. The certification system used was the Programme for the Endorsement of Forest Certification (PEFC).

Keywords: Sustainable forests management, resilience, human well-being, political guidelines, Regional Forestry Certification

2. Effects of forest management regimes on ecosystem service coproduction in Mediterranean mountain forests

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Understanding how different management regimes affect Mediterranean socio-ecological systems is essential for guiding sustainable coproduction of ecosystem services (ES). This knowledge is crucial particularly in forest ecosystems, as they are facing increasing uncertainty under current global change. We assessed how forest management intensification affects the coproduction of key ES (timber production, nutrient cycling, climate regulation and plants of cultural value) in three mountain regions of Spain. In each region, we sampled 20 x 20 m native and reforested stands under three management conditions: protected, in production, and potentially exploitable (N=132). Data on natural capital (i.e., woody vegetation diversity and cover at the plot scale, stand age and soil nutrients), together with records on ES (including provisioning, regulating and cultural services) were collected in each plot. In addition, we surveyed forest owners or managers (including rangers) to assess anthropogenic capitals (human, social, manufactured and financial) via phone or videocall. We observed that reforested stands generally exhibited higher overall plant species richness than native forests. Our results indicate that the potentially exploitable stands showed higher plant richness than protected and production forests. However, when focusing specifically on plants of cultural value, richness was greater in native stands in two out of three regions. For each of the key forest ES assessed (namely, timber production, carbon sequestration and cultural value), we will disentangle the relative role of natural and anthropogenic capitals. Our approach provides guidance on the relationships between ES and different anthropogenic capitals and enables to validate the sustainability of forest management regimes based on the coproduction of ES.

Keywords: Mediterranean forests, Socio-ecological systems, Anthropogenic capitals, Forest management intensification, Coproduction of ecosystem services

3. Citizen preferences for forest ecosystem services across a north-south and east-west European gradient


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Understanding societal preferences for forest ecosystem services (FES) is essential for designing forest policies that are both effective and publicly legitimate. This study investigates citizens' preferences and willingness to pay for FES arising from different forest management interventions using a discrete choice experiment conducted in four European regions: Flanders (Belgium), the Czech Republic, Norway, and Spain. The experiment is complemented by survey questions capturing attitudes towards forest management intensity and an information treatment explaining the effects of active management on FES provision. Together, these elements allow us to address three research questions: 1) which FES are most valued by citizens, 2) how do societal values for individual and bundles of FES depend on payment vehicle, and 3) do stated attitudes toward forest management align with stated demand for FES. Across all study regions we find robust support for multifunctional forests that simultaneously deliver provisioning, regulating, and cultural ecosystem services. Preferences for increased timber production and enhanced protection against natural hazards are consistently strong and positive, indicating broad acceptance of active management when it contributes to forest resilience and safety. In contrast, preferences for cultural FES are more heterogeneous and context dependent, reflecting differences in



local forest conditions, legal frameworks, demographic characteristics, and exposure to recent natural disturbances. The choice of payment vehicle has strong implications for estimate WTP values. The information treatment increases support for management strategies aimed at maintaining forest health and long-term multifunctionality, suggesting that public preferences are responsive to improved understanding of forest functions. Overall, the results indicate a close alignment between societal expectations and multifunctional forests management. At the policy level, findings support maintaining multifunctionality as the cornerstone of European forest governance, while highlighting the need for regionally adapted approaches to management intensification. Rather than uniform, EU-wide prioritization of specific services, policies should allow flexibility to accommodate local preferences and conditions while safeguarding the diverse benefits forests provide.

Keywords: Forest ecosystem services, discrete choice experiment, multifunctional forest management, environmental valuation

4. From Indicator-Based Assessment to Recommendations for Sustainable Forest Development

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Sustainable forest development requires decision-making frameworks that link forest condition, biodiversity conservation, and ecosystem service provision transparently and operationally. In the present study, an indicator-based integrated assessment approach that underpins the development of recommendations for sustainable forest development in Bulgaria is analyzed. In the present study, an indicator-based integrated assessment approach is analysed, developed within a methodological framework that is currently being updated and aligned with evolving EU policy requirements, while fully accounting for all applicable national and European forest and environmental regulations.

