

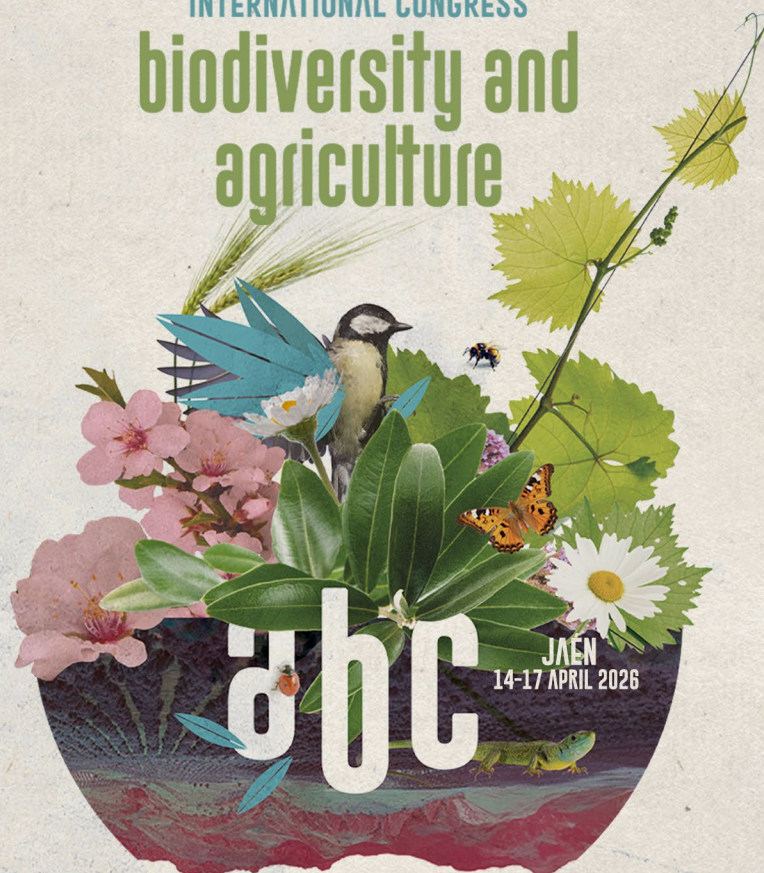


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*the natural abc: nurturing knowledge,
regenerating life and protecting the land*

BOOK OF ABSTRACTS





SEO/BirdLife is the pioneering organisation for nature and biodiversity conservation in Spain. It was founded in 1954 under the name “Sociedad Española de Ornitología”, with the aim of working towards the conservation of birds and their habitats.

Our work is based on three main pillars: science, conservation and public outreach. Conservation relies on sound scientific knowledge and the support of society; therefore, research, conservation action and public awareness are all essential.

Our ultimate goal is to achieve a world rich in biodiversity, where humans and nature coexist in harmony.

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COMMITTEE**





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**OPENING
TALK**





BIODIVERSITY AS THE FOUNDATION OF FOOD SYSTEMS: RETHINKING PRODUCTION FOR A SUSTAINABLE FUTURE

Maria Helena Semedo

Former Deputy Director General, FAO (Food and Agriculture Organization of the United Nations)

This keynote explores the evolving relationship between biodiversity and agriculture, advancing a central message: biodiversity is not a constraint on food production, but its very foundation.

It challenges the persistent framing of agricultural production and biodiversity conservation as competing objectives and instead highlights the structural dependence of agrifood systems on biodiversity at ecosystem, species and genetic levels. From this perspective, it underscores that food security cannot be achieved without the conservation and sustainable use of biodiversity.

The keynote will highlight how the Kunming–Montreal Global Biodiversity Framework (KMGBF), adopted at COP15 of the Convention on Biological Diversity, provides a concrete roadmap for the sustainable transformation of agrifood systems—enhancing biodiversity while ensuring food security and improving livelihoods.

Drawing on recent experience and evidence, it will reflect on progress made in mainstreaming biodiversity across agrifood systems, while identifying the persistent technical, policy and political challenges that continue to hinder implementation.

Looking ahead to 2030, the keynote will outline key orientations to overcome these constraints, calling for:

- stronger science–policy interfaces;
- greater policy coherence across agriculture, environment and finance.
- and governance approaches that place farmers at the centre of the transition, supported by enabling policies and aligned incentives.

Ultimately, it will argue that transforming agrifood systems through biodiversity is not only an environmental necessity, but a strategic pathway towards resilient, inclusive and sustainable development.



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**PLENARY
TALKS**





PLENARY TALK 1

HALTING THE LOSS OF BIODIVERSITY AND ECOSYSTEM SERVICES ASSOCIATED WITH FARMING INTENSIFICATION: FROM AGROECOLOGICAL THEORY TO PRACTICE IN LONG-TERM RESTORATION PROJECTS

P.J. Rey

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A significant part of the future of biodiversity is at stake in agricultural systems, which occupy around 40% of the emerged lands, globally. Many groups of organisms are experiencing population declines and a diversity crisis by land/agricultural intensification, affecting sustainability and human welfares. Modern Agroecological theory is concerned with modelling and obtaining evidence on factors fostering biodiversity in agricultural landscapes. Fundamental to this is the body of hypotheses of the "Landscape moderation of biodiversity patterns and processes" that gives to the interplay between landscape and agricultural intensification a prominent role in determining both the biodiversity that agricultural fields harbor and the effectiveness of the agri-environmental interventions to recover biodiversity and ecosystem services (ES). I first present some models of this theoretical framework and show empirical evidence from studies of biodiversity and ES in Europe confirming these views both in arable lands and permanent crops, with parallelism in the factors hampering biodiversity maintenance (landscape homogenization, intensive agriculture, climate change). While, the possibility of recovery is moderated by the presence of seminatural habitats through providing potential sources of biodiversity and spillover with the agricultural fields. Then, I move from theory to practice by introducing our own conceptual approach for long-term biodiversity restoration in agricultural systems. This approach operates with demonstrative (intervened) and control (not intervened) farms and with reference systems. It entails preoperational, intervention, and postoperational phases throughout gradients of agricultural intensification and landscape simplification. I exemplify it with biodiversity recovery studies in olive groves from the "Olivares Vivos" (OV) LIFE Project, showing (1) the importance of olive groves as a refuge for biodiversity in Europe, (2) the drivers of biodiversity loss for different organisms, (3) the effectiveness in recovering biodiversity, and (4) the recovery debt remaining after interventions, and the rate at what we expect to approach the reference system. Finally, I present our efforts, through the sister project "Secanos Vivos", to create a common framework for an environmentally-friendly agriculture and effective biodiversity restoration.





PLENARY TALK 2

FARM MANAGEMENT AND BIODIVERSITY, A COMPLEX ISSUE WITH OPPORTUNITIES AND CHALLENGES

S. Castaldi

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Over the past two decades, the EU and the scientific community have increasingly articulated the environmental sustainability thinking on productive systems from merely measuring harm through to actively quantifying positive contributions to ecosystems services and nature benefits, leading towards healthy, resilient, and productive ecosystems whilst ensuring EU competitiveness.

The ecosystem health and integrity are the result of a complex interaction of structure and functions, where ecosystems services are strongly linked to one other in a holistic vision.

Biodiversity is a central criterion for ecosystem health and at the same time the most complex one to define, measure and relate to specific activities within productive systems like agroecosystems. Biodiversity is complex, multifunctional, and multilayered, and cannot be fully captured by a single indicator. It encompasses genetic diversity, species richness and ecosystem variety. It can be expressed as *composition*, the identity and abundance of species present, *structure*, the spatial arrangement and organization of habitats and communities, *function*, the ecological processes and interactions that sustain ecosystems, which clearly might translate in different operative targets for farming practices.

For this reason, certification schemes for agro-productions, like LCA, struggle to define univocal measures and practices to guarantee biodiversity protection whilst supporting agronomic productivity and cost/benefit sustainability.

In the presentation I will provide a personal vision on challenges and opportunities that farmers might have when dealing with biodiversity and nature benefits in their management plans. Based on my experience with adaptive and resilient agriculture projects and on the ongoing EU debate of sustainability frameworks and nature/sustainability payments, I will support a holistic vision that embeds biodiversity to facilitate farmers choices on this complex topic.



PLENARY TALK 3

BRINGING BIODIVERSITY INTO FOOD CHOICES: CHALLENGES FOR MARKETS AND POLICY

C. Contini

Profesora asociada de Economía Agraria y Alimentaria en la Universidad de Florencia

Biodiversity outcomes emerge from the interaction of multiple behaviours across the food system. Public decision-makers define regulatory frameworks and incentives; producers and supply chains translate them into concrete practices; retailers, media and certification schemes shape how these practices are communicated and positioned in the market. Within this structure, consumers represent the point at which these efforts are either reinforced or weakened through demand. It is therefore at the level of food choice that the functioning, or malfunctioning, of the broader system becomes most visible.

Against this background, the presentation focuses on the consumer. It aims to provide insights into the frictions that arise between consumers and biodiversity at the point of choice, and to open a space for reflection on the contextual conditions under which consumer demand can effectively contribute to biodiversity support.

Although biodiversity conservation is widely perceived as legitimate and important, it rarely functions as a concrete decision criterion in everyday food purchases. The core difficulty does not lie in indifference, but in the failure to translate general concern into operative criteria under real choice conditions.

To explain this gap, the analysis identifies four interrelated obstacles. Biodiversity is often conceptually misunderstood, limiting its use as a decision category. When understood, it is frequently perceived as distant, reducing its motivational force. Markets may not provide clear and recognisable signals that allow biodiversity-supporting practices to be identified and compared. Finally, communication formats may render existing signals too abstract or cognitively demanding to guide choice in crowded retail environments.

The presentation then discusses the enabling conditions under which biodiversity could become visible, interpretable and comparable within real food choices, and finally turns to implications for consumer research.



PLENARY TALK 4

**SCALING BIODIVERSITY-FRIENDLY FARMING:
OPPORTUNITIES AND CONSTRAINTS WITHIN THE EU
COMMON AGRICULTURAL POLICY**

M. Dhaskali

BirdLife Europe and Central Asia

In an era of shifting climates and volatile markets, the European Common Agricultural Policy (CAP) is undergoing its most significant transformation in decades. As we navigate the 2023–2027 cycle, the mandate is clear: agriculture must move from being a driver of biodiversity loss to becoming its primary restorer. But how do we bridge the gap between high-level policy ambition and the practical realities of the furrowed field? The keynote speech will move beyond the legislative jargon to examine the systemic “locks” that prevent nature-friendly practices from reaching a continental scale—ranging from economic risk and administrative complexity to the geopolitical pressures reshaping food security narratives in 2026.

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ORAL COMMUNICATIONS 1





1. LONG-TERM BIRD MONITORING IN ITALIAN AGROECOSYSTEMS: CHALLENGES, METHODS, AND ECOLOGICAL EVALUATIONS

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The Farmland Bird Index–Italy is the national project monitoring farmland bird populations and assessing the health of the agricultural environment in Italy. The project was launched on a voluntary basis in 2000, with support from the Ministry of the Environment and several regional authorities, and was named MltO2000. Since 2009, the project has benefited from financial support from the Ministry of Agriculture, Food Sovereignty, and Forestry, funded by Rete Rurale Nazionale (until 2024) and Rete Nazionale PAC (since 2025).

Today, the monitoring is a key tool within the framework of the Common Agricultural Policy, used as the C36 context indicator for the 2023–2027 programming cycles.

The sampling protocol is based on 10-minute listening points, conducted during the breeding season (May–June). Each year, at least 500 10x10km squares are monitored; each square includes 15 listening points, located within as many 1x1 km squares, selected through a statistical randomization procedure.

The Farmland Bird Index (Fbi) and the Montane Grassland Index (Fbipm in Italian) are the two multi-species indicators that summarize the population trends of 41 bird species (28 for Fbi and 13 for Fbipm) chosen for their strong association with agricultural environments.

Since its beginning, these indices have consistently shown declines: in 2025, the Fbi stands at 66.51, with 75% of species declining, and the Fbipm at 70.10, with 46% declining, both relative to an initial value of 100 in 2000. There has been a –50% decline in lowland areas. The wryneck shows the worst decline (–76%), followed by the tawny pipit (–73%) and the stonechat (–71%). Even historically widespread species are beginning to show a negative trend due to the progressive simplification of agricultural landscapes. These results underscore the urgent need for conservation actions to halt and reverse these downward trends, in accordance with the European Biodiversity Strategy for 2030.

Keywords: ecological indicators, ecosystem services, farmland bird index, agroecosystems





2. THE SILENT KILLER: WHEN FUNGICIDES ACT AS INSECTICIDES

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The effects of pesticides on non-target species remain insufficiently studied in many cases, despite the great diversity of organisms associated with agricultural ecosystems that play a key role in their maintenance. Among these organisms, beetles (Coleoptera) constitute a group of invertebrates of great ecological importance, providing several ecosystem services such as organic matter decomposition and trophic web support within agroecosystems.

The focus of pesticide impacts on fauna has been traditionally placed on insecticides because of their supposedly higher toxicity to animals. However, fungicides are generally applied in larger amounts, with triazoles being the most widely used group. In this study, we evaluated the effects of triazole fungicides on physiological, hormonal and genetic variables in tenebrionid beetles, one of the most abundant groups of Coleoptera in agricultural landscapes.

Beetle exposure to triazoles through food resulted in weight loss and decreased feeding activity. Ecdysone levels (a hormone that plays a key role in molting, development and reproduction) were significantly lower in tenebrionids that ingested triazoles than those unexposed. The expression of six of the thirteen genes analyzed, which are involved in the ecdysone metabolism and signaling pathways, showed a clearly altered pattern with downregulation of up to 2000-fold compared to non-exposed individuals. In addition, molecular docking analyses assessing the binding affinity of triazole fungicides to the ecdysteroid receptor showed that these substances can bind to it with affinities comparable to those of some commercially used insecticides specifically developed to inhibit molting.

This study suggests that widely used fungicides could be contributing to the decline of a key group of invertebrates in agroecosystems, even when insecticide use is low as it happens in Mediterranean rainfed herbaceous crops. It also highlights the need to assess pesticide effects on non-target species using integrative approaches that consider molecular, physiological, and population-level indicators.

Keywords: pesticide, ecotoxicology, agroecosystem, biodiversity, arthropod



3. AGRICULTURAL MANAGEMENT AS A TOOL FOR RESTORING SOIL NEMATODE COMMUNITIES UNDER CONTRASTING CLIMATIC CONDITIONS IN SPAIN

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Climate change is intensifying abiotic stress in agricultural soils, compounding the biodiversity loss already driven by land use change and agriculture intensification. Under increasingly arid and thermally extreme conditions, soil communities face pressures that may exceed the recovery capacity of even sustainably managed systems. Soil nematodes are particularly valuable bioindicators in this context, as the most diverse and abundant soil invertebrates, they occupy multiple trophic levels within the soil food web, and exhibit a wide range of feeding behaviours and life history strategies, making them highly sensitive trackers of both disturbance and recovery. Sustainable approaches, such as organic and regenerative agriculture, through practices including no-tillage management, crop rotation, cover cropping, and reduced chemical inputs, are increasingly proposed as tools to restore soil health and biodiversity. Yet a critical question remains largely unaddressed: can these practices effectively improve nematode community structure and diversity when soils are already under significant climatic conditions? To investigate this, we analysed nematode communities across a broad gradient of cropping practices (fertilization, tillage, no-tillage, cover crops), and soil and climate variability (subhumid and semiarid). A total of 300 samples were collected from several cultivation plots and climates across Spain, from Córdoba, Granada and Murcia in the south to Lleida and Barcelona in the north. This design allows us to disentangle the relative contributions of agricultural management, soil and climate in shaping soil nematode communities, and to evaluate whether sustainable practices can overcome climatically imposed constraints on soil biodiversity. Our results indicate that under semiarid conditions, climatic stress acts as a strong environmental filter, driving community homogenisation, regardless of the agricultural management applied. In contrast, sustainable practices retain their potential to enhance soil nematode diversity under subhumid climates.

Funding: PID2022-140592OB-I00 Project, MCIN/AEI/10.13039/501100011033 and FEDER, UE.

Keywords: *biodiversity, climatic variability, soil health, regenerative agriculture, organic management*



4. THE SEED BANK OF MEDITERRANEAN OLIVE GROVE FLORA: FACTORS INFLUENCING AND THE IMPACT OF MANAGEMENT ON BIODIVERSITY

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Biodiversity loss is one of the major global environmental challenges, threatening ecosystem functions, stability, and the supply of ecosystem services in both natural habitats and farmland systems. Typically, greater biodiversity is linked to increased ecosystem stability and resilience, especially in agroecosystems facing growing environmental and management pressures. In the Mediterranean basin—one of the world's key biodiversity hotspots—olive groves are a prominent agricultural landscape feature that significantly impacts biodiversity at the landscape level. Currently, these olive grower areas are experiencing a trend toward monoculture expansion and more intensive management practices and increased use of inputs. This study, part of the EU-funded Soil O-live project, investigated plant diversity in the soil seed bank of 52 olive farms across five Mediterranean countries. Soil samples from inter-row and under-tree areas at 0–10 cm and 10–20 cm depths were collected and sowing in common conditions to analyse alpha and beta diversity of the annual herb species emerged. The farms ranged from high-density intensive groves to less intensive conventional and organic groves. Results indicated significant differences among management types, with intensive groves showing the lowest diversity. Biodiversity was positively linked to soil organic carbon (SOC), nutrients like N, P, and K, and landscape heterogeneity, while negatively related to soil bulk density and olive tree density. These results suggest that less intensive grove management enhances soil health, reduces degradation, and supports greater agroecosystem stability. Promoting sustainable management practices is therefore crucial for conserving biodiversity and enhancing the resilience and sustainability of Mediterranean olive agroecosystems.

Keywords: olive agroecosystem; soil seed bank; sustainable management; taxonomic erosion; soil health





5. PEST CONTROL SERVICE AND DISSERVICE BY INSECTIVOROUS BIRDS IN OLIVE GROVES. IMPORTANCE OF THE FARMING PRACTICES, LANDSCAPE AND CONSERVATION OF INSECTIVOROUS KEY SPECIES

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Biological pest control is attracting considerable interest as a means of reducing chemical inputs in crop production to achieve more sustainable and healthier production. We present the most comprehensive study to date on biocontrol of olive pests by insectivorous birds. We used DNA-metabarcoding to analyze pest and natural arthropod enemy consumption by 50 bird species on 15 olive farms with varying levels of landscape complexity distributed over the areas of olive cultivation of Andalusia. We detected consumption of 16 of the 35 olive tree pests, which appear in 56% of 933 samples analyzed. Among the pests of highest concern, the olive fly (*Bactrocera oleae*) was detected in 29% of the samples, while the olive moth (*Prays oleae*) was detected in 16%. Arthropod considered to be vectors of *Xylella fastidiosa* were detected in 10% of samples. The pest control service and disservice provided by insectivorous birds was calculated by multiplying the frequency of occurrence in bird scats of taxa considered pests or natural enemies, respectively, by the insectivorous bird abundance. At the community level, we detected greater service in landscapes of intermediate complexity, compared to simple and complex landscapes. In turn, disservice was greater than service at all landscapes. However, it should be noted that service and disservice are not directly comparable, since most natural enemies are generally not specialists while pests commonly are. We further tested agricultural intensification effects, showing a general trend to increased service (and disservice) in less intensive (herbaceous cover and organic farming) compared to intensive farming (bare soil and conventional farming). Our results indicate that as a whole birds are not a particularly effective agents for pest biocontrol. Nonetheless, genera such as *Phylloscopus*, *Parus*, and *Cyanistes* are of high agronomic interest because they have high rates of pest consumption compared to the consumption of natural enemies.