The integrated assessment framework builds on indicators already embedded in national forest inventory, planning, and monitoring systems, allowing for a consistent and operational evaluation of forest ecosystem condition and development without the need for additional monitoring efforts. These indicators include, among others, forest area dynamics, tree species composition and origin, age structure and structural heterogeneity, stand density, forest connectivity and fragmentation as components of green infrastructure, quantities of standing and lying deadwood, and soil protection functions. Within an integrated ecosystem services perspective consistent with the MAES framework, these indicators are interpreted as proxies for the capacity and condition of key regulating, provisioning, and cultural ecosystem services.

Based on the assessment results, the study presents a structured set of recommendations for sustainable forest development, derived from the integrated interpretation of biodiversity and ecosystem service indicators. The recommendations address forest conservation, restoration, and adaptive management under increasing climate-related pressures, with particular emphasis on wildfire risk, and are illustrated through key management principles such as prioritization of natural regeneration, enhancement of structural diversity, retention of old trees and deadwood, maintenance of riparian buffer zones, limitation of intensive interventions, and use of natural succession following disturbances. The study shows that indicator-based integrated assessment can serve as a robust analytical foundation for developing scientifically grounded and policy-relevant recommendations. By explicitly linking assessment results to management-oriented guidance, the approach demonstrates the added value of ecosystem services assessment for informing sustainable forest development and for strengthening the contribution of forests to biodiversity conservation and long-term socio-economic resilience in rural landscapes.

Keywords: indicator-based assessment; sustainable forest development; ecosystem services; MAES; forest ecosystems

5. From Carbon to Biodiversity: Evaluating Agroforestry as a Nature-based Solution for Sustainable Forest Development

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Nature-based Solutions (NbS) are increasingly recognised as integrative approaches for addressing biodiversity loss, climate change, and rural livelihood challenges. In forest-dependent landscapes of India, agroforestry systems represent a critical NbS that links sustainable forest development with biodiversity conservation and income diversification for rural communities. This study examines agroforestry-based NbS as practical indicators of sustainable forest development by analysing their contributions to biodiversity enhancement, ecosystem services, and socio-economic resilience.

Drawing on field-based research and ongoing methodological work on agroforestry carbon projects, this paper integrates ecological indicators (species diversity, regeneration dynamics, and structural complexity) with climate mitigation metrics (biomass accumulation and carbon sequestration) and livelihood outcomes. Particular emphasis is placed on how agroforestry systems function as multifunctional landscapes, supporting both material benefits (fuelwood, timber, non-timber forest products) and non-material ecosystem services such as cultural values, microclimate regulation, and landscape resilience. The assessment further highlights the role of Monitoring, Reporting and Verification (MRV) frameworks in capturing biodiversity co-benefits alongside carbon outcomes, addressing a key gap in current NbS and carbon market assessments.

The findings underscore that well-designed agroforestry systems can serve as measurable indicators of sustainable forest development, especially in climate-vulnerable rural regions. However, their potential remains constrained by policy fragmentation, limited recognition of non-material ecosystem services, and insufficient integration of biodiversity metrics within climate finance mechanisms. The study advocates for stronger institutional convergence, biodiversity-inclusive MRV frameworks, and capacity-building initiatives that empower rural communities to actively participate in NbS implementation.

By positioning agroforestry as a biodiversity-positive NbS, this contribution aligns with the session's objective of advancing sustainable forest development while reinforcing the socio-ecological foundations of rural livelihoods. The paper offers insights relevant for policymakers, practitioners, and researchers seeking scalable NbS models that integrate biodiversity conservation, climate action, and community well-being.