Keywords: DNA-metabarcoding, bird scats, avian insectivory, olive groves, olive moth, olive fly





6. BIODIVERSITY GAINS IN AGRARIAN LANDSCAPES: EVIDENCE FROM TWO YEARS OF IMPLEMENTATION

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Biodiversity for Food and Agriculture (BFA), as defined by the FAO, underpins food and agricultural systems. Although these systems depend on ecosystem services, they also drive biodiversity loss, revealing a paradox between their reliance on nature and their potential for nature-positive transformation. However, sustainability strategies often suffer from “carbon tunnel vision,” prioritizing emissions reductions while overlooking biodiversity and ecosystem health. A holistic sustainability approach that integrates climate action with biodiversity conservation and restoration is essential to achieve true sustainability in agroecosystems.

However, assessing biodiversity impacts remains challenging due to limited standardized data and inadequate monitoring tools at appropriate scales. In response, several international frameworks, such as the Kunming–Montreal Global Biodiversity Framework, the Natural Capital Coalition, the Biological Diversity Protocol, and the Taskforce on Nature-related Financial Disclosures, have emerged to improve biodiversity accountability through science-based and transparent indicators. Despite this progress, global indices remain poorly suited to assess farm-level management practices, increasing investment risks and limiting the effectiveness of public and private interventions.

To address these gaps, FGN has developed the [Calculation of Biodiversity Gains in Agrarian Landscapes](#) methodology, a science-based framework designed to quantify biodiversity gains or losses resulting from agricultural management practices. Using a standardized set of biodiversity metrics expressed as Biodiversity Units (BU), the methodology allows for the assessment of biodiversity changes resulting from specific agricultural practices, such as intercropping, different types of fallow land, reduced pesticide use, rotational grazing, or winter cover crops, within defined areas and across different crop types. Based on two years of implementation, this approach translates biodiversity into a measurable asset, supporting nature-positive transformations and informed decision-making. In an evolving regulatory context, marked by increasing disclosure and accountability requirements under frameworks such as CSRD and LRN, robust biodiversity metrics are essential for aligning agricultural and financial strategies with emerging compliance and market expectations.

Keywords: Biodiversity units, agroecosystem assessment, sustainable agriculture, nature-positive transformation, agricultural management practices

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ORAL COMMUNICATIONS 2





1. IMPACT OF THE SECANOS VIVOS PROJECT ON BIODIVERSITY

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Biodiversity is threatened by current changes in agricultural practices. Secanos Vivos is a SEO/BirdLife project that integrates specific interventions in cereal crops or vineyards with the aim to improve rentability whilst restoring biodiversity and improving resilience against climate change. This work assesses whether the program had the desired effects on biodiversity. The work was done from 2023 to 2025 in 20 cereal and 10 vineyard farms, well distributed within peninsular Spain, each including a demonstrative field (where interventions occurred) and a control field (a close-by field without interventions). Thanks to a monitoring protocol that studied birds, arthropods and vegetation biodiversity parameters, net biodiversity gain for each study year was quantified. The different parameters were transformed into “ecological debt”, an indicator that standardize the values and allows combination and direct comparison. Ecological debt ranges from 0 to 1 (the former indicating maximum values for each parameter in relation to the optimum, thus no debt). We also calculated difference in ecological debt between each period (2023–2024 and 2024–2025). Overall, ecological debt declined throughout the project, indicating a gain in biodiversity, both in demonstrative and control fields. When taking into account other additive factors (such as period, type of crop, intensity of the implemented actions), results showed that the debt decline was higher in demonstrative than in control fields. These results show promising future for the relationship between agriculture and frameworks focused on promoting biodiversity, but in the future, more specific work needs to be addressed.

Keywords: biodiversity monitoring; management guide; agricultural practices; ecological debt



2. LIFE IBERIAN AGRO-STEPPE PROJECT

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The LIFE Iberian Agrostepes project, coordinated by Sociedad Española de Ornitología (SEO/BirdLife), addresses one of the most pressing challenges in European agroecosystems: how to halt farmland biodiversity decline while maintaining farm viability. Implemented in Natura 2000 sites across Extremadura, Aragón and Alentejo (Portugal), the project develops and tests a biodiversity-oriented agricultural management model in cereal steppes and extensive grazing systems.

Responding to the dramatic decline of steppe birds such as Little bustard (*Tetrax tetrax*), Great bustard (*Otis tarda*) and Montagu's Harrier (*Circus pygargus*), the project moves beyond species protection towards a functional redesign of the production system. Through land stewardship agreements covering over 1,000 hectares, farmers implement concrete measures including delayed harvesting in nesting areas, long-term fallows without tillage, pesticide reduction, landscape feature restoration, adapted grazing management, and the recovery of traditional long-cycle cereal varieties with market potential.

LIFE Iberian Agrostepes operates as a real-scale demonstrative laboratory linking agroecological theory with long-term restoration practice. Agricultural administrations participate as project partners, enabling the direct transfer of evidence into Common Agricultural Policy (CAP) instruments and agri-environmental schemes.

After four years of implementation, the project is entering its final phase, when the tested farming commitments and bird population monitoring are beginning to provide results that support the expected biodiversity benefits of these agricultural management models. Emerging ecological and socio-economic evidence suggests that biodiversity conservation and agricultural profitability are not opposing goals, but mutually reinforcing when ecological criteria are embedded in farm management design.

Keywords: biodiversity integration, demonstrative agricultural models, agri-environmental governance, common agricultural policy (CAP), knowledge transfer, sustainable farming systems



3. FROM LIVESTOCK PASTURES TO BIODIVERSITY NET GAIN: INTEGRATING ALMOND FARMING AND ECOLOGICAL ENHANCEMENT IN WESTERN SPAIN

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Agricultural land-use change can have significant impacts on biodiversity but also offers opportunities to integrate conservation measures into productive systems. The Holguera Project, located in Cáceres (western Spain), involved the transformation of approximately 508 hectares of irrigated cattle pastures into irrigated almond orchards between 2022 and 2024. This transition was accompanied by a Biodiversity Action Plan designed to mitigate impacts and deliver a measurable Biodiversity Net Gain.

As part of this plan, fauna-supporting infrastructure was installed in spring 2024 to address the lack of natural refuges typical of intensively managed agricultural landscapes. A total of 151 nest boxes targeting passerines, raptors, lesser kestrel and bats were deployed, together with 102 raptor perches, 102 insect hotels and a large insect hotel with an additional educational function. These measures aimed to promote species that provide key ecosystem services, particularly natural pest control.

In parallel, a biodiversity island covering approximately 5.5–6 hectares were planted in 2025 with around 11,500 native woody plants. The planting was structured into functional vegetation units, including riparian woodland, forest core and scrub formations, with species selected according to local ecological suitability to increase habitat heterogeneity.

Monitoring results highlight contrasting responses. Between 2024 and 2025, nest box occupancy increased markedly, especially for passerines and raptors, with notable use by barn owls (*Tyto alba*), indicating rapid uptake of artificial structures once established. In contrast, plant establishment within the biodiversity island was limited and highly heterogeneous, largely due to extreme climatic conditions and the emergence of persistent waterlogging in certain areas that could not be anticipated during the design phase.

A long-term biodiversity monitoring programme (2025–2030) is in place to track vegetation dynamics, fauna presence and infrastructure use. The project illustrates both the potential and the limitations of integrating biodiversity enhancement into large-scale irrigated agricultural systems.

Keywords: agricultural land-use change, biodiversity enhancement, agri-environmental measures fauna-supporting infrastructure, biodiversity monitoring



4. OPERATIONAL GROUP COVERCROPS. CULTIVATION AND USE OF AROMATIC AND HERBACEOUS SPECIES BETWEEN FRUIT TREES TO DIVERSIFY PRODUCTS AND ECOSYSTEM SERVICES LINKED TO FARMS AND AGRI-ENVIRONMENTAL POLICIES

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The COVERCROPS project aims to assess the establishment of vegetative cover crops made up of aromatic and herbaceous species between fruit trees (cherry and flat peach) in farms located in Bajo Cinca (Huesca), within Natura 2000 areas. It addresses three major challenges facing modern fruit production: biodiversity and pollinator decline, soil degradation, and limited product diversification. Through an experimental design comparing different management systems (bare soil, spontaneous cover, herbaceous mixtures, and rows of aromatic plants), the project evaluates their impact on beneficial insect communities, soil fertility and structure, microclimate regulation, reduction of phytosanitary inputs and fertilizers, and the economic feasibility of harvesting aromatic plants as a complementary crop. The goal is to demonstrate that these cover crops enhance ecosystem services, strengthen climate resilience, and create new income opportunities for farmers.

The Operational Group is composed of NECTACINCA SL and SAT Río Cinca (Cinca Group), AGROCULTÍVATE Soluciones SL, SEO/BirdLife, and ARNA (Aragonese Beekeeping Association), with the participation of the technological research centers CITA (Agri-Food Research and Technology Center of Aragón) and FITA (Agri-Food Innovation and Transfer Foundation of Aragón), which provide technical coordination and scientific support. The project is part of Spain's CAP Strategic Plan 2023–2027 and the Strategic Subsidy Plan of the Department of Agriculture, Livestock and Environment of Aragón. It is funded by the Government of Aragón and the European Union through the European Agricultural Fund for Rural Development (EAFRD).

Keywords: cover crops; ecosystem services; pollinator conservation; soil regeneration; product diversification



5. DROVE ROADS AS GREEN INFRASTRUCTURE FOR WILD BEE CONSERVATION IN INTENSIFIED MEDITERRANEAN AGROSYSTEMS

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Habitat fragmentation due to agricultural intensification and urbanization threatens wild pollinator biodiversity in South-Western Europe. The BeeConnected SUDOE project explores how Green Infrastructure (GI) can enhance ecological connectivity, focusing here on drove roads in Castilla-La Mancha (Spain).

This communication presents the case study of the Cañada Real Conquense, a 380 km drove road embedded in a highly intensified agricultural matrix. Within the project framework, this corridor is evaluated as a key reservoir for wild bees. The study adopts a multidisciplinary approach that integrates ecological, spatial, agronomic, and social perspectives to evaluate the multifunctional role of this corridor as GI.

First, wild pollinator communities are characterized through a combination of active (entomological nets) and passive (pan traps) sampling. Second, structural and functional connectivity are analyzed using GIS and field assessments, identifying microhabitat drivers such as floral resource availability or nesting substrates. Third, the capacity of the corridor to mitigate agrochemical drift is evaluated through soil and vegetation residue analysis. Fourth, the influence of the drove road on agricultural production is measured by quantifying the contribution of wild pollinators to almond crop yield (*Prunus dulcis*) via fruit set assessment. Finally, a transdisciplinary perspective is integrated through perception surveys and participatory workshops with local stakeholders to co-design Nature-Based Solutions.

Overall, these “Buzz Lines” demonstrate how traditional drove roads can serve as resilient green corridors, enhancing biodiversity and supporting sustainable land use.

Keywords: pollination services, habitat fragmentation, agrochemical mitigation, ecological connectivity, pesticide drift



6. BRIDGING SCIENTIFIC RESEARCH AND FARMERS' DEMANDS: TRAINING AS A SCALING MECHANISM IN LIFE OLIVARES VIVOS+

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One of the defining features of the LIFE Olivares Vivos projects (2015–2026) has been the combination of strong scientific production with a clear practical vocation: to transform farming through evidence-based biodiversity management that improves both environmental and economic performance. Yet a gap remains between knowledge generation and its effective application in daily farm management.

Farmers frequently express the need for applied training in more sustainable production systems. This demand extends beyond established producers to individuals managing an olive grove for the first time, who require rigorous yet accessible technical guidance. Vocational agricultural teachers have similarly called for updated, high-quality, science-based materials.

In response, LIFE Olivares Vivos+ (LIFE20 NAT/ES/001487) developed a training programme positioned at the intersection of science and agricultural practice. The course is organised into three sequential blocks: an introductory module that builds on and disseminates the major biodiversity research developed under LIFE Olivares Vivos and continued under LIFE Olivares Vivos+; a central block focused on the agronomic implementation of the Olivares Vivos model (herbaceous cover management, ecological restoration of non-productive areas and fauna-supporting infrastructures); and a final block addressing profitability and market positioning, which incorporates plant health management in response to sector demand.

A central challenge has been translating complex scientific outputs into accessible materials without compromising rigour. This has been addressed through continuous dialogue with farmers in fairs, technical meetings and field visits; a substantial graphical effort to convey key concepts visually, and the development of interactive learning resources designed to enhance clarity and engagement.

Since 2023, 225 participants have completed the online course in Spain, complemented by around ten in-person sessions involving over 200 additional stakeholders. Replication is underway in Greece, Italy and Portugal, indicating that evidence-based training linked to demonstration farms can act as an effective scaling mechanism towards regional adoption.

This work was implemented within the framework of the European Project “LIFE Olivares Vivos+ Increasing the impact of Olivares Vivos in the EU” LIFE20 NAT/ES/001487 LIFE OlivaresVivos+, with the European Commission as the funding body and SEO/BirdLife’s own contribution.

Keywords: biodiversity-based agricultura, knowledge transfer, agricultural training, scaling mechanism

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3





1. THE EMOTIONAL RESPONSE OF PRO-ENVIRONMENTAL FOOD CONSUMERS: A SPECIFIC CONTEXT OF BIODIVERSITY PROTECTION

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There is abundant research on pro-environmental consumer behaviour, both in general purchasing contexts and in more specific ones such as eating habits. One of the main limitations of this extensive body of literature is related to the fact that this study has been approached from a generalist perspective of environmental protection. In addition, the general literature on consumer behaviour highlights that the effectiveness of its modelling may be conditioned by the specific context of the study. In this sense, there is a partial understanding of this phenomenon, while at the same time there is a need to address the study of pro-environmental consumer behaviour in more specific contexts. At the same time, biodiversity is an important environmental issue from both an ecological and regulatory perspective. Institutions point out that the protection of biodiversity is a fundamental climate objective, as it is the main dimension of environmental sustainability and the main indicator of the health of the planet. Simultaneously, society is showing an increasing level of concern for biodiversity conservation. Among the behavioural variables studied, consumer emotions currently stand out as one of the factors that is gaining greater relevance for the scientific community. Therefore, the overall objective of this study is to analyse the effect of these emotions on the purchasing process of pro-environmental foods in different European countries in the Mediterranean basin (Spain, Portugal, France, Italy, and Greece) and in a specific context of biodiversity protection. A total of 4,000 valid responses were analysed using structural equation modelling. The results highlight the need to design different communication strategies, depending on whether the aim is to influence earlier stages of the process (attitude) or more advanced stages (purchase intention and behaviour).

Keywords: pro-environmental consumer behaviour, sustainable consumption, pro-environmental foods, biodiversity protection, emotions



2. HOW DOES PEOPLE'S OPINION AND EMOTIONS DETERMINE AGRICULTURAL MANAGEMENT?

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People play an important role in shaping landscapes almost anywhere in the world. Particularly, the intensification of agricultural landscapes continues to grow to meet raising food demands, increasing pressure on ecosystems health and potentially affecting people's health and wellbeing. However, little research has investigated the effect that different agricultural practices exert on both biodiversity and human health. Taking as a model example olive grove plantations in southern Spain, we conducted 400 face-to-face and 400 online surveys with inhabitants of villages dominated by olive groves to understand how alternative agricultural practices influenced mental health (N = 800) in terms of: i) landscape preferences (comparing between traditional, intensive and superintensive olive groves with and without vegetation cover), ii) emotions associated to each landscape, and iii) connectedness to nature. We also explored potential differences between the online and face-to-face surveys in the type of response.

Additionally, we focused on farmers' responses (N = 249) to analyse the relationship between farmers' motivations (classified as intrinsic, instrumental, and relational values) underpinning their management practices and i) the actual practices farmers engaged with (considering the plantation pattern, certification scheme and irrigation type), ii) the practices they consider most economically profitable in the long term, and iii) those they believe can positively influence their health.

We expect to find a relationship between people's landscape preferences and main income source, positive emotions associated to traditional groves with ground cover, negative emotions predominant in super-intensive ground cover-free groves and incongruencies between farmers' landscape preferences and management practices.

Our results will enhance our understanding of how different olive production approaches affect our society in terms of mental health and human wellbeing.

Keywords: landscape preferences, agriculture intensification, human well-being, values, land managements



3. HOW TO COMMUNICATE BIODIVERSITY? A CROSS-CULTURAL ANALYSIS ON THE EFFECTIVENESS OF MESSAGE FRAMING STRATEGIES

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Biodiversity preservation is increasingly recognised as a key value attribute for consumers of pro-environmental foods. However, research on how to effectively communicate it remains scarce, and optimal strategies for capturing consumer attention are underexplored. To address this, this study applies Message Framing Theory, which posits that how information is presented significantly alters decision-making. An integrative framework is proposed, combining Prospect Theory (emphasising the gains or losses of an action) and Construal Level Theory (managing psychological distance between consumers and biodiversity) within the Dual Mediation Hypothesis model of advertising theory.

Specifically, this study examines the joint effect of a three-way interaction between message framing (positive/negative appeal), construal level (abstract/concrete information), and regulatory focus (individual/collective focus) on consumer attitudes across four European countries: Spain, Italy, Portugal, and Greece.

To this end, a 2×2×2 between-subjects experiment was conducted using extra virgin olive oil as a case study. Data were analysed via structural equation modelling (SEM) with multigroup analysis.

Results reveal that while positive framing generates universally superior attitudes, the cognitive processing of biodiversity messages varies by culture. Italy and Portugal show stable preferences for individual and collective focuses, respectively, regardless of how the message is framed. In Spain, a heuristic processing is confirmed, where positivity drives attitudes independent of other approaches. In Greece, a significant three-way interaction is revealed, indicating systematic processing where consumers prioritise the combination of positive, concrete and collective messages, and strongly penalise messages lacking this triple fit.

These findings contribute to the literature and marketing of pro-environmental foods, demonstrating that the efficacy of biodiversity claims is not universal, but culturally contingent. While positive framing is a global baseline, maximising value perception requires tailoring the abstraction and focus of the message to the specific cognitive processing style of each national market.

Keywords: biodiversity communication, message framing, prospect theory, construal level theory, dual mediation hypothesis, pro-environmental food



4. SOCIAL INNOVATIONS AND THEIR OUTPUTS IN THE CONTEXT OF AGRICULTURAL PRODUCTION: EXPERIENCES IN BRAZIL AND SPAIN

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The study aimed to identify and analyze the outputs for sustainable agricultural production resulting from successful social innovation experiences in Brazil and Spain. The methodology adopted was qualitative, combining techniques such as participant observation, documentary analysis, interviews, and focus groups, involving groups active in the Articulation of the Brazilian Semi-Arid Region (Semi-Arid, Brazil) and through the Rural Development Centers (Galicia, Spain). The results revealed a diversity of outputs generated by these experiences, including agricultural and other products, services, methodologies, protocols, and new organizational forms that have contributed to mitigating the challenges faced in these territories. In the case of the Articulation of the Brazilian Semi-Arid Region, social technologies for coexistence with the semi-arid environment stand out, such as cisterns, which have improved families' capacity to produce food, as well as the creation of the public policy Programa Cisternas, resulting from collaboration between civil society and the Brazilian public authorities. In turn, within the Rural Development Centers, a methodology oriented toward proximity-based actions and sustainable production, grounded in innovations in production practices, proves fundamental to improving the quality of life of the beneficiary population. It is concluded that the outputs of these experiences were successful insofar as they were socially accepted by the rural population, becoming viable and sustainable practices that are strongly adapted to the local context and, in some cases, have reached a regional scale.

Keywords: social innovation, rural areas, sustainable development, sustainability



5. NATURE-BASED SOLUTIONS IN MEDITERRANEAN AGROFORESTRY SYSTEMS: SUITABILITY ANALYSIS BASED ON FARMERS' PERCEPTIONS

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Mediterranean agro-silvo-pastoral ecosystems (MAEs) are historically important socio-ecological systems that provide essential environmental services, livelihood opportunities, and economic benefits. MAEs are expected to be severely affected by climate impacts and are exposed to threats such as droughts, tree decline, wildfires, and biodiversity loss. Nature-based Solutions (NbS) have emerged as an approach to address these challenges and improve climate resilience and biodiversity conservation, but their successful adoption depend on the participation of farmers, landowners, and policymakers. We analyse farmers' perceptions of 14 NbS identified as most relevant for the sustainability of MAEs across four European countries: Spain, Portugal, Italy, and Greece. In particular, NbS aimed at supporting and promoting biodiversity, such as afforestation, natural islands, early detection of tree mortality, and active protection of trees and shrubs, among others, have been included. Quantitative and qualitative data was collected from responses to an online survey using best-worst scaling choice experiments. We present findings to outline the differences in farmers' judgements of 14 NbS. The results from the survey respondents show that farmers prioritise NbS related to fire prevention, protection of natural regeneration, legume-rich grass sowing, and regenerative rotational grazing, which are also among the most widely implemented practices. In contrast, solutions such as biochar, natural watercourses restoration, and real-time livestock monitoring technologies are less commonly applied but nonetheless perceived by some stakeholders as having strong potential to enhance long-term sustainability. The results reveal high heterogeneity in farmers' judgements, which appears to be related to differences in farmers characteristics, farm types and management systems, leading the identification of distinct farmer groups.

Findings will support the development of policy and incentive recommendations and





implementation mechanisms to enhance biodiversity in MAEs at European, national and regional scales, showcasing commonalities as well as regional and contextual differences in acceptance and perception of NbS by local actors.

Acknowledgements. This research has received funding from the European Union's Horizon Europe research and innovation program under Grant Agreement No 101156076, DRYAD Project.

Keywords: agroforestry systems, nature-based solutions, Mediterranean region, farmland biodiversity, agri-environmental policy

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1. CAN THE EUROPEAN UNION TRANSFORM GLOBAL AGRICULTURAL SUSTAINABILITY? LESSONS FROM THE DEFORESTATION-FREE REGULATION AND THE DEBATE ON MIRROR MEASURES

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The European Union has progressively strengthened environmental, climate and social standards within its agricultural and food systems under the European Green Deal. However, these advances have exposed a structural tension: while European producers must comply with increasingly demanding regulations, agri-food imports may originate from production systems operating under significantly lower environmental and social requirements. This situation raises concerns regarding policy coherence, biodiversity loss, and the externalization of environmental impacts beyond EU borders.

In response, the debate on “mirror measures” has emerged as a key policy proposal aimed at conditioning access to the EU internal market on compliance with equivalent production standards. The Regulation (EU) 2023/1115 on deforestation-free products (EUDR) represents the most advanced attempt to operationalize this approach by linking market access to verifiable environmental conditions in third countries. This communication analyzes the regulation as a real-world case study to assess the opportunities and limitations of trade policy as a driver of global agricultural sustainability.

The implementation of the deforestation regulation has revealed significant political, technical and governance challenges, including verification difficulties, resistance from producing countries, concerns about impacts on smallholders, and repeated delays in its entry into force. These challenges illustrate the complexity of extending domestic environmental standards to global markets within the constraints of international trade law and geopolitical relations.

Drawing on the mirror measures debate and ongoing trade negotiations such as EU–Mercosur, this communication argues that implementing mirror measures faces substantial political and diplomatic constraints. It examines to what extent such approaches are realistically achievable and explores complementary pathways to advance sustainability objectives in the absence of a clear obligation to comply fully with European environmental and social standards.

Ultimately, the EU experience suggests that transforming global agricultural sustainability is possible but inherently complex, requiring a shift toward shared transition pathways between producing and importing regions.

Keywords: mirror measures; deforestation regulation; international trade; agricultural sustainability; biodiversity governance; EU policy



2. FROM FRAGMENTED MEASURES TO COORDINATED LANDSCAPES: HOW COOPERATIVE GOVERNANCE CAN STRENGTHEN BIODIVERSITY IN AGRICULTURAL REGIONS

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Agricultural landscapes are expected to deliver multiple societal benefits, including food production, biodiversity conservation and climate mitigation. Although scientific knowledge on biodiversity-friendly farming practices is widely available, biodiversity loss in agricultural regions continues. A key reason is that agri-environmental measures are often implemented at individual farm level with limited coordination, while different and sometimes conflicting expectations are placed on land use. This contribution argues that biodiversity conservation in agricultural landscapes is less a matter of lacking knowledge and more a challenge of governance, institutional coordination and effective policy implementation.

Building on cooperative and collective agri-environmental approaches originally developed in the Netherlands, the presentation examines how such governance arrangements have been adapted and implemented in several German model regions. The focus lies on how European and national policy frameworks and funding instruments are translated into coordinated action at landscape scale. Particular attention is paid to decision-making structures, cross-farm coordination, regional facilitation and the negotiation of shared biodiversity objectives among farmers, conservation actors and public authorities.

Drawing on experiences from model regions within the German joint research project KOMBI – including peatland protection initiatives in Brandenburg and ecological connectivity strategies in Baden-Württemberg – the contribution illustrates how cooperative governance can spatially align measures and improve their effectiveness under high land-use pressure. First empirical insights indicate that coordinated planning and collective implementation enhance ecological coherence and stakeholder acceptance. Rather than conflicting with agricultural production, cooperative approaches help reconcile multifunctional land-use demands by strategically allocating measures where they generate the greatest biodiversity and climate benefits.

The presentation concludes by reflecting on key success factors, limitations and transferability of cooperative governance models to other European agricultural contexts facing similar land-use and policy challenges.

Keywords: cooperative agri-environmental schemes; collective governance; landscape-scale coordination; policy implementation; peatland protection; ecological connectivity



3. FARMERS' PREFERENCES FOR SPATIALLY-COORDINATED PAYMENTS FOR RESULTS-BASED ECOLOGICAL ENHANCEMENT

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Voluntary environmental support schemes have gradually been integrated into the European Union's agricultural policy in the face of global environmental challenges. However, several studies show that the environmental and ecological performance of agri-environmental schemes (AES) is modest. The implementation of AES by means of action-oriented payments and their conception as individual farm actions can explain, among other reasons, this poor performance. To improve AES efficiency, results-based AES (rAES) and spatially-coordinated AES (cAES) are often recommended in the literature. However, there are notable barriers to the implementation of such approaches. The present paper aims to provide insights into farmers' preferences for specific characteristics of results-based cAES (crAES), such as the number of farmers participating in the schemes, the spatial distribution of their plots (distance between farms), and the type of environmental service monitored (biodiversity or carbon sequestration). The analysis relies on a discrete choice experiment, using a mixed logit model in willingness to accept (WTA) space as modeling approach, followed by a random-effects generalized least squares regression model to assess heterogeneity of farmers' preferences. The study focuses on sloping olive groves, a prevalent agricultural system in the Mediterranean region. Results show that the number of participants largely determines the WTA for participating in crAES, showing significantly higher WTA for coordinated schemes than for individual ones, although the marginal increase in WTA decreases with the number of participants, with the distance between plots having a lower impact on WTA. As a result, low levels of participation on crAES are expected for the current payment levels (€200-400/ha), being significantly higher for schemes based on carbon sequestration than for biodiversity. A complementary spatial analysis demonstrates diverse patterns of farm connectivity between individual and collective participation, resulting in non-obvious policy decisions that are largely site and species-specific.

Keywords: discrete choice experiments, performance-based schemes, outcome-based schemes, collaborative schemes, farmland biodiversity



4. HIGH NATURE VALUE HAY MEADOWS: BIODIVERSITY RESULTS-BASED SCHEME IN NAVARRE (CAP 2023–2027)

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In contrast to traditional management–requirement–based approaches, biodiversity results–based payment schemes link payments directly to the achievement of defined environmental outcomes, making them much more attractive for delivering environmental benefits.

Although Regulation (EU) 2021/2115 of the European Parliament and of the Council states that “Member States may promote results–based payment schemes to encourage farmers to achieve a significant improvement in the quality of the environment on a larger scale and in a quantifiable manner,” in Spain only one such intervention has been implemented within the 2023–2027 CAP Strategic Plan.

This is the High Nature Value Hay Meadows Scheme in Navarre. The scheme was implemented in 2024 thanks to the experience gained through the RBAPS (Results–based Agri–environmental Pilot Scheme) project and the studies carried out in this region for the characterization and monitoring of High Nature Value (HNV) agricultural systems.

This support program, which already benefits 379 hectares belonging to 60 livestock farmers in northern Navarre, uses a payment system based on a score between 0 and 100 obtained through a form that assesses the biodiversity present in each hay meadow. The score evaluates plant diversity and the presence of features that support biodiversity (hedges, isolated trees, dry–stone, and shelters). The higher the score, the greater the biodiversity in the meadow and the higher the payment.

The beneficiary farmers themselves carry out the assessment and scoring of their meadows after receiving training, advice, and support.

Linked to this scheme and funded by the POCTEFA REDBIO project, the 1st Navarre Flowery Meadow Competition was held in 2025 to highlight the benefits of extensive livestock farming primarily the conservation of biodiversity and the traditional landscape associated with grazing.

Keywords: results–based schemes, CAP 2023–2027, extensive livestock, HNV farming systems, semi–natural grasslands, scorecard



5. AN INNOVATIVE GOVERNANCE TOOL UNDER THE CONCEPTUAL FRAMEWORK OF INCENTIVES FOR ECOSYSTEM SERVICES: THE ADMINISTRATIVE AGREEMENTS FOR THE RECOGNITION AND SUPPORT OF TRADITIONAL AND HISTORICAL IRRIGATION SYSTEMS IN SPAIN

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Traditional and Historical Irrigation Systems (THIS) are communal, centuries-old, complex socioecological systems present across the globe. THIS preserve biodiversity and promote a resilient and sustainable agricultural model, through environmental stewardship (biodiversity conservation, water and energy efficiency, landscape protection, etc.). THIS sustainability relies on traditional rights, cultural identities and traditional ecological knowledge. Through low-cost low-impacting practices THIS provide collective conflict resolution, direct democracy, heritage protection, social justice, food sovereignty and a wide range of ecosystem services that benefit rural communities.

Since 2021, in South Spain, the Laboratory of Biocultural Archaeology of the University of Granada, MEMOLab-UGR, have been developing governance tools for the recognition and support of the Irrigation Communities (IC, *Comunidades de Regantes*) that govern these THIS, including Administrative Agreements (AA). AA are 4-year, renewable, legal binding agreements between public law corporations. MEMOLab-UGR AA were signed between IC and their municipalities, under the conceptual framework of Incentives for Ecosystem Services (IES): municipalities recognize the “general interest” of the THIS for their social, economic and environmental values and the ecosystem services they provide. As compensation municipalities commit to support IC through different tools: resources, administrative support, taxes and fees bonifications, public recognition, joint application to subsidies, etc. On their side IC commits to govern and manage THIS to preserve their values, as well as the ecosystem services THIS provide to the territory.

Between 2022–25, 14 AA were signed including 3.954,82 ha and 3.209 irrigators. Results show that AA are successful in improving the IC conditions and THIS sustainability. In the other hand, municipalities have benefited by obtaining legal certainty for investing public resources in the THIS of their territory. Overall, this PES approach has demonstrated to be a good strategy for improving and preserving the values and ecosystem services THIS provide to agriculture, rural communities and their territories.

Keywords: administrative agreements, traditional and historical irrigation systems, commons, recognition, payment for ecosystem services (PES)





6. THE NEW GOVERNANCE FRAMEWORK AND PUBLIC POLICIES FOR STRENGTHENING CERTIFIED PRODUCTION MARKETS IN ANDALUCÍA

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Organic and integrated production in Andalucía represents one of the emerging pillars of the regional agri-food system, with around two million hectares certified and a constantly expanding sector. However, domestic consumption is not keeping pace with this growth, generating imbalances between supply and demand. The Law for the Promotion and Development of Organic Production and Other Certified Productions (LIPESA) establishes a new regulatory framework aimed at strengthening markets, improving sector governance, and promoting coherent and more sustainable policies.

This work consists of a documentary analysis of LIPESA, examining its titles, articles, and strategic objectives. The market mechanisms, governance, and environmental policies contained in the standard were identified and classified into areas of public intervention: economic incentives, trade promotion, consumption encouragement, digitalization, participatory governance, and administrative simplification.

The analysis reveals that the Law establishes a broad set of instruments to rebalance markets and increase the resilience of the agri-food system. Among the most relevant findings are:

- Regulatory and budgetary priority for certified production in aid, incentives and public procurement.
- Promotion of consumption in public administrations, educational centers and the Horeca channel.
- Boosting local markets, direct sales and international promotion.
- Creation of an advisory and participatory body to strengthen sector governance.
- Introduction of sustainability, biodiversity, digitalization, and circular economy criteria throughout the value chain.
- Statistical and informational reinforcement to improve transparency and market functioning.

LIPESA is a comprehensive tool for aligning production, markets, and agri-food policies in Andalucía. Its multi-sectoral approach and emphasis on governance, sustainability, and market dynamism will enable progress toward a more balanced, competitive, and environmentally responsible agri-food system. Its effective implementation will be key to consolidating consumption in line with the region's leading production sector..

Keywords: agricultural policy, organic production, integrated production, agri-food policy, sustainability

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POSTERS 1





1. COMPARING THE EFFECTS OF DIFFERENT OLIVE GROVE MANAGEMENT SYSTEMS ON BIODIVERSITY

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Humanity is increasingly dependent on food production systems, which places unprecedented pressure on natural resources and agricultural systems, particularly olive groves. Three key factors influence the sustainability of olive groves: the plantation framework (super-intensive, intensive, or traditional); the certification system (organic or conventional); and the water supply (irrigated or rainfed).

We investigated how the combination of these different olive grove management systems affects biodiversity (vascular-plants and diurnal lepidopteran species). We sampled 53 olive groves larger than 10 hectares across Andalusia (southern Spain) and analysed the relationship between the management of the olive groves and biodiversity.

Our results show larger variability in the abundance of diurnal lepidopterans in organic farms compared to conventional ones, as well as a tendency toward higher abundance in organic farms. Regarding species richness, variability was larger in conventional farms, with a tendency toward lower values. However, no significant differences were observed between the two management types in terms of Shannon diversity. In terms of irrigation type, no significant differences were found for any biodiversity indicator, although organic plots showed larger variability in richness and abundance. In relation to the planting framework, no differences were observed between intensive and traditional systems; however, super-intensive farms showed significantly lower values of butterfly richness and diversity.

Regarding plant diversity, no significant differences were found between management types nor irrigation system, although mean values in organic and irrigated systems were higher for species richness, abundance and Shannon diversity. In the same way, no significant differences appear to be found among management types, although mean values in super-intensive systems were lower for the three indices. We also found a positive correlation between plants and butterflies' abundance and richness. However, butterfly diversity appeared to be independent of plant diversity. Our results are fundamental to design more sustainable olive grove management strategies.

Keywords: olive tree plantations, biodiversity, butterflies, plant diversity, land use intensity, landscape management



2. MORE IS NOT ALWAYS BETTER! OLIVE GROVE INTENSIFICATION ALTERS INSECTIVOROUS BAT COMMUNITIES IN ANDALUSIA

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Bats play a key role in maintaining ecological integrity and providing natural pest control in agroecosystems, including olive crops. In Mediterranean landscapes, traditional olive groves are increasingly being replaced by high-density hedgerow systems characterized by closer planting, greater pesticide use, and full mechanization. This intensification may affect bat populations and the ecosystem services they provide. In this study, we assessed the effects of olive grove management on insectivorous bats in terms of diversity, community composition, activity, and foraging behavior. Acoustic surveys using passive recorders were conducted during May–June 2025 at 61 sampling points over four nights in Andalusian olive groves representing traditional, intensive, and superintensive systems, classified according to planting density and vegetation cover management. Preliminary results identified ten phonic groups, with *Pipistrellus pygmaeus* being the most frequently recorded. Species richness did not differ significantly among management types; however, total bat activity was significantly higher in superintensive groves. Despite this increase, community composition was altered, with relative frequencies of phonic groups varying across systems and a clear dominance of generalist species in superintensive groves, reflecting more unbalanced communities. At the phonic group level, *P. pygmaeus* and *Cnephaeus/Nyctalus* sp. showed higher activity in superintensive groves, whereas *Pipistrellus kuhlii* was more active in traditional groves, suggesting that structural simplification may negatively affect certain species. Vegetation cover appeared to enhance foraging activity, with denser cover associated with more feeding buzz events. Overall, these findings indicate that structural simplification may differentially affect bat species according to their ecological traits, favoring generalists while displacing others with distinct ecosystem functions. This shift could have important implications for bat-mediated biological pest control in olive production. Additionally, these results highlight key environmental factors relevant to bat conservation in olive agroecosystems, such as maintaining vegetation cover or natural vegetation patches to mitigate the negative effects of agricultural intensification.

Keywords: agriculture intensifications, olives groves, bats, community composition





3. MEDITERRANEAN AGRICULTURAL LANDSCAPES PROMOTE CULTURAL ECOSYSTEM SERVICES AND BIODIVERSITY CONSERVATION

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Agriculture, during its millenarian history, had contributed to shape impressive cultural landscapes; however, in recent decades, many of these have been lost or degraded because of widespread intensification or abandonment. Low-intensive agricultural landscapes are of utmost importance for biodiversity conservation and the delivery of cultural ecosystem services, i.e. the “nonmaterial benefits people gain from ecosystems”, such as spiritual, religious, aesthetic and cultural heritage values, recreation, and ecotourism.

Within the framework of a wider study, we worked in a landscape shaped by low-intensity olive groves on slopes where marginal habitats in the olive matrix and soil management create a gradient of agricultural intensification (in the province of Córdoba, southern Spain). We explicitly quantified aesthetic services (visual quality index on the basis of public preferences) and bird diversity (bird species richness and abundance) associated with this landscape at 6 sampling sites. We aimed to define an appealing strategy combining biodiversity conservation and ecosystem service delivery in the cultural landscapes.

Breeding bird communities abundance and richness was positively related with landscape aesthetic value, but no relationship was found between the latter and winter bird communities. Bird diversity and aesthetic services were positively associated with herbaceous cover and marginal habitats, suggesting that landscapes with higher visual quality are those that harbor greater biodiversity.

We concluded that managing the agricultural landscape to maintain aesthetic values, which primarily means implementing spontaneous cover and conserving its traditional traits, would favour bird diversity. It will also promote the heritage and recreational value of the landscape itself, underlining the importance of the synergistic integration of conservation targets into a combined strategy.

Keywords: olive groves, bird diversity, herbaceous cover, agriculture intensification



4. MULTI-SCALE DRIVERS OF EROSION OF TAXONOMIC AND FUNCTIONAL DIVERSITY OF SPIDERS IN IBERIAN OLIVE AGROECOSYSTEMS UNDER AGRICULTURAL INTENSIFICATION

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Agricultural intensification and landscape homogenization are major drivers of arthropod decline. Both can act as environmental filters of community assembly and alter ecosystem functioning. In Mediterranean agroecosystems, spiders are important predators of invertebrates. However, the extent to which landscape structure and farm management jointly filter spider assemblages across taxonomic and functional dimensions remains unclear.

Here, we characterized spider assemblages at taxonomic and functional levels across 33 olive farms in the Iberian Peninsula. The farms spanned a gradient of landscape complexity and agricultural management (intensive vs. low-intensive herbaceous cover management; organic vs. non-organic). Spiders were sampled during spring and summer 2022 and 2023 using pitfall traps in olive field and adjacent semi-natural habitats. We quantified infield alpha-diversity, taxonomic and functional beta diversity between habitats, and landscape-scale gamma diversity. Functional characterization of spiders was based on hunting strategy, trophic specialization, and body size. This trait-based framework enabled us to test whether landscape homogenization and management





intensity act as environmental filters, favoring certain ecological strategies.