Keywords: Nature-based Solutions (NbS), Agroforestry systems, Sustainable forest development, Biodiversity indicators, Carbon sequestration

6. Perceived ecosystem service flows and trends under climate and land-use change in the Western Indian Himalaya


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Mountain forests provide critical ecosystem services (ES) to rural communities, yet little is known about how people experience current ES flows and perceive their trajectories under rapid climate and land-use change. We combined household surveys with spatial climate and land-use data to analyze perceived ES flows and trends across 36 villages along a 300–3000 m gradient in Sirmour district, Western Indian Himalaya. We surveyed 704 households on perceived ES flows and wellbeing (access to food, water, housing, education, health, environmental quality and governance) and 1229 respondents on perceived trends (decreasing, stable, increasing) for 13 forest ES, including provisioning (fodder, fuelwood, grazing, food), regulating (fresh air and water, soil quality, carbon sequestration) and cultural services (spiritual values, recreation). We linked village-level perceptions to recent climate trends (temperature and precipitation, 1980–2020) and land-use change (forest, cropland and built-up cover, 1990–2020). Ordinal and mixed models were used to relate perceived ES flows and trends to socio-ecological context, climate and land-use dynamics.



Preliminary analyses show strong elevational structuring of both ES flows and trends: lower-elevation villages report higher perceived access to food, markets and services, whereas high-elevation villages report greater dependence on fodder, fuelwood and grazing but more frequent declines in these services. Villages with greater forest-to-cropland and forest-to-built-up conversion are more likely to report declining fuelwood, fodder and soil quality, whereas perceived trends in cultural and carbon-related services align more closely with temperature increases and forest fragmentation. We also identify “mismatch” hotspots where perceived declines exceed observed biophysical change, indicating heightened social vulnerability and low adaptive capacity. By integrating ES flow and trend perceptions with climatic and land-use trajectories, this study highlights where Himalayan forest landscapes are approaching social–ecological thresholds, and where targeted restoration, livelihood diversification and governance interventions could most effectively sustain forest ecosystem services for people.

Keywords: Climate and land-use change, Forest ecosystem services, Mountain socio-ecological systems, Socio-ecological gradients, Stakeholder perceptions.

7. Climate adaption strategies using socio-ecological linkages for grassland wetland ecotones in India

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From the current understanding on climate science to leading the attention to grasslands, wetlands, and grassland-wetland ecotones, in this paper, we are deriving socio-ecological linkages for nature based solutions in ecosystem like grasslands, wetlands, and grassland-wetland ecotones. The novelty of the study lies in its focus on addressing climate change impacts on grassland-wetland ecosystems from an intersectoral perspective. It aims to understand the linkages between ecological systems, social systems (such as livelihoods and policies), and climate adaptation strategies. We have reviewed, interlinked, and presented potential linkages to factor verticals, existing linkages, and mapping opportunities for socio-ecological indicators in grasslands, wetlands, and grassland-wetland ecotones as they are integral ecological systems supporting lives and livelihood. Our findings are a result of thematic literature review using research articles, published reports, and secondary sources for inter-linkages. We present three critical vertical for climate change adaptation in ecotones, and map the existing inter-linkages connecting the critical vertical for grassland wetland ecotones with livelihood and policy. The outcomes of this paper will help in sustainable planning and management of wetlands and grasslands.

Keywords: Adaptation, Climate change, Ecotone, Nature based Solution, Sustainability

8. ForestConnect: Climate-resilient ecological corridors for large carnivores in the Balkan–Carpathian–Dinaric region


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Habitat fragmentation and climate change are reshaping movements and habitat use of large carnivores across Southeast and Eastern Europe. ForestConnect, an Interreg Danube Region initiative, delivers practical, transferable measures to safeguard ecological corridors, harmonize monitoring, and strengthen coexistence in and around protected areas. This includes infrastructure adaptations (overpasses/underpasses, guiding structures), hotspot-focused mitigation to reduce wildlife–vehicle mortality, and continuous monitoring to inform adaptive management and planning for connectivity. Targeted “quiet zones” are established and adaptively managed in core habitats (e.g., denning and cub-rearing seasons) to minimize disturbance and support reproductive success. A digital, geo-referenced reporting and early-warning system links verification committees with mobile apps, a cloud database, and dashboards to record observations and threat events, enabling rapid, preventive responses by managers



and communities. Evidence-based communication and participatory engagement build trust, counter misinformation, and increase support for conservation actions. Financing blends EU and national programs (e.g., LIFE, Cohesion Policy, CAP) with private and user-pays mechanisms to mobilize start-up funds, share risk, and secure long-term operations. Together, these measures provide an integrated, scalable framework that enhances ecological connectivity, fosters human-wildlife coexistence, and strengthens the adaptive capacity of ecosystems and communities under climate change.