We found no effects of agricultural intensification on taxonomic diversity. Yet we found a pervasive effect of landscape complexity. Specifically, infield alpha (within the olive field) and landscape gamma diversity augmented as the semi-natural areas increased in the landscape while the beta diversity remains invariant. Consistent with this pattern we found a high correlation of infield alpha and gamma diversity, while gamma and beta diversity were uncorrelated. No filtering effect of landscape or management on functional diversity was patent. Our results suggest that the diversity of spiders within olive fields is to large extent shaped by the amount of semi-natural sources in the landscape.

This study provides insights into how agricultural landscapes structure the spider community within olive landscapes and informs on the need of maintaining and restoring semi-natural habitats as sources of natural enemies of olive pests.

Keywords: alpha-diversity, beta-diversity, gamma-diversity, functional traits; arachnids; landscape perspective, epigeal spiders



5. NATIVE HEDGEROWS AS BOOSTERS OF BIODIVERSITY: RESTORING POLLINATOR COMMUNITIES IN MEDITERRANEAN OLIVE AGROECOSYSTEMS

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The recent approval of the EU Nature Restoration Law (NRL) sets ambitious targets to halt and reverse biodiversity loss, including the recovery of pollinator populations in agricultural landscapes. Farmlands cover a significant portion of European land, and are considered a major responsible of pollinator decline. NRL promotes green infrastructures (GIs), such as native hedgerows, to enhance pollinator communities in farmlands and has been widely used in arable lands; however, empirical evidence of their effectiveness in Mediterranean woody crops remains limited.

Here, we evaluated the impact of 7-year-old native hedgerows on pollinator diversity and community composition across 16 olive farms in southern Spain. Wild bees, butterflies, and hoverflies were sampled during spring-summer 2024-2025 in three habitats per farm: olive fields; semi-natural patches, and GI. We characterized pollinator assemblages per habitat, and analyzed the effects of habitat type, landscape heterogeneity (olive cover, semi-natural habitat cover, land-use diversity, edge density, and patch richness), farm management (pesticide use and herbaceous-cover management intensity), and GI dimensions on their diversity.

Olive field habitats rapidly achieved high sampling coverage but consistently exhibited lower species richness, indicating simplified communities dominated by a few generalist species. In contrast, semi-natural habitats generally exhibited higher diversity values, revealing a greater structural complexity and a higher proportion of rare species. GI showed intermediate diversity and, although they did not differ significantly from either semi-natural or olive habitats, their diversity and assemblages were more similar to those of semi-natural patches than to productive fields. Habitat type was the only predictor showing a statistically significant effect on alpha diversity, whereas landscape structure and management variables did not exhibit consistent effects.

These results demonstrate that mature restored hedgerows can host pollinator communities comparable to semi-natural habitats, highlighting their strong potential as biodiversity restoration tools in Mediterranean olive landscapes under the EU Nature Restoration Law.

Keywords: agroecosystem functioning, arthropods, green infrastructure (GI), native woody species, Nature Restoration Law, olive groves



6. BOTH LANDSCAPE COMPLEXITY AND LOW-INTENSITY HERB COVER MANAGEMENT PROMOTE ABOVE-GROUND NESTING BEES' REPRODUCTIVE SUCCESS IN OLIVE LANDSCAPES

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As agroecosystems expand worldwide, bee populations in croplands decline due to the loss of floral and nesting resources from reduced semi-natural habitats. This decline can be driven by mechanisms such as increased parasitism in simplified landscapes (likely linked to longer foraging times) and reduced reproductive success where floral resources are scarce (resource availability strongly influences investment in female offspring). Additionally, reproductive success may differ with trophic specialization: oligolectic bees tend to forage more efficiently and rear more offspring than polylectic bees. However, in permanent agroecosystems, where ground herb cover may provide additional floral resources, these patterns remain poorly understood.

We installed 144 nest traps for above-ground nesting bees in the crop matrix and adjacent semi-natural habitats of 24 paired olive farms with contrasting herb cover management (low-intensity vs. high-intensity) across a landscape complexity gradient in Andalusia. We measured reproductive variables (colonization rate, sex ratio, total offspring, and parasitism) for the whole bee community and the two most abundant species, *Hoplitis adunca* (oligolectic) and *Osmia caerulescens* (polylectic), to assess the effects of herb cover, landscape complexity, and habitat type.

Above-ground nesting bees colonized semi-natural habitats more than crops, especially on low-intensity farms; *O. caerulescens* showed stronger differences on high-intensity farms, while *H. adunca* responded to landscape complexity. At the community level, fewer females were produced in semi-natural habitats; *H. adunca* also produced fewer females in the matrix crop at intermediate landscapes, while *O. caerulescens* sex ratio remained stable. Differences appear to reflect their distinct trophic specialization: *H. adunca* (oligolectic) sex ratio is more sensitive to landscape complexity, whereas *O. caerulescens* (polylectic) sex ratio is not. Community parasitism rate increased with landscape simplification and was higher for *O. caerulescens* in high-intensity farms at intermediate landscapes.

Maintaining semi-natural habitats and herbaceous cover in olive groves supports bee population persistence by enhancing reproductive success.

Keywords: *nest colonization rate, parasitism rate, permanent agroecosystems, pollinators, semi-natural habitat, sex ratio*



7. OLIVE GROVES, MORE THAN A CROP, A REFUGE FOR LIFE: CULTIVATING BIODIVERSITY IN THE MEDITERRANEAN HOTSPOT

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Covering only 1.6% of the Earth's drylands, the Mediterranean Basin is the second-largest biodiversity hotspot in the world. Its unique geographic position—as a bridge between Europe, Asia, and Africa—results in an exceptional biodiversity source for both fauna and flora. However, its long history of human occupation and increased farming intensification have degraded many landscapes. The Mediterranean region harbors around 95% of global olive oil production, with the Iberian Peninsula—Spain and Portugal—as the main producing area. Understanding how olive landscapes support biodiversity is one of the main focuses of the Olivares Vivos project (LIFE OV and LIFE OV+).

We sampled 62 olive farms across the Iberian Peninsula over a ten-year period (2016–2026) within the biodiversity monitoring program of LIFE OV and LIFE OV+. We focused on birds, plants, pollinators (mainly bees), ants, spiders, bats and terrestrial mammals.





To date, we have detected a substantial fraction of Iberian biodiversity inhabiting olive fields and their semi-natural adjacent patches: 32.5 % of bird species (193 species), 13.5 % of plants (957 species), 37.3 % of wild bees (386 species), 30.3 % of ant (90 species), 38.3 % of spiders (154 genera), 57.1 % of bats (20 species) and 29.6 % of mammalian carnivores (8 species). Altogether, this represents about 1/3 of the biodiversity of the Iberian Peninsula in these groups, confirming that olive groves are the most important cropland for biodiversity in Europe. Interestingly, this diversity is higher in olive groves of Spain than in other Mediterranean countries (Portugal, Italy or Greece) where Olivares Vivos has conducted assessments.

Our results highlight that although agricultural intensification in the last century has been a major driver of biodiversity loss, well-managed olive agroecosystems can provide habitats for a wide range of species and position traditional olive groves as High Nature Value Farmlands.

Keywords: agricultural landscapes, agroecosystem management, biodiversity hotspots, ecosystem restoration, high nature value farmlands, mediterranean region



8. INTEGRATED MAPPING PROPOSAL FOR SPANISH AGRICULTURAL SYSTEMS

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The Common Agricultural Policy (CAP) is the European policy that most influences land use and, with it, the conservation of biodiversity and its associated ecosystem services, an explicit objective of the CAP since the 1990s, whose direct evaluation is mandatory from 2023 onwards. Assessment in Spain is hampered by the wide variety of agricultural land uses included in official maps. In this paper, we propose a simplified and operational mapping method integrating agronomic, biogeographic, ecological and cultural criteria. Starting from a public cartographic database, we develop an explicit and replicable methodology that groups and maps all agricultural land uses into eight major systems: Mediterranean arable, extensive grazing, dehesas, mixed Eurosiberian, olive groves, vineyards, orchards and rice paddies. This simplification provides the updated maps needed for evaluating biodiversity effects of agricultural policies.

Keywords: CAP, agriculture, GIS, policy evaluation, land use



9. TEMPORAL CHANGES IN SPIDER COMMUNITIES IN A MEDITERRANEAN AGROECOSYSTEM

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Biodiversity assessments in agricultural ecosystems are essential for understanding species persistence and community dynamics under intensive land use. Spiders are key generalist predators and valuable indicators of habitat quality in agroecosystems. Spider communities were surveyed in an intensively cultivated field in Stavies, Messara (Heraklion, Crete) during two sampling periods, in 2022 and 2025, using pitfall traps across the main activity seasons. The study aimed to document species composition and examine whether temporal variation occurs between samples collected from productive areas (primarily olive cultivation) and semi-natural habitats, or from under versus beside the tree canopy, while also assessing seasonal differences within each sampling year. No significant differences were recorded between any of the tested habitats, except that spring spider populations were significantly higher than autumn populations across both habitats and years. Species composition varied between years, indicating temporal shifts in the community. Several species were exclusively detected in one sampling period, indicating temporal turnover in the community, likely reflecting environmental fluctuations and agricultural management practices. Notably, *Theridula aelleni* (Hubert, 1970) (Araneae: Theridiidae) is recorded for the first time in Greece, expanding the known distribution of the species and highlighting the importance of continued faunistic surveys in Mediterranean agroecosystems. These findings underline the dynamic nature of spider communities in olive agroecosystems and emphasize the value of repeated biodiversity assessments for documenting faunal changes and new species records.

This work was implemented within the framework of the European Project “LIFE Olivares Vivos+ Increasing the impact of Olivares Vivos in the EU” LIFE20 NAT/ES/001487 LIFE OlivaresVivos+, with the European Commission as the funding body and ELGO’s own contribution.

Keywords: *biodiversity, pitfall traps, species turnover, spiders*



10. CONSEQUENCES OF MEDITERRANEAN CLIMATE ARIDIFICATION ON BIODIVERSITY IN OLIVE LANDSCAPES: IMPLICATIONS FOR CONSERVATION AND RESTORATION

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Aridification and expansion of semiarid climate is one of the major threats associated to climate change and land degradation in the Mediterranean Basin. In particular, in the Iberian Peninsula, a substantial area currently under mesic climate is predicted to turn to semiarid conditions along XXI century, which challenges agriculture sustainability and the conservation of the biodiversity hosted in the agricultural landscapes. Here, as one of objectives of the LIFE project 'Olivares Vivos+', we evaluate the diversity (species or genera, depending of the group) and species composition of flora and several vertebrate and invertebrate fauna groups (birds, bats, bees, ants and spiders) in 24 olive landscapes of Andalusia (southern Spain) considering a gradient from mesic to arid Mediterranean conditions. We found comparable diversity in mesic and semiarid Mediterranean climate. Reducing agricultural intensification and creating heterogeneity through active restoration have proved to enhance biodiversity in olive landscapes under mesic conditions. Similar to mesic conditions, agricultural intensification and landscape simplification lead to species loss in semiarid ones, which informs that controlling this driver of diversity loss should lead to enhance biodiversity also in semiarid conditions. However, we further detected important changes in species composition within the olive landscapes that occur throughout the gradient of aridification of south of Spain,



arising particular assemblages under semiarid conditions in most groups of species. Our findings suggest that although diversity levels may be maintained in the olive landscapes despite climate change, aridification will transform their species assemblages, with unpredictable consequences in species interactions and associated ecosystem services, pest biocontrol among them.

Keywords: climate change, land degradation, aridity, species composition, agricultural intensification, landscape complexity



11. USE OF SHELTER-BOXES BY WEASELS (*MUSTELA NIVALIS*) IN CEREAL AGROECOSYSTEMS: PREDATOR INFLUENCE AND BIRDS OF PREY NEST-BOXES

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Weasels (*Mustela nivalis*) are small carnivores that play a key role in cereal-based agroecosystems, where they act as specialized predators of the common vole (*Microtus arvalis*), particularly during population outbreaks. However, the use of artificial shelters by weasels and their interaction with other biological control tools, such as nest-boxes for birds of prey, remain poorly understood.

This study evaluated the use of shelter-boxes by weasels in three agrarian areas of Castilla y León (Spain), characterized by different levels of intensification and presence of nest-boxes installed for common vole control. Monitoring was carried out between 2023 and 2025, covering different population phases of the rodent. Shelter-box occupancy was analysed in relation to the proximity of nest-boxes (barn owl and kestrel) and the presence of other predators, mainly red foxes.

Data were gathered using footprint traps to evaluate the use of shelter-boxes, phototrapping to study weasel ethology and predator presence, and direct monitoring of nest-boxes during reproductive periods (spring–summer). Pellets collected from nest-boxes were also analysed to evaluate potential predation on weasels.

Results showed that weasels used shelter-boxes in all study areas, including those with nearby active nest-boxes, without detecting clear avoidance associated with their presence. Pellet analysis detected no remains within the study samples; thus, while opportunistic predation cannot be entirely ruled out, nest-boxes do not appear to pose a significant threat to the use of shelter-boxes. Variations in the temporal use of shelters were observed and appeared to be more closely related to prey availability than to predator presence, although the influence of predation risk and landscape structure cannot be ruled out.

This study highlights that both biological control tools are compatible and contribute to the control of the common vole within the agrarian mosaic, emphasizing their role in the evaluation of functional biodiversity.

Keywords: Mustela nivalis; cereal-based agroecosystems; biological control; nest-boxes; predator community; functional biodiversity



12. THE EFFECTS OF FARMING SYSTEM AND SOIL MANAGEMENT ON PLANT DIVERSITY IN SLOPING OLIVE GROVES

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The effects of the farming system (conventional-organic-abandoned) and soil management (native cover crop vs tillage) on vascular plant species were analyzed in sloping olive groves (>20%) in 20 different locations in Andalusia, SE Spain. The soil management techniques included Organic Tillage (OT), Organic Cover Crops (OC), Conventional Tillage (CT), Conventional Non-Tillage (CNT), Abandoned Cover Crops (AC) and Abandoned Woody (AW). Data for the vascular plant species were recorded through three line transects of 30 m with a bar perpendicularly touching every 1m of the measuring tape. Environmental variables were also recorded at plot level to assess their influence. Dependent variables, such as species abundance, richness and diversity indexes were studied using univariate analysis (one-way ANOVA, Kruskal–Wallis test) while multivariate statistics (ANOSIM, SIMPER, DCA) were used for analyzing the data matrices. We found that the different combinations of farming system and soil management affect biological diversity in terms of individual abundance, plant cover, species richness and diversity, species and family composition. Life forms and species distribution patterns are also affected. The main environmental variables affecting the plant taxa were those related with soil and climate characteristics, slope, olive age and intensive land uses at landscape level, including the percentage of artificial surfaces. The lowest levels of biodiversity (e.g., species richness) were found in the tilled olive groves (CT = 8.1 sp. $\pm$ 2.2, OT = 10.0 sp. $\pm$ 5.4). Surprisingly, the organic tilled groves (OT) were very poor in species compared to those with native plant cover (OC = 27.9 sp. $\pm$ 3.0). The latter, however, showed similar species richness to the abandoned olive groves (AC = 21.2 sp. $\pm$ 3.7, AW= 27.2 sp. $\pm$ 3.0). Possible solutions for increasingly uncompetitive sloping olive groves include conversion to organic with native plant cover or abandonment for rewilding.

Keywords: agricultural abandonment; cover crops; organic farming; plant diversity; soil tillage



13. SOIL DATASPACE FOR CARBON BALANCE ASSESSMENT: ENHANCING SOIL ORGANIC CARBON SEQUESTRATION AND CLIMATE CHANGE MITIGATION IN SPANISH AGROECOSYSTEMS

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The CLIMA use case, integrated within the Soil DataSpace project (Espacio de Datos de Suelos) at the University of Jaén, represents a key technological and scientific innovation for the monitoring and quantification of soil organic carbon (SOC) as a climate change mitigation strategy. This digital demonstrator addresses the need to harmonize edaphological, climatic, and geospatial data in order to accurately assess carbon sequestration capacity in Spanish agroecosystems, with particular emphasis on Mediterranean olive groves. The objective of this study is to analyze soil organic carbon fixation in agricultural soils through the assessment of soil carbon balance. To this end, experimental olive plots under different management practices located in Andalusia were selected. Soil carbon balance was estimated through the integration of multiple data sources (experimental, agronomic, and geospatial), combined with the use of modeling and spatial analysis tools, including the RothC model and Geographic



Information Systems (ArcGIS). Preliminary results indicate that the adoption of sustainable management practices —such as the establishment of cover crops, incorporation of shredded pruning residues, and application of organic amendments—enhances soil organic carbon sequestration. The developed system enables simulation of carbon dynamics under different climatic scenarios and management strategies, ensuring the traceability required for certification and monetization of ecosystem services in accordance with Regulation (EU) 2024/3012.

Keywords: soil dataSpace, soil organic carbon, carbon balance, climate change, olive groves



14. PARASITOID COMMUNITY AND OLIVE FLY PEST CONTROL DAMAGE ACROSS HABITATS IN TWO OLIVE FARMS IN ANDALUSIA

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Southern Spain has the largest olive grove area in the Mediterranean basin, where land use intensification promotes landscape simplification through olive monoculture expansion and high agrochemical input, leading to biodiversity loss and ecosystem instability. *Bactrocera oleae* (the olive fly) is a major olive pest causing significant losses in olive oil yield and quality, while parasitoids are promising biological control agents that naturally regulate pest populations. We explored the *B. oleae* parasitoid community in two farms in Andalusia. Olives were sampled from trees adjacent to three habitats: semi-natural patches (SNAT), 8-year restored woody green infrastructures (GI), and agricultural matrix (OL). At six sampling stations per habitat on each farm, two trees were selected and fly damages to 100 olives per tree recorded. We incubated infested olives to quantify *B. oleae* and parasitoid emergence. Estimated damage was 7.6%, 15.3% and 13.2% in SNAT, GI and OL, respectively. SNAT showed roughly (statistically significant) half the damage observed in GI, while the difference with OL was marginally significant. In the same way, F1 flies' population projection was lower for SNAT than GI (significant) and OL (marginal), with no differences between GI and OL. Parasitoids emerged in 25% of sampling stations, with *Pnigalio mediterraneus*, *Laelius pedatus*, and *Psyttalia gr. concolor* being the identified species. Parasitoid presence increased with pest abundance, and it was significantly higher in OL than in GI, but differences between SNAT and OL habitats were not significant. These results indicate that parasitoid establishment remains strongly dependent on host availability and that 8-year small green infrastructures are still not serving as biological control promoters. Overall, semi-natural habitats act as buffers and seems to control the pest in adjacent olive trees, showing the lowest *B. oleae* damage. Conserving and expanding these habitats within olive agroecosystems is essential to enhance biological control.

Keywords: *biological control, ecological restoration, parasitoids, olives pests, ecosystem services*





15. THE INFLUENCE OF LAND USE ON SOIL PROPERTIES: BIOLOGICAL PROPERTIES OF AGRICULTURAL AND FOREST SOILS IN NORTH-WEST ASTURIAS

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Soils are living ecosystems whose quality depends both on their physical and chemical properties and on the composition, structure and activity of their microbial communities. This quality can be modified as a result of changes in land use and management practices. Mountain soils, despite their high ecological value and vulnerability to changes in use and management, have been little studied, partly due to their low agricultural productivity.