Keywords: Ecological Connectivity; Climate Adaptation; Large Carnivores; Forest Management; Transboundary Cooperation

9. Potential of ecosystem services of a natural forest (Sacred grove) and Community-managed Forest of Rudraprayag, Uttarakhand, India

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The Indian Himalayan Region (IHR) is a crucial life support system, renowned for its rich biodiversity and essential ecosystem services, including the hosting of four global biodiversity hotspots. Degradation of the ecosystem in IHR is caused by climate-related catastrophes such as forest fires, floods, droughts, and human interference, increasing vulnerability. This study focuses on the ecological, cultural, and socio-economic roles of the Hariyali Devi sacred grove in Rudraprayag District, Uttarakhand, exploring the community-managed forest and sacred grove. Hariyali Devi sacred grove is situated at 2800 masl and is a temperate broadleaf mixed forest, surrounded by plants like *Quercus leucotrichophora*, *Rhododendron arboreum*, *Quercus semecarpifolia*, *Abies spectabilis*, and *Lyonia ovalifolia*. The presence of ethnomedicinal plants makes this sacred grove a unique site for conservation. The research aims to examine the key differences between these forests, assessing biodiversity, ecosystem services, and the impact of management practices on forest health. Additionally, the study will investigate the economic role of the forests in providing natural resources. The study will depend on the field surveys for ecological assessments, interviews, and participatory workshops. In the context of climate change, under external pressures like anthropogenic activities, the study will assess the sustainability and resilience of both forest management systems.

Preliminary findings suggest that sacred groves tend to maintain stable ecological outcomes due to cultural protection, while community-managed forests provide significant livelihood resources but face challenges from over-exploitation. Further investigation will address community participation in conservation efforts and develop a model that balances ecological sustainability with socio-economic development. Conclusively, this study will seek to solution for sustainable forest management and promote a collaborative approach among stakeholders to tackle climate change in the IHR. By integrating scientific knowledge with local practices, we aim to enhance the resilience of Himalayan ecosystems through active community involvement in conservation initiatives.

Keywords: Ecosystem services, Climate change, Sacred grove, Community Forest, Forest health.

10. Participation over Awareness: Community Engagement as the Primary Driver of Nature-Based Solutions Effectiveness in Semi-Arid Northern Ghana

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Nature-based Solutions (NbS) are increasingly promoted as central pathways for climate adaptation and ecosystem restoration in semi-arid Africa. However, empirical evidence on what drives their perceived effectiveness at community level remains limited. This study examines how household awareness, participation, and socio-institutional context shape perceptions of NbS effectiveness in five forest-fringe



communities surrounding Mole National Park in northern Ghana.

Using a mixed-methods approach, we analysed household survey data (n = 302), ten gender-segregated focus group discussions, and field observations. Two composite indices—an NbS Awareness Index and a Participation Index—were constructed and related to perceived ecological effectiveness using correlation analysis, logistic regression, and hierarchical clustering. Results reveal substantial variation in awareness across communities, but consistently high participation in NbS activities such as tree planting, agroforestry, fire management, and soil-water conservation. Participation emerged as the strongest predictor of perceiving NbS as highly effective (OR = 275.5, $p < 0.001$), while awareness alone showed no significant influence.

Cluster analysis identified three engagement typologies: low-engagement households, participation-driven adopters, and high-awareness/high-participation groups. Qualitative findings highlight how labour constraints, institutional continuity, fire disturbance, and grazing pressures shape both engagement and outcomes. Importantly, households evaluated NbS effectiveness primarily through hands-on involvement and visible livelihood benefits rather than formal knowledge of NbS concepts.