This study is located in a mountainous area in north-western Asturias, on soils developed on Luarca Black Slate. This area has average annual temperatures of 9.5°C, no summer drought, and rainfall exceeding 1500 mm per year. Soils were selected under five representative uses of the study area: meadows, scrubland, oak forests, and pine forests of *Pinus sylvestris* and *Pinus radiata*, with five replicates for each use. Physicochemical properties (pH, C/N ratio, organic matter (OM), nitrate and ammonium, exchangeable cations, effective cation exchange capacity and Al saturation) were determined, as well as soil microbial properties (urease and β -glucosidase enzyme activity and microbial biomass carbon). The data were subjected to ANOVA testing for analysis.

The results show that, in general, there are no significant differences between soils with different uses for most of the physicochemical properties and for all the biological properties studied. Only significantly higher Ca contents and lower aluminium saturation percentages were detected in meadows, due to liming. The lack of differences between uses could be explained by the high organic matter contents of these mountain soils, which would act to buffer the effect of anthropogenic interventions.

These results indicate that, in these high, cold areas with high OM contents, the strongly acidic pH and climatic conditions act as limiting factors for microbial activity, without land use having a significant effect on it.

Keywords: meadows, mountain areas, organic matter, pines, pH





16. BEYOND FRAGMENTATION: THE QUALITY OF WOODLAND PATCHES SUPPORTS THE SEED DISPERSAL ECOSYSTEM SERVICE IN OLIVE GROVES LANDSCAPES

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Seed dispersal ecosystem service is essential for completing the biological cycle of fleshy-fruited plants, while also having major implications at the ecosystem level in areas such as landscape connectivity, habitat maintenance and animal species conservation. Land use for anthropogenic purposes and the expansion of crops (in many cases monocultures) fragments and simplifies the landscape, reducing the area covered by natural vegetation.

To assess the state of seed dispersal service in olive grove landscapes we collected seeds dispersed by frugivorous birds using seed fall traps trays in remnants of seminatural woodland vegetation of 15 olive groves. We identified the disperser species using barcoding. We evaluated the landscape at the configurational level (size and distance between of woodland patches) and compositional level (area occupied by olive groves and woodland habitat) and the quality of the woodland patches (richness and abundance of available fleshy fruit).

We compared the interaction strength (seed rain density) and the interaction network parameters across farms at the community level and analyzed the effect of the aforementioned parameters on bird guilds at the phenological and family levels for frugivorous birds and fleshy-fruited plants. We found that patch quality had a greater effect on the maintenance of the seed dispersal service than landscape degradation. In turn, olive groves, being a permanent woody crop producing fleshy fruit, are permeable to wintering birds. This mitigates the negative effects of habitat loss. However, landscape simplification does negatively affect resident birds that were sensitive to the disaggregation of forest patches. These results show that it is not enough to simply conserve natural areas; these areas must also be of sufficient quality to attract birds and maintain seed dispersal ecosystem services.

Keywords: DNA barcoding, frugivorous birds, habitat fragmentation, olive groves, seed rain, avian-fruit interactions





17. RECONNECTING AGRICULTURE AND BIODIVERSITY IN DOÑANA: A TRANSITION TOWARDS RESILIENT AGROECOSYSTEMS

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Agricultural intensification in the Doñana Natural Area has compromised ecological and cultural values, while also undermining the economic resilience of the agricultural sector in the region. This situation arises from the industrialisation and globalisation of agriculture and the simplification of landscapes, which have reduced soil fertility, pollinator abundance and traditional knowledge, among other values; while increasing water demand, pest incidence and aquifer contamination from agricultural chemicals (e.g., nitrates and herbicides).

To address these challenges, the DOÑANA-REGENERA project proposes three complementary lines of action to promote innovation in the agricultural sector and restore biodiversity, grounded in scientific and technological knowledge and supported by an interdisciplinary, participatory approach. The first line of action focuses on testing practices that enhance agroecosystem services flows in dominant crops (berries, citrus, and olives). Sideways, it aims at shedding light on the ecological and socio-economic value of traditional crops, like vineyards and annual crops, as well as native livestock breeds. The second line of action aims to promote biodiversity within agroecosystems through conservation actions, like installing nest boxes and increasing habitat heterogeneity, combined with biodiversity monitoring to identify priority taxa and degraded areas. Finally, the third line of action synthesizes results from the experimental activities and integrates them with similar initiatives, with the aim of demonstrating the economic and socio-ecologic value of these actions and facilitating uptake by farmers, NGOs, and companies. Overall, DOÑANA-REGENERA aims to foster a collective transformation of the landscape towards more resilient and sustainable agroecosystems.

Keywords: regenerative agriculture, sustainable farming, agroecological transitions, ecosystem services, cultural landscapes



18. RECENT TREND AND HABITAT SELECTION OF FOUR STEPPE BIRD SPECIES IN CASTILLA-LA MANCHA BETWEEN 2020 Y 2025

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In this study, we analysed the distribution, population trend and habitat of four steppe bird species in Castilla-La Mancha between 2020–2025. The species considered were the great bustard (*Otis tarda*), little bustard (*Tetrax tetrax*), pin-tailed sandgrouse (*Pterocles alchata*) and black-bellied sandgrouse (*Pterocles orientalis*).

Great bustard: population ranges between 2,561–2,295 individuals (spring), 8,565–4,798 individuals (summer), with a negative trend, and 8,443–6,045 individuals on winter. **Little bustard:** spring populations were estimated between 14,846–11,720 males, with a non-significant trend, and 3,251–1,114 individuals on winter, with a negative trend. **Pin-tailed sandgrouse:** population estimated between 7,801–3,309 (spring), with a positive trend, and 3,828–2,164 individuals on winter, with a non-significant trend. **Black-bellied sandgrouse:** population estimated between 696–531 individuals (spring) and 568–287 individuals (winter), with a non-significant trend.

The results show that the largest great bustard populations are concentrated in the provinces of Toledo and Albacete, whereas the other species are mainly concentrated in Ciudad Real. Stubble fields and green fallows are confirmed as key habitats for these species and, particularly, irrigated summer alfalfa crops for the little bustard.

The adoption of specific conservation measures (maintenance of stubble fields, green fallows and summer alfalfa crops) is recommended within Special Protection Areas (SPAs) and, in the case of the little bustard, in areas with higher spring presence, specifically in Campo de Calatrava, La Mancha and Campo de Montiel (Ciudad Real).

This Project has been funded by the Regional Ministry of Sustainable Development of Castilla-La Mancha.

Keywords: steppe birds, population trend, habitat use, conservation management



19. HEDGEROWS AS BIODIVERSITY RESERVOIRS AND SOIL QUALITY REFUGES IN INTENSIFIED SEMIARID AGROECOSYSTEMS

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This communication evaluates the ecological contribution of eight hedgerows embedded in an intensively cultivated semiarid landscape in southern Spain, focusing on their role in supporting vegetation diversity and improving soil quality. Hedgerows in this region, often remnants of pre intensification vegetation, persist mainly in marginal or unproductive areas and function as structural boundaries within the agricultural matrix. Despite pressures from intensification, these linear elements continue to provide key ecosystem services.

Vegetation surveys recorded 77 species across hedgerows, showing high variability and many taxa present in only one site. Most species were native, and structural complexity was marked, with herbaceous, shrub, and tree layers forming vertically diverse habitats. The longest and most complex hedgerow contained the highest richness and the only Near Threatened species, underscoring its value as a biodiversity reservoir and highlighting the importance of maintaining landscape connectivity.

Soil assessments comparing hedgerow interiors with adjacent cultivated soils revealed substantial improvements within hedgerows. Soil organic carbon averaged 3.0% inside versus 1.4% outside, while soil respiration was nearly fourfold higher. Aggregate stability increased markedly, and bulk density tended to be lower, reflecting reduced disturbance and greater organic matter inputs. Soil phosphorus and pH showed no consistent differences, likely due to heterogeneous fertilization regimes in surrounding fields.

An analysis of linear elements from 2005 to 2025 indicated that planting hedgerows and tree alignments is the most effective strategy for expanding green infrastructure and improving connectivity in Córdoba's agricultural landscapes. New plantings increased by 72%, and overall hedgerow length expanded by 25%.

The study concludes that hedgerows substantially strengthen ecosystem functioning in semiarid Mediterranean farmlands, enhancing biodiversity and soil health. Their preservation and expansion should be prioritized within agrienvironmental policies to bolster resilience against erosion, biodiversity loss, and climate driven stressors. These findings emphasize their strategic relevance for sustainable land management across intensively used Mediterranean regions today worldwide.

Keywords: ecosystem Services, landscape elements, mediterranean climate, vegetative diversity





20. EVOLUTION OF THE INSECT COMMUNITY ASSOCIATED WITH LONG-TERM FALLOW LAND IN THE MEDITERRANEAN REGION OF NAVARRE

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Insect biodiversity is declining globally, and the intensification of agriculture is one of the factors driving this decline. Traditional fallow land are areas that are temporarily left uncultivated and provide a refuge for the biodiversity of many species, including insects. It is known that the insect community linked to long-term fallow land experiences significant changes in its richness and abundance, conserving functional species that are very rare or absent in intensive agriculture.

For four consecutive years and with the use of "pitfall traps", the composition of the insect community in long-term fallow land in a cereal-growing area in central Navarra (Mediterranean region) has been studied.

The results obtained in this study suggest that the colonization of insects in fallow land follows an ecological succession linked to changes in vegetation. In the first phase, after the cessation of cultivation and during the first year of fallow, a low richness of insects is observed, but a high abundance (massive colonization) of orthoptera and coleoptera. In a second phase, during the second and third years of fallow, with a pattern of richness and abundance similar to that of the previous phase, coleoptera appear as a superdominant group, ranking well above orthoptera. Finally, during the fourth year, although the lowest total abundance of the study period is observed, species richness reaches its peak with seven insect groups in very balanced relative abundances (coleoptera, orthoptera, hymenoptera, diptera, isopoda, arachnida, gastropoda, lepidoptera and myriapoda).

In summary, it has been seen how, in the area studied, long-term fallow land has changed the insect community from a simplified structure with low diversity to a more complex and diverse community. In the fourth year of fallow.

Keywords: biodiversity, insect community, long-term fallow, intensification





21. DIVERSITY OF THE FAMILY BELONDIRIDAE (NEMATODA: DORYLAIMIDA) IN OLIVE GROVE FROM SOUTHERN SPAIN: DESCRIPTION OF THREE NEW TAXA

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Olive groves are fundamental agroecosystems in the Mediterranean; however, the biodiversity of free-living nematodes in their soils remains insufficiently documented. Under the framework of the European project *Soil O-Live* (Grant No. 101091255), this study investigated this fauna in olive orchards across the southern Iberian Peninsula. The methodology employed an integrative taxonomic approach, combining traditional morphometry using optical microscopy and scanning electron microscopy (SEM) with molecular phylogenetics analysis based on 18S and 28S ribosomal DNA markers. The research resulted in the characterization of three new taxa within the Belondiridae family. *Oleaxonchium olearum* (from Málaga) establishes a new genus defined by a rectangular, sclerotized lip region and a short, rounded tail. The discovery of *Capitellus caramborum* (from Córdoba) led to the formal retrieval and validation of the genus *Capitellus Siddiqi*, 1983, distinguished by its unique perioral refractive disc. Additionally, *Dorylaimellus* (*Dorylaimellus*) *grandis* (from Jaén) is described, characterized by its remarkable body length (up to 2.43 mm) and its contribution to clarifying the phylogeny of the subfamily Dorylaimellinae. The new species highlight the complexity of Dorylaimellinae and Belondiridae, revealing great morphological diversity and intricate evolutionary relationships. These findings considerably expand the known taxonomic diversity of the order Dorylaimida in general, and the family Belondiridae in particular, within the Iberian region. The identification of these new taxa underscores the ecological value of olive agrosystems as critical reservoirs for “invisible” soil microfauna. Furthermore, providing robust morphological and molecular data on these species facilitates their use in future studies in monitoring soil health and promoting sustainable agricultural practices under current environmental challenges.

Keywords: SEM, nematofauna, olive tree, integrative taxonomy, biodiversity





22. EFFECTS OF NATURAL HABITAT LOSS AND DOMESTIC MAMMALS ON THE DIVERSITY AND ACTIVITY PATTERNS OF FRUGIVORE MAMMALS IN ACTIVELY RESTORED OLIVE GROVES

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Agricultural intensification and the loss of semi-natural habitats are among the main threats to biodiversity and ecosystem services in Mediterranean agroecosystems. In this context, ecological restoration through green infrastructure emerges as an effective strategy to mitigate the effects of habitat homogenization. We assessed how landscape heterogeneity, the presence of semi-natural habitats, and restoration through hedgerows and field margins influence the diversity and activity patterns of native mammals in olive groves in southern Spain, as well as the response of key frugivores to anthropogenic disturbances. A total of 14 olive farms were surveyed using camera traps, across three habitat types: the olive matrix, restored infrastructures, and semi-natural remnants. In total, 74 vertebrate species were recorded, including 18 native mammals. Mammal species richness was significantly higher in semi-natural and restored habitats than in the olive matrix and increased with the area restored. In contrast, relative activity did not differ among habitats and was more strongly influenced by variability among farms. The main frugivores (red fox, badger, and stone marten) showed predominantly nocturnal activity patterns and temporal segregation from disturbances, although foxes showed greater overlap with dogs in semi-natural habitats. Overall, ecological restoration using native woody green infrastructure enhances mammal diversity in Mediterranean olive groves, although its functionality also depends on adequate management of anthropogenic pressures and landscape-scale factors.

Keywords: permanent crops, ecological restoration, wild mammals, anthropogenic disturbance, ecosystem services, green infrastructure





23. SOIL MICROBIAL COMMUNITY STRUCTURE ACROSS MANAGEMENT GRADIENTS: INSIGHTS FROM HIGH-THROUGHPUT SEQUENCING WITHIN A HUNGARIAN AGRI-ENVIRONMENTAL MONITORING STUDY

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Soil microbial communities play a central role in agroecosystem functioning, resilience, and long-term sustainability. In 2025 we assessed bacterial and fungal community structure across natural, agri-environmental, and conventional agricultural sites using high-throughput amplicon sequencing (16S rRNA V3–V4a; Fu18Sa, ITS1b, ITS2a).

Across all management types, bacterial communities were dominated by Actinomycetota, Proteobacteria, Acidobacteriota, Firmicutes, and Bacteroidota. Phylum-level composition was largely shared among categories; however, relative abundances revealed a clear management gradient. Natural sites showed higher proportions of oligotrophic groups (e.g., Acidobacteriota), while conventional sites exhibited relatively higher abundances of opportunistic taxa (e.g., Proteobacteria, Firmicutes). Bray–Curtis-based ordinations indicated structured but partially overlapping community clusters, suggesting that local edaphic conditions exert stronger control than management alone.

Fungal communities displayed high taxonomic richness and structured assembly patterns across all markers. While *Fusarium* was among the dominant genera in all categories, its relative contribution varied, with higher dominance in conventional systems and greater evenness and heterogeneity in natural sites. Importantly, no extreme taxon monopolization was observed, indicating functionally complex and balanced soil microbiomes.

Our results demonstrate that agricultural management influences dominance relationships and community evenness rather than wholesale taxonomic turnover. These findings support the use of microbial community structure and relative dominance patterns as ecological indicators for agroecosystem assessment. Integrating microbial biodiversity metrics into national monitoring schemes can strengthen evidence-based recommendations for sustainable crop and soil management aimed at maintaining resilient and multifunctional agricultural landscapes.

Keywords: soil microbiome; agroecosystem management; biodiversity indicators; fungal communities; bacterial communities; high-throughput sequencing





24. EDAPHIC AND BIOCLIMATIC DRIVERS OF NEMATODE COMMUNITY ASSEMBLY IN MEDITERRANEAN ORGANIC OLIVE GROVE

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Nematodes (*phylum Nematoda*) represent one of the most diverse and functionally significant components of soil biota, contributing decisively to nutrient cycling and ecosystem stability. In Mediterranean agroecosystems, olive groves are strategic reservoirs of biodiversity. Within the European project *Soil O-Live* (Grant No. 101091255), this study assessed nematode agrodiversity and its relationship with soil physicochemical and bioclimatic variables in 62 organically managed olive groves across four Mediterranean countries. Soil parameters were analysed and linked to nematode community structure through Redundancy Analysis (RDA). The global model was statistically significant ($F = 2.82$, $p = 0.001$), explaining 40.8% of total community variation (adjusted $R^2 = 0.26$), with the first two canonical axes accounting for 49.3% of the constrained variance. RDA1 captured a gradient driven primarily by rainfall seasonality and bulk density, reflecting water variability and soil compaction. Along this axis, *Cervidellus vexilliger* was associated with dense soils under fluctuating moisture conditions. RDA2 describes a pH and texture gradient. *Clarkus papillatus* emerged as a strong indicator of sandy substrates. *Pseudacrobeles unguicolis* showed affinity for clay-rich environments with elevated Ca/Na concentrations. From a geographical point of view, Greek olive groves are characterised by greater seasonal water stress and denser soils, Spanish soils have a higher clay content and thermal stability, while Portuguese and Moroccan olive groves are predominantly sandy. These findings demonstrate that nematode assemblages in Mediterranean olive orchards are structured by deterministic interactions between local edaphic properties and regional climatic variability, providing a robust baseline for soil health monitoring and resilience assessment under ongoing climate change.

Keywords: *Nematoda*, *RDA*, *gradients*, *biodiversity*, *soil*, *assemblages*





25. BIODIVERSITY OF RHABDITID NEMATODES (NEMATODA, RHABDITIDA) IN MEDITERRANEAN OLIVE GROVES

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Nematodes of the order Rhabditida represent a diverse and ecologically significant group within the phylum Nematoda, comprising free-living, saprobic and bacterivorous forms, as well as species parasitic on plants and animals. This order includes numerous families with a broad geographical distribution, inhabiting natural soils, agroecosystems, aquatic environments and even extreme habitats. The present study, conducted within the framework of the European project "Soil O-Live (Grant No. 101091255)" focused on the study of the nematofauna in olive groves of the south of the Iberian Peninsula. The comparative analysis of nematode communities in the Mediterranean olive groves reveals high species diversity (45 species) studied in Spain (33 spp.), Portugal (28 spp.), Morocco (23 spp.), and Greece (31 spp.), appearing a mixed biogeographical pattern in the Mediterranean region. A core group of species is widely distributed across all four countries, including *Acrobeles complexus*, *A. singulus*, *Acrobeloides nanus*, *Cervidellus vexilliger*, *Cephalobus persegnis*, *Chiloplacus tenuis*, *C. trilineatus*, *Pseudacrobeles unguiculis* and *Paracephalobus bodenheimeri* (Cephalobidae), *Bursilla vernalis* and *Mesorhabditis minuta* (Mesorhabditidae), *Drilocephalobus coomansi*, *D. moldavicus* (Drilocephalobidae), *Panagrolaimus rigidus* (Panagrolaimidae), and *Protorhabditis* sp. (Protorhabditidae), suggesting the presence of a widely distributed fauna adapted to similar ecological conditions. At the same time, several taxa exhibit a restricted distribution, occurring in one or only a few countries, such as *Chiloplacus demani*, *C. magnus*, *Nothacrobeles lunensis* or *Drilocephalobus goodeyi*, highlighting the influence of local edaphic and climatic factors on community structure. Overall, the results reflect a combination of broadly distributed elements and regionally restricted components, illustrating both the biogeographical connectivity of the Mediterranean and the ecological uniqueness of each territory.

Keywords: Greece, Morocco, nematofauna, olive tree, Portugal, Spain



26. IDENTIFYING ENVIRONMENTALLY SUITABLE AREAS FOR PROBLEMATIC *AMARANTHUS* SPP. SPECIES TO SUPPORT INTEGRATED WEED MANAGEMENT IN NO-TILL FARMING SYSTEMS IN ARGENTINA

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Weed species of the genus *Amaranthus* are among the main biotic constraints in Argentine No-till farming systems due to their high competitive ability and the increasing occurrence of herbicide-resistant biotypes. Understanding their potential distribution and the environmental factors that determine their establishment is essential for developing preventive and sustainable management strategies. The objective of this study was to model the potential distribution of *A. hybridus* subsp. *quitensis* and *A. palmeri* in Argentina using species distribution modeling tools, in order to identify environmentally suitable areas for their establishment and potential expansion, and to evaluate the correspondence between these areas and regions where herbicide-resistant biotypes have been reported.

Georeferenced occurrence records obtained from national herbaria and field surveys were combined with climatic (CHELSA) and edaphic (ISRIC) variables and analyzed using the MaxEnt algorithm. Predictor variables were selected through multivariate analyses and model performance was evaluated using the area under the ROC curve (AUC). The models showed very good predictive performance for *A. hybridus* (AUC = 0.855) and *A. palmeri* (AUC = 0.958).

Results indicate that climatic variables – annual precipitation, precipitation of the coldest quarter, and temperature seasonality– explained most of the variability in the potential distribution of both species. Edaphic variables, especially soil pH, also contributed relevant explanatory power. *A. hybridus* exhibited a broader potential environmental niche than *A. palmeri*, resulting in a wider geographic extent of environmentally suitable areas. Moreover, regions identified by the models as highly suitable largely coincided with areas where herbicide-resistant biotypes have been reported.

Overall, this study demonstrates that species distribution modeling is an effective tool for anticipating potential risk scenarios, strengthening early detection systems, and complementing ecophysiological studies of the species. These contributions support informed decision-making in integrated weed management programs in Argentina, including strategies such as crop rotation and the use of cover crops.

Keywords: predictive mapping, weed management; early detection, No-till farming





27. LOCAL MONITORING OF A DECLINING AGRO-STEPPE RAPTOR: MONTAGU'S HARRIER (*CIRCUS PYGARGUS*) IN CAMPO DE CALATRAVA, SPAIN

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The Montagu's Harrier (*Circus pygargus*) is a migratory raptor that nests on the ground and shows a marked preference for steppe habitats and cereal crops, which makes it particularly vulnerable to agricultural practices performed during the breeding season. The species is experiencing a steep population decline, with local extinctions and increasingly fragmented distribution. In the province of Ciudad Real (central Spain), two main historical areas of occurrence are recognised: Campo de Montiel, where systematic monitoring has revealed a sharp population decline, and Campo de Calatrava, where the species is considered residual and no systematics programs are in place. During the 2023 breeding season (April–July), targeted fieldwork was conducted in Campo de Calatrava and surrounding areas to identify breeding sites and monitor breeding pairs. Four breeding nuclei were detected, occurring in the municipalities of Abenójar, Alcolea de Calatrava, Aldea del Rey, and Cabezarados, in addition to observations in other locations where breeding could not be confirmed. The breeding population was estimated at 14–18 pairs, several of which experienced early breeding failure, at least three of them due to early harvesting of cereal crops. Detailed monitoring was carried out for six pairs: two failed for unknown reasons, while the remainder were affected by mechanised harvesting. At least one chick was rescued from mechanised harvesting and transferred to a wildlife rehabilitation centre. Overall productivity was 0.16 chicks per pair. In small and isolated populations such as this, it is urgent to establish early detection systems for breeding pairs and implement coordinated agri-environmental management measures involving authorities and stakeholders, in order to reduce breeding failure and ensure the return of adults and offspring in subsequent seasons.

Keywords: agricultural impact, breeding success, cereal crops, conservation measures, habitat fragmentation, reproductive failure

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POSTERS 2





1. COMPARATIVE BIODIVERSITY INVENTORY IN VINEYARDS WITH DIFFERENT LEVELS OF ECOLOGICAL COMPLEXITY IN A MEDITERRANEAN AGROECOSYSTEM OF THE DUERO RIVER BASIN

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Biodiversity plays a key role in the functioning of agroecosystems, contributing to essential ecological processes such as biological control, pollination, and soil stability. In Mediterranean vineyards, agricultural intensification and landscape simplification may negatively affect these processes, highlighting the need to assess biodiversity under different management contexts.

This study presents a comparative biodiversity inventory conducted in two geographically proximate vineyard plots located in the southwestern Duero Basin, Spain. Both plots share similar edaphoclimatic conditions but differ in their degree of ecological complexity and habitat structure. A multitaxa approach was applied, including soil invertebrates, pollinating and beneficial insects, birds, bats, amphibians and reptiles, other mammals, and vegetation. Taxon-specific sampling methodologies were used, combining passive and active trapping, direct observation, acoustic monitoring, and inspection of artificial shelters.

The results reveal consistent differences in species richness and community composition between the two vineyard plots. The vineyard characterized by higher structural complexity and the presence of seminatural elements exhibited greater overall biodiversity, as well as a higher representation of functionally relevant taxa, Iberian endemics, and species of conservation interest. In contrast, the vineyard with a more homogeneous management context showed simplified biological communities across most of the studied taxonomic groups.

Although the study design does not allow for establishing direct causal relationships between management practices and observed biodiversity patterns, the results are consistent with previous research highlighting the importance of agricultural landscape heterogeneity for biodiversity conservation. This inventory provides a valuable ecological baseline for long-term monitoring and for the development of vineyard management strategies aimed at enhancing the sustainability and resilience of Mediterranean agroecosystems

Keywords: vineyard biodiversity, mediterranean agroecosystems, multitaxa assessment, agricultural landscape heterogeneity, ecosystem services



2. “LAS POZAS” PLOT AS AN AGRO-LIVING LAB MODEL: INTEGRATING HABITAT RESTORATION AND ENTOMOLOGICAL RESERVE DESIGNATION INTO THE TRANSFER OF ECOSYSTEM SERVICES.

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The restoration of degraded areas within agricultural landscapes represents a strategic opportunity to comply with the EU Nature Restoration Law; however, its success depends on the ability to effectively transfer these benefits to the primary sector. In this context, we present the case of “Las Pozas” (Villalar de los Comuneros, Valladolid), recently designated as an **Entomological Reserve by the Spanish Entomological Association (AeE)** in February 2026. This distinction recognizes the excellence of a 4.34-hectare former illegal landfill transformed into an “Agro-Living Lab” designed for the experimentation and dissemination of agri-environmental measures.

Through the implementation of multifunctional flower strips, melliferous vegetation, and nesting infrastructures, the capacity of this space to act as a reservoir for functional biodiversity was evaluated during the 2024 cycle. Results reveal rapid colonization with 102 identified species, where the wild pollinator guild (*Apoidea*) and the biological control guild (*Syrphidae* and *Tachinidae*) establish a complex trophic web capable of providing pollination services and pest suppression to adjacent crops. Beyond its biological value, the plot has established itself as a critical infrastructure for technology transfer, hosting 681 visitors, including 320 professional farmers who were able to validate *in situ* the compatibility between conservation and agricultural profitability. It is concluded that this demonstrative reserve model is a fundamental tool for agricultural extension, bridging the gap between scientific evidence and field practice, thereby facilitating the adoption of the new CAP eco-schemes through a participatory approach.

Keywords: *knowledge transfer, entomological reserve, agro-living lab, functional biodiversity, ecosystem services, pollinators*





3. MICROBIAL PROPERTIES OF SOILS IN MEADOWS MANAGED WITH EXTENSIVE LIVESTOCK FARMING. NORTHWEST ASTURIAS

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Meadows are a semi-natural ecosystem typical of mountain areas, managed through mowing, grazing or a mixed regime, and linked to extensive livestock farming systems. This type of livestock farming is generally considered environmentally sustainable, with some farms even receiving quality labels, such as organic certification.

This study is located in a mountainous area in north-western Asturias, on soils developed on Lueza Black Slate. The area is characterised by an average annual temperature of 9.5°C, the absence of summer drought, and accumulated rainfall of more than 1500 mm. Soils from meadows managed by conventional and organic extensive livestock farming were selected, differentiating in both cases between fertilised and unfertilised plots, with 5 replicates per treatment. Physical-chemical soil parameters such as pH, C/N ratio, amount of organic matter, nitrate and ammonium, exchangeable cations, effective cation exchange capacity and Al saturation percentage were analysed. Three microbial properties of the soil were also determined: urease enzyme activity, β -glucosidase and microbial biomass carbon. Statistical analysis was performed using the ANOVA test.

The results show that the values for pH, organic matter, C/N ratio and Al saturation percentage do not differ significantly between the different treatments studied. However, the plots fertilised using the conventional system differ from the other plots, with significantly higher values for exchangeable calcium and microbial biomass carbon.

These results indicate that liming, as well as annual fertilisation with complex synthetic fertilisers, increases Ca availability and promotes an increase in microbial biomass in soils under conventional extensive management. In the absence of fertilisation, no significant differences were observed between organic and conventional extensive management.

Keywords: *grasslands, mountain areas, organic matter, pH*





4. INTENSIFICATION IS NOT THE ONLY FACTOR (NOR THE MAIN ONE) FOR THE SUSTAINABILITY OF OLIVE LANDSCAPES IN ALENTEJO (PORTUGAL)

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The olive landscapes of Alentejo (Portugal) have intensified over the last 15 years, driven by increased water availability and agricultural financialization (Silveira et al, 2019). Changes also include farm enlargement and landscape homogenization, supported by the public, financial and agribusiness sectors, resulting in a complex, non-linear and uncertain process (Muñoz-Rojas et al, 2024).

In this article we examine whether intensification alone can help explain trends in the transition towards sustainability. To do this, we adopt the concept of landscape sustainability (Wu, 2013).

We selected 25 plots on 15 olive farms, representing extensive, intensive and super-intensive groves with conventional, integrated, organic and biodynamic management. For each plot, we identified Sustainable Technological Solutions (STS), including cover crops (cc), landscape features (lf), grazing livestock (gl), organic fertilizers (of), chemical inputs (ci), tree age heterogeneity (ta) and nature designations (nd). 10 of these plots were STS and 15 non-STs.

We then calculated the Sustainability Standard (STSi) at the plot scale (Liétor & García-Ruiz, 2023):

$$STSi = \sum (lcc, lf, lgl, A*lof, B*lci, C*lta, lnd)$$

A, B and C are weighting factors, determined for each geographic context with stakeholders.

The results were then standardized, setting the lowest STSi values at 10 and the highest at 30.

For the STS plots, the maximum STSi value obtained was 23.4 and the minimum 14.4, with 70% of the plots showing Medium-high to High Sustainability Standards.

For non-STs plots, the maximum value was 25.4 and the minimum was 10, with 75% of these plots showing Medium-low to Low Sustainability Standards.

For both STS and non-STs plots, the results indicate a high variance of results.





The sustainability of olive groves is a multi-factor issue that transcends agricultural intensification. It is the result of multiple practices related to soil, biodiversity, water management and farming. The application of herbicides and soil tillage are determining factors for sustainability.

However, agricultural sustainability is a scale-dependent concept that needs to be scaled up to more effectively link to policies and funding.

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Keywords: *sustainable intensification, farming systems, rural landscapes, mediterranean, complexity*



5. ASSESSMENT OF BIODIVERSITY OUTCOMES AND AGRONOMIC PROFITABILITY OF THE BIODIVERSITY ACTION PLAN (BAP) AT SOTOMAYOR FARM, ARANJUEZ

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The Biodiversity Action Plan (BAP) at Sotomayor farm (Aranjuez, Madrid) aims to integrate agricultural production with biodiversity conservation. We present the monitoring results from 2022 to 2024, focusing on two main aspects: (1) the profitability of dryland crops and (2) their effects on steppe birds, bats, and pollinators.

The shift toward extensive farming practices—such as the use of fallows, rotations with legumes, and reduced inputs—has led to a notable decline in gross yield. However, this has been offset by lower variable costs and by potential payments available through the CAP or other agri-environmental schemes. The resulting net margins are comparable to those of conventional farms, with less year to year variability, strengthening the economic feasibility of dryland systems.

Regarding fauna, encouraging trends have been observed in steppe birds: the little bustard has reappeared, and the Montagu's harrier continues to be present, although there is no recent evidence of breeding. Occasional sightings of great bustard were recorded, together with an increase in stone curlew numbers and growth in steppe passerines such as the calandra lark, the greater short toed lark, and the Thekla's lark.

Bat activity and species richness remained high and stable, with confirmed consumption of cereal pest insects, highlighting their important ecosystem role as natural pest control agents.

Fallows also supported greater richness and abundance of pollinators and orthopterans, both essential for maintaining functional biodiversity and providing food resources for steppe birds.

Overall, these findings emphasize the importance of jointly assessing agronomic profitability and ecological outcomes across different faunal groups to ensure the long term sustainability of such initiatives.

Keywords: steppe birds, fallows, rainfed crops, CAP, yields, pollinators





6. LEGUME CROPS BOOST BIODIVERSITY IN CEREAL LANDSCAPES IN CENTRAL SPAIN

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Farmland biodiversity is declining sharply worldwide, largely as a result of agricultural intensification. Identifying farming practices that provide economic benefits while supporting higher biodiversity remains a key challenge. To investigate the effects of agricultural management on biodiversity in two provinces of central Spain—one in the south-east of Madrid and the other in Ciudad Real—we focused on the potential beneficial effects of legume crops compared with dry cereal fields. To this end, three legume crops were studied: alfalfa, peas and vetch, with alfalfa assessed under both irrigated and non-irrigated management. We evaluated species richness, abundance, and functional diversity of birds, butterflies, and other flower-visiting insects. All taxonomic groups showed higher richness and abundance in legume crops than in cereals, with alfalfa supporting the highest diversity likely due to its dense growth and extended flowering period, providing abundant resources for insects and their predators. However, certain management practices in legume crops can be detrimental to species that breed, forage, or rest in these habitats. We therefore recommend that promoting legume crops for biodiversity should be accompanied by management strategies that minimize disturbances, particularly during the avian breeding season.

Keywords: alfalfa, biodiversity conservation, butterflies, farmland birds, vetch



7. ADOPTION OF SUSTAINABLE SOIL AND FARM MANAGEMENT PRACTICES: INSIGHTS FROM HUNGARY AS A TRANSITION-READY BUT SUPPORT-CONSTRAINED AGRICULTURAL SYSTEM

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The transition towards sustainable soil and farm management requires not only technological solutions but also an understanding of farmers' knowledge, motivations and implementation constraints. This poster presents results from Hungary within a survey conducted in 13 European countries under the [Soil-X-Change project](#), based on responses from 65 Hungarian farmers, representing the largest national sample in the study.

The findings show that Hungarian farmers demonstrate high awareness of sustainable soil management practices, consistent with the overall European pattern, while implementation levels remain lower than awareness across practices. This confirms the broader project observation that knowledge alone does not automatically translate into adoption. In Hungary, farmer-to-farmer exchange emerges as the most important source of information on sustainable practices, even more prominently than in the overall dataset, highlighting the central role of peer learning in knowledge transfer. Environmental motivations such as improving soil health and adapting to climate change are among the most frequently reported drivers, while economic constraints and gaps in practical implementation knowledge are among the most frequently identified obstacles. A substantial share of Hungarian farmers indicate plans to adopt additional practices in the future, suggesting that relatively low adoption levels are likely driven by the perceived constraints rather than a lack of willingness.

The Hungarian results also indicate relatively frequent use of biological and microbiological soil inputs compared to several other practices reported in the dataset. This pattern can only be interpreted in light of the national policy context, where a specific eco-scheme measure provides support for such practices. Overall, the findings underline that the transition towards sustainable soil management depends not only on awareness, but also on knowledge exchange mechanisms, economic feasibility and supportive implementation conditions.

Keywords: sustainable soil management, farmer survey, knowledge transfer, adoption constraints, agri-environmental policy



8. EFFECT OF SOIL MANAGEMENT ON FLORA COMPOSITION OF VEGETATIVE COVERS IN DRYLAND ECOLOGICAL ALMOND FARMS IN THE GRANADAN- ALMERIAN ALTIPLANO

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The European Common Agrarian Policy promotes the use of vegetative covers that curb erosion, sequester atmospheric CO₂, and improve the fertility and biodiversity of agricultural systems. However, it is still not known whether it is better to adopt spontaneous vegetative covers by allowing existing plants and seeds in the seed bank to grow, or plant vegetative covers by selecting species varieties that are better adapted to local farm conditions.

This poster would display preliminary results of a study aimed to evaluate the effects of different soil management practices on the flora composition of spontaneous and seeded vegetative covers in four rain fed almond orchards representative of semiarid conditions. The experimental design was a randomized complete block design with five replicates for each soil management treatment: traditional tillage (bare soil), native plant cover managed by brush-cutter, native plant cover managed by tillage, seeded plant cover managed by brush-cutter, and seeded plant cover managed by tillage. Plant species inventories were conducted in March and April of 2025 from four rain fed organic almond farms located in South-eastern Spain. Three 15m transects were used in each parcel with a bar being placed every 0.5 meters along each line. Each plant that touched the bar was identified and recorded. Preliminary results will show how different soil management practices affect plant species abundance, richness, and Shannon diversity. This study will try to identify the best soil management practice to improve functional plant diversity in rain fed woody crop systems under semiarid conditions.

Keywords: agroecology, vegetative cover, erosion control, regenerative agriculture, ecological almond farms



9. BIODIVERSITY RECOVERY FOLLOWING AGROECOLOGICAL RESTORATION — THE NAVALAB FIELD LAB (SOUTH-CENTRAL SPAIN)

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FIRE (Fundación Internacional para la Restauración de Ecosistemas) established **NavaLab**, an agroecological and forest restoration field lab at 'La Nava del Conejo' estate (Valdepeñas, C. Real) in collaboration with IRIAF (Junta de Castilla-La Mancha) in September 2021. The legal agreement allows FIRE to manage ca. 230 ha of rainfed cropland and pastures alongside with 170 ha of Mediterranean forest and scrubland. The agroecological management includes the application of the principles of organic and conservation agriculture and the introduction of small species-rich landscape elements such as hedgerows and ponds.

One of the primary objectives of NavaLab is to monitor the predicted enhanced levels of biodiversity and ecosystem services following the agroecological management. Thus, FIRE has conducted exhaustive monitoring of the avian, bat, butterfly, and carnivore communities. The periodic surveys of avifauna encompass common birds, steppe birds, diurnal and nocturnal raptors, and endangered species such as the Little Bustard (*Tetrax tetrax*), Pin-tailed Sandgrouse (*Pterocles alchata*), and Black-bellied Sandgrouse (*P. orientalis*). Bat populations are monitored every early summer and autumn through various inventory methods and inspection of installed shelters. Diurnal butterflies are monitored across two transects of 1,9 km and 1,7 km following the BMS methodology ca. 10 times per year. The carnivores are monitored through camera traps installed at eight points between April and June. To date, 121 bird, 7 bat, 43 butterfly, and 7 carnivore species have been registered at the state, together with four phonic groups of bat species. Particularly, the registered abundance and species richness of birds have increased by 55% and 3%, respectively, in three years. Little bustard maintains densities of ca. 5 males km⁻².

In short, our results illustrate that (1) best agricultural practices without competition for land use can promote biodiversity and (2) the composition of the monitored fauna communities act as bioindicators of ecosystem health.