The study demonstrates that NbS function as social processes as much as ecological interventions. Strengthening participatory structures, aligning NbS with livelihood realities, and ensuring long-term institutional support are critical for sustaining NbS in semi-arid landscapes. These findings provide actionable insights for operationalising Ghana's National Adaptation Plan and NDC commitments through locally grounded, equity-sensitive NbS implementation.

Keywords: Nature-based solutions; community participation; ecosystem restoration; climate adaptation; Ghana

11. Mapping Cultural Ecosystem Services to Support Nature-Based Solutions for Sustainable Forest Development in Rural Area

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Forests are critical habitats for biodiversity and play a fundamental role in providing a wide range of ecosystem services (ES) essential to human well-being. They deliver multiple ES, including timber and food production, water regulation, air filtration, carbon storage and sequestration, nutrient cycling, soil formation, and recreational and aesthetic benefits. However, nonmaterial benefits, particularly recreation, a key component of Cultural Ecosystem Services (CES), are often undervalued due to their intangible nature and lack of direct market value. Natural landscapes offer diverse recreational opportunities that support physical health, psychological well-being, and cultural identity, yet CES remain frequently overlooked in decision-making processes. This study adopts the methodological framework of the Millennium Ecosystem Assessment (2005) and aligns with European policy initiatives such as the EU Forest Strategy for 2030, which promote alternative forest-based industries, including ecotourism, among other measures, EU Biodiversity strategy for 2030 and EU Green Infrastructure Strategy.

Within this context, the study employs citizen-generated spatial data to evaluate the multifunctional role of forests and natural areas in rural communities. Specifically, the objective of this research is to assess both the supply and demand of CES in Italy and to identify people's preferences for recreational activities. The methodology integrates geospatial data from Greenmapper (2025), an online questionnaire focused on natural areas, with key indicators (e.g., population density, protected areas, distances from the main roads) in a Random Forest Regression (RFR) model to generate predictive spatial maps within a GIS environment.

The results reveal distinct spatial patterns in the distribution of CES, highlighting the multifunctionality of forests and natural landscapes. Overall, the findings demonstrate the potential of Nature-based Solutions (NbS) to support sustainable forest development by integrating ecological, social, and economic dimensions and provide valuable insights for rural and urban planning and ecosystem management.

Keywords: cultural ecosystem services, nature-based solutions, rural area.



12. Cultural ecosystem services of temperate mountain forests in the northwest of the Iberian Peninsula: livelihoods, human well-being and cultural-spiritual values

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The objective of our research is to study the cultural ecosystem services (CES) of European temperate mountain forests in the sustainable development of local communities. This is a complex and multidisciplinary topic given that it involves socioeconomic, political and environmental characteristics. So adequate coordination between all stakeholders (administrations, forest owners, neighbours, forest users...) is essential. The multifunctional nature of forests promotes the establishment of markets, both for timber and non-timber forest products. Likewise, the regulation services that depend on them and the cultural services linked to the well-being of the population. A livelihood includes both people and their capabilities, income, food, another natural resources, etc. Policymakers, forest owners, and individual capacity are vital factors in generating possibilities for growth and integrating that knowledge into decision-making. The assessment of forest ecosystem services has prioritized economic values, including fresh water, carbon storage, production of food and medicines, and soil conservation, among others. However, on too many occasions the cultural-spiritual value of forests has been ignored because their intangible nature hinders their economic estimation. The importance of these services is not only critical in their scope but also implies a greater potential for conservation through Nature-based Solutions (NbS). In fact, several billion people significance their forests mainly for their cultural-spiritual meaning. Our work analyses the ancestral role of temperate mountain forests, a lot of them communal, play in the sustainable development of rural communities in Galicia, northwest of the Iberian Peninsula. These forests constitute a special model of collective ownership of Germanic origin among the members of the community and enjoy a unique legal status. Therefore, they could be a driver of development for general well-being, citizen empowerment, equity, employment and local progress.

Keywords: Stakeholders, decision-making, intangible nature, rural communities, Galicia