Keywords: bat, butterfly, bird, carnivore, monitoring, regenerative agriculture



10. THERMAL AND STRUCTURAL REFUGE IN TRADITIONAL OLIVE GROVES: IMPLICATIONS FOR REPTILE CONSERVATION UNDER AGRICULTURAL INTENSIFICATION

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Traditional Mediterranean olive groves support structurally complex habitats that provide critical refuges for reptile communities. In contrast, agricultural intensification has replaced old growth trees and traditional elements such as dry stone walls with simplified, high yield plantations, reducing the availability of natural shelters essential for reptile persistence. This study integrates field surveys comparing reptile abundance and species richness between traditional and intensive olive groves with an assessment of the thermal properties of key microhabitats in traditional systems during summer. Reptile richness and abundance were consistently higher in traditional olive groves than in intensified ones, regardless of the addition of artificial refuges in the latter. Individuals in traditional plots frequently used old olive trees, particularly trunk cavities, as primary shelters. By contrast, reptiles in intensive groves were more often observed on the ground, likely due to the scarcity of natural microhabitats. Artificial refuges were used by several individuals in intensive plots, suggesting that they may partially mitigate the effects of habitat simplification when natural shelters are absent. Thermal monitoring of hollow olive trunks and dry stone walls revealed notable differences in their buffering capacity under extreme summer conditions. Hollow trunks provided the coolest and most stable microclimates, offering reduced maximum temperatures and smaller daily fluctuations, likely linked to evaporative cooling and the physical properties of old wood. Dry stone walls, although valuable in providing structural refuge, exhibited warmer and more variable conditions, especially during the hottest hours. These findings highlight the ecological value of traditional olive groves, where old trees and dry stone walls create a mosaic of microhabitats essential for reptile survival. Conservation strategies should prioritize preserving these features and incorporating supplemental refuges into intensified systems to enhance biodiversity resilience amid ongoing agricultural intensification and climate warming.

Keywords: microhabitats; olive groves; reptile conservation; thermal ecology



11. LANDSCAPE-SCALE PERSISTENCE OF *TUTA ABSOLUTA* DURING SEASONAL DECLINE

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Tomato leafminer, *Tuta absoluta* (Meyrick, 1917), is one of the most destructive pests of tomato crops worldwide. Effective management requires a solid ecological understanding, yet off-season population dynamics across crop surroundings and semi-natural habitats remain understudied. Such knowledge is essential for the development of biodiversity-driven pest management strategies that link landscape heterogeneity with preventative, ecologically based Integrated Pest Management.

We monitored *T. absoluta* across a 31.6 km² greenhouse-dominated landscape in Almería, Spain, during the 2025 off-season (June–October). A cluster sampling design was implemented using 89 pheromone traps distributed across the surroundings of 19 greenhouses and 10 semi-natural areas. Traps were inspected twice monthly throughout the study period. Spatio-temporal dynamics were analyzed using Taylor's Power Law (TPL) to estimate pest aggregation indices, and a generalized linear mixed model (GLMM) with a negative binomial distribution was used to identify landscape, climatic, and management-related drivers of pest persistence.

TPL revealed a strongly aggregated distribution, with relative contagion increasing as population densities declined, suggesting that a limited set of landscape elements functions as off-season refugia. Preliminary GLMM results indicated that pest persistence decreased with time since host-plant removal and mean temperature, with a negative interaction suggesting that warm conditions suppress pest populations primarily in host-free environments. In addition, easterly winds were positively associated with higher pest counts, indicating potential landscape-scale dispersal pathways. The model improved predictive performance by 56.2% in mean absolute error compared to an only-intercept null model.

Overall, our findings show that *T. absoluta* populations become highly aggregated during the off-season, revealing spatial bottlenecks where ecological interventions may be most effective. This information provides a basis for designing biodiversity-based habitat management and ecological infrastructures, such as hedgerows, to strengthen conservation biological control and reduce pesticide dependence at the landscape scale.

Keywords: spatial ecology, pest management, abiotic drivers, greenhouse horticulture, sustainable agriculture





12. LANDSCAPE PROTECTION PROJECT: OLIVARES VIVOS, PERIMETER ORCHARDS AND PREVENTIVE GRAZING

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The Landscape Protection Project, promoted together with the County Council of Somontano de Barbastro (Huesca), aims to restore sustainable farming and livestock practices, improve landscape quality, enhance biodiversity, and strengthen resilience to climate change. It is structured around three complementary lines of action: the implementation of the OLIVARES VIVOS model—based on mechanical management of ground cover, installation of nest boxes, and the creation of “biodiversity islands”—with scientific monitoring of birds, insects, and vegetation, and a pathway toward olive oil certification; the recovery of traditional perimeter orchards as productive spaces that also function as firebreak areas; and strategic preventive grazing to reduce vegetation fuel loads in sensitive areas close to urban centers and infrastructure.

The project is being implemented within the framework of the Sustainable Tourism Plan “Saborea Guara Somontano” and is led by the County Council of Somontano de Barbastro, with technical support from SEO/BirdLife in applying the OLIVARES VIVOS model. It is funded by NextGenerationEU funds through Spain’s Recovery, Transformation and Resilience Plan (PRTR), integrating conservation, wildfire prevention, and the valorization of local products as key pillars of sustainable territorial development.

Keywords: olivares vivos, biodiversity, somontano, barbastro, sustainable farming



13. SOIL DATA SPACE FOR NUTRIENT BALANCE MANAGEMENT: IMPROVING SOIL HEALTH, BIODIVERSITY AND SUSTAINABLE FERTILIZATION IN SPANISH AGRICULTURAL SYSTEMS

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The European Soil Data Space provides a federated framework for integrating heterogeneous soil datasets to support sustainable agricultural management. Within this context, the AGRI use case focuses on monitoring soil fertility and health through nutrient balance assessment, facilitating compliance with agricultural regulations while promoting environmentally responsible fertilization practices. The pilot is being implemented across agricultural soils in Spain, particularly in Andalusia, with special relevance in olive-growing areas of Jaén. The system integrates historical soil data, laboratory analyses, remote sensing products, and emerging IoT sensor information into interoperable platforms that enable parcel-scale nutrient balance calculations. The approach aligns with Royal Decree 1051/2022 and subsequent amendments on sustainable fertilization and the Directive (EU) 2025/2360 on Soil Monitoring and Resilience. Preliminary results show improved nutrient balance assessments and fertilizer doses adjusted to regulatory requirements, helping prevent soil degradation, mitigate risks in nitrate-vulnerable areas, and enhance soil health indicators. Beyond compliance, the AGRI use case promotes knowledge transfer to farmers and advisors through interoperable data services and decision-support tools. This data-driven nutrient management contributes to soil health improvement, reduced diffuse pollution, and the conservation of agricultural biodiversity, particularly in Mediterranean olive systems. The initiative demonstrates the potential of federated soil data infrastructures as operational tools for agronomic decision-making integrating productivity, environmental protection, and biodiversity conservation.

Keywords: soil data space, nutrient balance, soil health, sustainable fertilization, agricultural biodiversity, olive groves





14. SOIL DATA SPACE FOR EROSION QUANTIFICATION: AN INTEROPERABLE AND AUTOMATED USLE-BASED FRAMEWORK FOR HIGH-RESOLUTION ASSESSMENT

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Climate change is modifying temperature and precipitation regimes, with rising temperatures and an increasing frequency of extreme rainfall events. These pressures are compounded by biodiversity loss, more frequent and severe wildfires, and advancing desertification processes. Such changes enhance runoff generation and sediment transport, thereby increasing soil vulnerability to erosion. Furthermore, the European Commission has highlighted the substantial socio-economic costs associated with altered hydrological cycles and soil erosion across the EU (Panagos *et al.*, 2018, 2024), underscoring the need for unified assessment systems.

Within this context, the HIDRO use case of the Soil Data Space- a sovereign and interoperable ecosystem that connects edaphological, ecological, and geospatial datasets- addresses soil erosion dynamics in Andalucía and Castilla y León. This research focuses on a pilot sub-catchment of the Guadalquivir River and an olive grove in Jaén (Andalucía). Soil erosion rates were assessed using USLE-based methods, focusing on the automation of processes and reproducibility. Data were obtained from publicly



accessible sources (e.g., REDIAM, IGN, INES) and complemented with private datasets, integrating historical soil information, laboratory analyses, and remote sensing products. Preliminary results indicate high spatial resolution and a high level of detail in soil erosion rate estimates.

Overall, the HIDRO case study establishes a standardized and automated methodology for soil erosion assessment. By identifying erosion-prone and vulnerable areas with greater precision, this approach supports evidence-based decision-making, improved land-use planning, and the design of targeted mitigation measures to limit soil degradation. The primary target users are public administrations and agricultural cooperatives, who can benefit from consistent, interoperable, and actionable information to enhance sustainable soil management.

Keywords: Soil Data Space, soil erosion, USLE, olive groves



15. VISUALISING DESIRABLE FUTURES FOR MULTIFUNCTIONAL PROTECTED LANDSCAPES: PHOTO-COLLAGE AS A PARTICIPATORY VISIONING TOOL IN SIERRA NEVADA

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Effectively integrating biodiversity conservation and food production in multifunctional protected landscapes, characterized by diversified land use and complex landscape structure, requires not only technical solutions, but also participatory processes that capture local knowledge, values, and perceptions. This study presents a methodological approach based on a participatory visioning method, implemented through an actor workshop in the Sierra Nevada Natural park case study (Spain), aimed at co-creating desirable and more sustainable futures that integrate biodiversity conservation in food systems.

The workshop combines participatory dialogue with a central photo-collage exercise, in which participants collectively construct visual representations of their envisioned futures by selecting and assembling images related to biodiversity, agricultural practices, land uses, and socio-cultural values. This visual storytelling method enables the expression of complex narratives, reduces technical and communicative barriers, and fosters dialogue among multiple actors, functioning as an effective interface between scientific knowledge and local experience.

Analysis of the photo-collages and the associated group discussions allowed the identification of shared priorities, perceived trade-offs, and collectively envisioned management strategies for reconciling agricultural production and biodiversity conservation in highly multifunctional contexts. The results highlight the potential of photo-collage as an innovative participatory and transfer tool to support reflection, learning and decision-making, while producing socially robust knowledge relevant for everyday agricultural management.

By presenting both the process and outcomes of the visioning exercise, this contribution advances the discussion on participatory methodologies for implementing conservation strategies in agricultural systems. It demonstrates how visual co-creation tools can enhance social acceptance, support the scaling-up of sustainable practices and contribute to landscape-scale governance.

Keywords: social values; participatory methods; governance; sustainable landscape management



16. IS IT FEASIBLE TO REGENERATE DEHESA TREES BY DIRECT ACORN SEEDING?

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The *dehesa* is the most widespread agroforestry system in Europe and of recognized importance to biodiversity. One of the most important threats it is suffering is the loss of trees and the lack of regeneration. This study analyses the direct sowing of acorns versus outplanting in the survival and development of the holm oak (*Quercus rotundifolia* Lam.), as well as the effect of the mother tree, the acorn mass and the planting/sowing site. To this end, in November 2022, acorns were collected separately from 10 selected mother trees. In February 2023 the acorns were sown in a nursery, in deep containers of 41 cm long and 7 liters volume, and conventional forestry trays of 18 cm long and 300 cm³ volume cells. In November 2023, 720 holm oaks were planted in the field. At the same time, direct sowing of acorns collected from the same mother trees but one year later was carried out, with 360 sowing points in total. The experiment was replicated in 3 experimental sites of southeastern Spain, with 3 blocks per site. Results showed that direct sowing of acorns, when carried out as in this study, can be just as successful or more successful as planting, especially in sites with harder environmental conditions.

Keywords: *dehesa, acorn seeding, nursery, container, semi-arid*



17. GOAT GRAZING RESHAPES PLANT DIVERSITY IN A DRYLAND FOREST

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Arid and semi-arid ecosystems cover approximately 41% of the Earth's land surface and rank among the most vulnerable systems to environmental change and intensive land use. In these regions, overgrazing constitutes one of the main anthropogenic pressures, with strong potential effects on biodiversity and ecosystem functioning. This study evaluates whether goat grazing intensity affects desert plant community assembly at taxonomic, functional, and phylogenetic levels, and whether high grazing pressure promotes community homogenization. We conducted this study in the Central Monte ecoregion (Mendoza, Argentina), within the *Neltuma* woodlands of the Telteca Forest Reserve. We established 900 m² plots at two distances from watering points (livestock settlements), representing contrasting goat grazing intensities (high and low). We assessed plant species richness and cover using fixed 25 m linear transects and analyzed changes in community composition using NMDS and PERMANOVA. We evaluated phylogenetic diversity using a regional phylogenetic tree and several abundance-weighted and unweighted indices. To assess functional diversity, we calculated multiple indices, including Rao's Q, FDis, FDiv, functional evenness, and community-weighted means of categorical functional traits (life form, growth form, and life span). High grazing intensity significantly altered taxonomic and phylogenetic composition, causing plant species loss and increasing community homogenization. Grazing primarily affected palatable shrubs such as *Tricomaria usillo*, *Atriplex lampa*, and *Suaeda divaricata*. Grazing-resistant species partially compensated for these losses, as non-palatable C4 annual herbs avoided by local goat herds replaced perennial, woody, C3 forage species characteristic of low-grazing-intensity sites. Abundance-weighted taxonomic and phylogenetic indices reflected these changes, along with reduced phylogenetic



overdispersion. In contrast, functional diversity and invasive species presence did not show significant changes. Overall, these findings demonstrate the strong influence of overgrazing and wood use on plant community structure in arid ecosystems and provide relevant insights for silvopastoral management and conservation strategies aimed at sustaining biodiversity and ecosystem functioning.

Keywords: monte desert; neltuma flexuosa woodlands; biodiversity conservation; plant community structure; goat grazing; overgrazing; silvopastoral systems



18. SPONGE TERRITORY APPROACH APPLIED TO FLOOD MITIGATION, AGRO-BIODIVERSITY AND A COMPANY WATER PRINT IMPROVEMENT IN AGRICULTURAL LANDS: A CASE IN THE RAMABUJAS CATCHMENT

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In September 2023, a DANA in the area of Toledo affected the Ramabujas river catchment causing floods and material damage to houses, industries sites and agricultural land with heavy erosion. In this territory, the Suntory company is implementing a project named "Guardians of the Tagus", with the technical assistance of the consultancy Mediodes, to return water to nature and improve associated ecosystems. Together with the Tagus Chair of Castilla-La Mancha University, the Iberian Centre for River Restoration (CIREF), and the consultancies Stroming and Biotecnología y Medio Ambiente, they propose the "Sponge Territories" approach for this catchment, mostly occupied by crops.

The idea is to "dissipate and retain" water in the catchment through nature-based solutions, that are able to improve the infiltration capacity and reduce and slow down the flow in extreme episodes while increasing biodiversity in these large agricultural areas. The infiltration improvement can contribute to reduce Suntory's water print, with annual savings, but it can also work for mitigating flood events. For both approaches, a quantification of the water saved is being estimated with the current existing methodologies.

In a previous study of the Ramabujas catchment, the best areas for the project were identified, and later specific measures were proposed and dimensioned, such as: the creation of living hedges of native shrub vegetation between crops, following contour lines; the promotion of direct seeding with reduced ploughing, creating a permanent cover in cereal crops; infiltration bioswales; and small retention dams following the Keyline design with erosion control barriers. There is a special opportunity with a land owner, the Carral Foundation, receptive to these transformations. The measures will be monitored and assessed in terms of water retention and increased biodiversity and will serve as a pilot experience to scale up this philosophy of more respectful and profitable agriculture throughout the area.

Keywords: NBS, water retention, flood risk, soil erosion, sponge territories, best agricultural practices





19. IMPACT OF COMPOST, COMPOST TEA, AND MULCHING ON SOIL QUALITY IN A CIRCULAR HORTICULTURAL SYSTEM: ENZYMATIC AND METATAXONOMIC INSIGHTS

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In the framework of circular and sustainable horticulture, the valorization of green waste into organic amendments is a key strategy for enhancing soil health. This study aims to evaluate the effects of compost, compost tea (CT), and mulching on soil quality within a diversified horticultural system. The research was conducted in an experimental plot divided into eight subplots containing four different crops. The experimental design included four fertilization treatments: Control, Compost, Compost + CT, and CT, each tested with and without organic mulching consisting of shredded garden waste.

Preliminary results show a clear positive trend in soil enzymatic activities, particularly in treatments integrated with mulching, suggesting an enhancement in nutrient cycling and microbial metabolism. These results are being complemented with metataxonomic analyses to determine shifts in microbial diversity and community structure. Altogether, these findings help to clarify how the synergy between liquid and solid organic amendments, combined with mulching, promotes soil resilience.

This project provides a scalable model for urban waste valorization, contributing to the transition toward a circular bioeconomy in Mediterranean horticultural production.

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Keywords: sustainable agriculture; soil resilience; compost; compost tea; mulching



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POSTERS 3





1. BEYOND INTENTION: KEY FACTORS FOR INCENTIVISING THE PURCHASE OF BIODIVERSITY-FRIENDLY FOODS

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Despite the fundamental role of sustainable agriculture in preserving ecosystems, a significant gap persists between intention and the actual purchase of pro-environmental foods. Addressing this gap is crucial for understanding how to incentivise action, particularly regarding foods that preserve biodiversity.

This study analyses the variables influencing the purchasing behaviour of pro-environmental foods, integrating classic pro-environmental product typologies with those specifically oriented towards biodiversity protection. To this end, an extension of the Theory of Planned Behaviour (TPB) is proposed, integrating perceived behavioural control, willingness to pay, and trust in certifications within the post-intention phase, contrasting with traditional models focused on the pre-intention stage. Furthermore, the influence of these variables is addressed through a dual approach: as direct antecedents of behaviour and as potential moderators of the intention-behaviour relationship.

Using hierarchical Structural Equation Modelling (SEM) and a multi-group analysis based on a sample of 2,016 consumers in the United States and Spain, the results robustly validate the proposed model. The findings demonstrate that perceived control and willingness to pay function as direct antecedents of behaviour, acting as structural and economic prerequisites. Conversely, trust in certifications emerges as the sole significant moderator, facilitating the conversion of intention into actual purchase. Similarly, the analysis reveals significant cultural differences: the weight of these variables varies between the Spanish and US markets, reflecting distinct priorities regarding price sensitivity and trust in certifications.

These results offer fundamental implications for the marketing of biodiversity-preserving foods and policies oriented towards its conservation. Achieving actual purchasing behaviours requires more than fostering positive intentions; by addressing trust and economic and situational constraints, key stakeholders can effectively convert latent intention into active support for biodiversity through sustainable food consumption.

Keywords: pro-environmental foods, theory of planned behaviour, intention-behaviour gap, green marketing, biodiversity marketing



2. FOOD FRAUD AS A BRAKE ON SUSTAINABILITY: PRODUCERS' PERCEPTIONS

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Food fraud poses a threat not only to food safety and market efficiency, but also to the transition toward more sustainable agri-food systems that protect biodiversity. In premium categories such as extra virgin olive oil (EVOO), sustainability-related attributes, including origin schemes (e.g., PDO/PGI), quality and environmental certifications, and traceability, function as market signals intended to translate responsible practices into economic value (price premiums, market access and reputation). When practices such as misrepresentation of category or origin, blending, or misleading labelling are perceived as frequent, the credibility of these instruments may deteriorate, eroding the sustainability premium and increasing transition costs for compliant producers.

This study explores how olive oil producers perceive food fraud and how such perceptions may shape investment and adoption decisions linked to sustainable practices and certification strategies. We adopt a qualitative design based on in-depth, semi-structured interviews with producers (cooperatives and private mills) representative of the main producing areas of southern Spain, historically the world's leading olive oil producers and the global industry benchmark.

Initial insights suggest that perceived insufficient control and supervision increase uncertainty and fuel a "contagion effect" (if fraud is not sanctioned, more actors may join), weakening trust in market signals. Producers describe a shift in resources from agronomic improvements (e.g., biodiversity-friendly measures) toward defensive compliance, which may slow sustainability transitions. We discuss implications for strengthening standards, transparency, controls and sanctions, while protecting the economic value of sustainability signals.

Keywords: food fraud, olive oil, sustainability premium, certification, traceability, governance



3. PROMOTION AND TRANSFER OF SUSTAINABLE PRACTICES IN THE OLIVE AND LIVESTOCK SECTOR THROUGH PARTICIPATORY LABS, DIGITAL CAMPAIGNS AND INTEGRATED ASSESSMENT MODELS

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CHOICE is an European project in which we at Cooperativas Agro-alimentarias de Andalucía are working alongside 15 other partners from Europe, South Africa and Colombia, with the aim of promoting the adoption of sustainable practices at different stages of the value chain. In Spain, the pilot demonstration focuses on the olive and livestock sectors, given the importance of both to our rural economy and their need to find solutions to common challenges.

Three participatory labs were held with the involvement of different stakeholders from the olive sector: cooperatives, public administration, universities, and companies. Through these labs, the situation of the sector was analysed in depth, and the main barriers and levers for the adoption of sustainable practices were identified. This made it possible to prioritise those practices that are most sustainable and profitable for farmers, in order to promote them and encourage their adoption.

With the aim of promoting the practices considered most relevant from an economic and environmental point of view, a transfer strategy was defined through the launch of three digital campaigns under the common slogan "Olive Groves with a Future: Profitable, Smart and Resilient." Each of the campaigns focuses on a specific topic —1. Digitalisation, 2. Integrated production, and 3. Ground cover— under a cross-cutting element, integrated management. Through these campaigns, olive growers would share their experience in using these practices and the benefits they have brought them.

Digital campaigns impact is assessed throughout A/B testing tools and behavioral change surveys. In addition, the campaigns are reinforced by a new generation of more accessible and user-friendly Integrated Assessment Models (IAMs) and data storytelling approaches, which translate complex information into clear and engaging messages. Together, these tools help stakeholders better understand the benefits of sustainable practices and support informed decision-making across the olive value chain.

Keywords: olive sector, sustainability, IAMs, digital campaigns, A/B testing, data storytelling





4. BEYOND THE SEAL: HOW SOCIODEMOGRAPHIC PROFILES SHAPE THE INTERPRETATION OF ECOLABELS

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The primary method agricultural organizations use to communicate their sustainable practices to the market is through certification systems. These take the form of seals or symbols on product packaging, commonly known as ecolabels. The underlying assumption is that consumers understand their meaning and value the invisible practices these companies undertake. However, the widespread proliferation and heterogeneity of ecolabels (in terms of what is certified and by whom) hinder the accurate processing of the information they intend to convey. Simply put, the cognitive effort required is too demanding for the average food consumer. Consequently, ecolabels are primarily used as heuristic cues to infer product attributes such as quality, sustainability, and naturalness. This study explores whether the inferential processes associated with environmental certifications vary across different consumer profiles. Based on an online between-subjects experiment involving 720 participants—where subjects were presented with an EVOO (Extra Virgin Olive Oil) bottle and label, and the number and type of ecolabels were manipulated—clear differences linked to sociodemographic variables were detected. These findings help clarify the true role of ecolabels in conventional consumer behavior, enabling more tailored decision-making based on specific consumer profiles.

Keywords: *ecolabels, heuristics, inferences, consumer profiles*



5. KEY FACTORS FOR STRENGTHENING THE ORGANIC MARKET: A DEMAND ANALYSIS IN ANDALUSIA

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Andalusia has consolidated its position as one of Europe's leading regions in organic production, both in terms of certified area and product diversity. In 2024, the region reached 1.46 million hectares under organic management, representing approximately 50% of Spain's total organic area.

Despite this strong production base, domestic consumption of organic products—both nationally and particularly in Andalusia—remains significantly below the European average. In Spain, per capita expenditure on organic food amounts to approximately €66, while in Andalusia it reaches €61, far below levels observed in leading European markets such as Switzerland (€437) and Denmark (€365).

Strengthening the organic market and fostering local consumption are therefore critical to consolidating more sustainable agri-food systems, enhancing the added value of Andalusian organic production, contributing to the Sustainable Development Goals (SDGs), and aligning with the EU Biodiversity Strategy and the Farm to Fork Strategy.

This study provides a SWOT analysis of the development of organic demand and consumption in Andalusia. The objective is to identify the main strengths, weaknesses, opportunities, and threats shaping the sector and to determine the key factors influencing its consolidation. By diagnosing market barriers and consumer-related constraints, the research aims to propose strategic pathways to stimulate demand and reinforce market signals that support biodiversity-friendly agricultural systems.

This work has been developed within the framework of the ECOMERCA project (PEIT: IDF2023028.002), co-financed at 85% by the European Regional Development Fund (ERDF).

Keywords: consumer behaviour, demand analysis, biodiversity, organic sector

1ST

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POSTERS 4





1. LOW UPTAKE OF BIODIVERSITY FRIENDLY AGRICULTURAL PRACTICES IN STEPPE BIRD DIVERSITY HOTSPOTS

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Steppe birds are among the most endangered bird groups in Europe, primarily due to the intensification of agricultural activities. Spain is a key European stronghold for steppe birds, where many declining species currently live outside protected areas. The 2023–2027 Spanish CAP Strategic Plan (PEPAC) includes eco-schemes and rural development agri-environmental measures aimed at curbing farmland bird declines, with a particular focus on steppe birds. Here we assess whether PEPAC conservation measures are implemented effectively on areas of high conservation value for steppe birds. To this end, we evaluated the degree of spatial alignment between areas of high steppe bird diversity (hotspots) and the adoption of PEPAC measures. Steppe bird hotspots were selected based on the combined taxonomic, functional, and phylogenetic diversity of 26 steppe bird species in peninsular Spain. Uptake of the 'Biodiversity Areas' eco-scheme and the 'Protection of birds' rural development measures were taken from official sources. Uptake was significantly higher in steppe bird hotspots than in non-hotspot areas in areas with land covers suitable for steppe birds ($17.3 \pm 14.1\%$ vs $7.2 \pm 10.8\%$ for the eco-scheme and $0.8 \pm 4.2\%$ vs $0.3 \pm 2.9\%$ for the rural development measures, respectively; mean $\pm$ SD). Overall uptake was very low, however, seemingly insufficient to halt the decline of steppe bird populations, as compared with the 30% target of the Kunming–Montreal Global Biodiversity Framework. Results highlight an urgent need for more effective strategies to engage farmers and drive the adoption of biodiversity-oriented initiatives, using existing biodiversity maps and spatial analysis to guide CAP planning to safeguard key steppe bird areas.

Keywords: *common agricultural policy, eco-schemes, farmland biodiversity, rural development measures, spatial planning, Spain*



2. FROM LANDSCAPES TO PLOTS: DETERMINANTS OF HIGH NATURE VALUE (HNV) FARMLAND IN WESTERN PYRENEES

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High Nature Value (HNV) farming is central to biodiversity conservation in Europe, linking low-intensity agroecosystems with significant environmental outcomes. However, the identification of HNV areas has traditionally relied on landscape-scale indicators, which often fail to capture the fine-scale management decisions made at the plot level. This study addresses this limitation by developing and implementing a multi faceted Nature Value Index to assess agrobiodiversity gradients at the plot scale in the Western Pyrenees.

The methodology adapts the Results-Based Agri-Environment Pilot Scheme (RBAPS) scorecard, integrating expert knowledge with field surveys conducted across 138 grassland plots. The index combines three key dimensions: (1) **agro-ecological integrity**, based on the richness and cover of positive plant indicators; (2) **threats, pressures, and future prospects**; and (3) **landscape structures that support biodiversity**, such as hedgerows and dry-stone walls.

Results reveal a clear gradient ranging from intensively managed, low-diversity plots to species-rich HNV grasslands. The highest agrobiodiversity scores were strongly associated with plots located within the Natura 2000 network, steep slopes, and traditional management practices, specifically horse or mixed-herd grazing and extensive mowing. In contrast, low nature values were linked to agricultural intensification, including frequent treatments (mineral fertilisation, manure application, and/or liming) and sowing. The study also identifies land use legacy as a limiting factor, showing that recently cleared areas previously covered by shrubs or forest exhibited lower values than long established, stable grasslands.

This plot scale approach provides a robust, evidence-based tool for the CAP 2023–2027, supporting the implementation of a results based intervention for environmental, climate and other management commitments in Navarra (the High Nature Value Hay meadows scheme, launched in 2024). By quantifying the impacts of specific management practices, the index facilitates a shift toward performance-oriented policy, encouraging farmers to adopt biodiversity-friendly practices while ensuring the conservation of existing HNV farmland.

Keywords: extensive livestock, HNV farming systems, results-based schemes, semi-natural grasslands, scorecard, agricultural biodiversity





3. TRANSITION PATHWAYS FOR RECONCILING BIODIVERSITY CONSERVATION AND AGRI-FOOD SYSTEMS IN A MULTIFUNCTIONAL PROTECTED LANDSCAPE: A PARTICIPATORY TOOL OF THE THREE HORIZONS FRAMEWORK IN SIERRA NEVADA NATURAL PARK (SOUTHERN SPAIN)

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Agri-food systems are operating under increasing ecological and socio-economic pressures, where biodiversity loss and the viability of rural livelihoods emerge as interrelated challenges. Although the need for food-system transformation is widely acknowledged, evidence on concrete pathways for change and on how these unfold within local social-ecological contexts remains limited. In this context, multifunctional protected landscapes are increasingly proposed as Nature-based Solutions (NbS) to reconcile economic activity and conservation. However, their implementation requires navigating tensions and trade-offs between actors and different motivations.

Our case study—the Sierra Nevada Natural Park (Almería, Spain)—constitutes a multifunctional protected landscape in which olive groves are intertwined with cultural identity, livelihoods, biodiversity, and the governance of the protected area. The territory faces multiple interconnected challenges, including sustaining viable agriculture amid demographic decline and economic pressure, reconciling production and conservation goals, managing water scarcity, and ensuring that local knowledge and values guide future decision-making.

To address these challenges, this communication presents a participatory workshop with regional and local actors to co-create a desirable future vision and to identify conflicts, opportunities, and actions for moving towards it. We applied a bottom-up participatory narrative scenario methodology using the Three Horizons (3H) framework, focusing on the transition space between present constraints and desirable futures. Participants co-designed transition actions by identifying relevant actors, enabling conditions, barriers, required resources, and time horizons. Analysis of the outputs from this activity allowed us to identify recurring patterns (e.g., governance arrangements, agri-environmental practices, valorization strategies, and capacity building) and potential bottlenecks for implementation. Overall, this process connects long-term aspirations with decision-making and actionable steps, providing a pathway to reconcile biodiversity conservation with agricultural management and landscape governance.

Keywords: nature-based solutions; actor engagement; participatory methods; agri-environmental management



4. QUANTIFYING THE SPATIAL REACH OF THE COMMON KESTREL (*FALCO TINNUNCULUS*) AS A BIOLOGICAL CONTROLLER

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Biological control of rodent pests, specifically the common vole (*Microtus arvalis*), through the advantage of raptors has emerged as a sustainable and effective alternative to chemical rodenticides in agrosystems. However, to maximize the efficiency of these interventions, it is crucial to determine the actual spatial coverage provided by each nesting unit.

This poster presents an integrated study conducted in Castilla y León (Spain) called GESINTTOP, combining the monitoring of nest-box occupancy and productivity with high-resolution movement analysis using GPS tracking on Common Kestrels (*Falco tinnunculus*). The primary objective is to define the "Effective Action Radius" of breeding pairs to establish technical criteria for optimal nest-box density.

Movement data are analyzed using foraging distances to characterize the core hunting areas around the nest boxes. The model evaluates how the intensity of space use varies with distance, allowing for the identification of zones where biological control may be more intensive. Furthermore, the study explores how this spatial reach is influenced by factors such as brood age and intra-specific competition and type of crop surrounding the nest-box.

The preliminary modeling aims to establish the maximum distance between nest-boxes required to ensure full territorial coverage. This precision treatment model is directly transferable to other agrosystems, providing a logistical tool for managers searching for to optimize nest-box placement and guarantee crop protection through ecosystem services.

Keywords: *biological control, Falco tinnunculus, GPS tracking, nest boxes, ecosystem services, Microtus arvalis*





5. FACILITATING EVIDENCE BASED DECISION MAKING IN SUSTAINABLE SOIL AND FARM MANAGEMENT: DEVELOPMENT AND APPLICATION OF THE SOIL-X-CHANGE DASHBOARD

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Effective knowledge transfer is essential for sustainable agricultural management, yet farmers, advisors, researchers and policymakers often face barriers in accessing, interpreting and applying evidence-based practices. To address these barriers Soil-X-Change (SXC) Dashboard was developed under the European Union's Horizon Europe Framework Programme. This poster showcases how this dashboard is designed to bridge this gap by providing an open access to documented good practices in sustainable soil and farm management across Europe.

The SXC Dashboard aggregates data from over 61 field-tested practices gathered from European Innovation Partnership Operational Groups (EIP-OGs), other knowledge-transfer initiatives and peer-reviewed research findings. It is a freely accessible, registration-free interface caters to a diverse range of stakeholders including farmers, agricultural advisors, extension services, researchers, students and policy makers making it an inclusive knowledge-sharing platform. The platform has three integrated functional modules. The Practice Explorer enables users to browse, filter and visualize the qualitative impacts of documented practices across agronomic, environmental and economic parameters. They can use climate zone, crop type and country as search criteria. The Comparison Chart allows side-by-side evaluation of two selected practices across up to six measurable effects (e.g. reduced invasive species occurrence, income source diversity & crop quality), supporting evidence-based decision-making. A forthcoming Decision Trees module will further enhance the tool's utility by guiding users through algorithmic, literature-derived decision pathways tailored to their specific conditions.

Through intuitive visual interfaces, color-coded impact scales and downloadable practice fact sheets, the SXC Dashboard transforms complex scientific data into actionable agricultural knowledge. It stands as a replicable model for technology-driven knowledge transfer, empowering stakeholders to make informed, context-sensitive decisions that advance sustainable land management across diverse European farming contexts.

Keywords: dashboard, sustainable agricultural management, evidence-based practices, decision-support tools, european farming systems, knowledge transfer





6. FUNCTIONS AND QUALITIES OF AGRICULTURAL ADVISORS FROM THE PERSPECTIVE OF FARMERS IN TRAINING: EVIDENCE FROM THE AKIS MODEL

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The adoption of sustainable practices and the conservation of biodiversity in agriculture depend on the effective interaction between scientific knowledge and practical experience. In this context, agricultural advisors play a strategic role within the AKIS (Agricultural Knowledge and Innovation Systems) model, facilitating learning networks, adapting innovations to local contexts, and supporting contextualized decision-making.

This study presents the results of a survey applied to farmers in training in Spain, designed to explore various aspects related to agricultural advisory systems. Among the topics analyzed are the respondents' perceptions of the functions and qualities of advisors, their ability to foster local innovation and sustainability, and their experience in collaborative learning processes.

The findings show that respondents particularly value the advisor's capacity to integrate scientific and practical knowledge, mediate complex decisions, stimulate peer-learning groups, and facilitate the adoption of sustainable practices and functional biodiversity. Significant challenges were also identified, including limited resources, insufficient communication, and the need to adapt recommendations to diverse production systems and local contexts. These results highlight that effective advisory services depend not only on the information provided but also on the advisor's ability to build trust and actively engage farmers in collaborative processes.

Strengthening the advisor's role as a facilitator of innovation and biodiversity is essential to scale best practices from the field to the landscape, enhance the adoption of sustainable measures, and bridge the gap between research and agricultural practice. The results provide valuable lessons for the design of policies, training programs, and support tools that optimize the efficiency of the AKIS system and enhance the sustainability of the agricultural sector.

This work has been developed within the framework of the ECOMERCA project (PEIT: IDF2023028.002), co-financed at 85% by the European Regional Development Fund (ERDF).

Keywords: agricultural advisors, agricultural innovation, biodiversity, farmers' opinions, knowledge transfer



7. DRIVING THE ECOLOGICAL TRANSITION OF AGRICULTURE THROUGH VOLUNTARY CERTIFICATION OF ENVIRONMENTAL IMPACTS

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Food consumption has increased due to human population growth, and agrifood production has intensified as a result. Degradation of biodiversity and pollution of the air and water are just two of the many negative effects of human activity on the environment. It is also essential to steer food production toward more sustainable methods in a global setting where environmental concerns are more prevalent. In this regard, sustainable production and consumption can be encouraged through the adoption of frameworks for certifying the environmental impact of agrifood products. With a specific focus on some of the most prominent environmental claims—such as biodiversity loss, water depletion, and global warming—this article intends to investigate the possibilities for certifying the environmental footprint of products. Since olives are the main tree crop in Mediterranean nations and have a significant impact on both the environment and human health, the industry was chosen as a case study. We used the expertise of specialists in the primary environmental certification fields as well as a review of the literature found in the SCOPUS database. In addition to pursuing specific business goals pertaining to certified products, the study demonstrated the potential for implementing different mitigation measures and enhancing environmental performance.

Keywords: greenhouse gases; climate change; carbon footprint; water footprint; biodiversity; life-cycle assessment; environmental product declaration



8. AGRICULTURAL CUSTODY AS A TOOL FOR THE ECOLOGICAL RESTORATION OF ABANDONED AGRICULTURAL LANDSCAPES

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Bioterreta is a multidisciplinary land stewardship project, specializing in rural areas and finding solutions to the abandonment of farmland

The project is conceived as a multi-tool based on six pillars: agroecology, circular economy, land stewardship, food, applied technology, and networking; each with its own distinct character, but which, when interconnected, generate a shared value system.

Through the combination of all these tools, an agri-food production model adapted to smallholdings has been developed that preserves and restores agricultural systems and their biodiversity, while also providing solutions to the abandonment of farmland and generational succession.

(CA) Through land stewardship, a social value chain of trust is generated, providing a solution by unlocking land transfers.

(AE) Through agroecological practice, understood as a second tool integrating ecological principles into agriculture, systems are created.

Resilient and sustainable production methods that respect the environment and enhance biodiversity. This tool allows for the certification of land for organic production, providing added value to the land and biodiversity, economic benefits for landowners, and health benefits for end consumers.

(EC) The circular economy in the agricultural value chain allows us to transform all plant waste from controlled pruning and logging into biomass products, thus maximizing resource use and minimizing waste. This fosters sustainability from primary production to final consumption, while simultaneously converting byproducts into resources for the soil.

(OC) Through a network of small, shared organic workshops strategically distributed across the territory, the processing of all agricultural waste is valorized, thereby reducing food waste and improving the economic viability of every plot, no matter how small. Furthermore, these food processing facilities help to revitalize abandoned land. Innovation: On-site production process at the field level.

(TA) Applied Technology. We are currently continuing its development using multipurpose robots, remote control, and satellite monitoring, and integrating phenological observation data from the field. The goal is to improve safety in agricultural tasks, eliminate precarious work, and thereby attract young farmers, as well as reduce food waste and soil compaction, and continue making small farms profitable.

Keywords: agricultural stewardship, ecological restoration, agroecology, circular economy, organic food, technology, smallholdings, sustainability, biodiversity





9. COMPENSATORY MEASURES FOR IMPROVING AGRICULTURAL BIODIVERSITY AND CONSERVING ENDANGERED STEPPE BIRDS IN NAVARRE

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In Europe, bird species associated with agricultural landscapes have experienced a sharp decline over several decades. Steppe birds are the most affected species, and agricultural intensification is one of the factors responsible for these losses.

The gradual disappearance of crop rotation in dryland agriculture is leading to a reduction in fallow land area. Fallow land is key to maintaining biodiversity in agricultural landscapes and is essential for the conservation of several endangered steppe birds, such as the little bustard.

In addition, other steppe birds such as the Montagu's and her harriers, which prefer to nest in cereal crops, are suffering sharp declines in their reproductive success due to the destruction of many of their nests by harvesters.

In recent years, compensatory measures have been implemented in Navarre to promote sustainable agricultural management and practices that benefit the conservation of several threatened steppe birds:

a) Agri-environmental measure 'Fallow land for steppe birds' (CAP 2023-2027):

In areas of critical importance for steppe birds and with a commitment of five consecutive years, payments have been made since 2023 for crop rotation that favours the conservation of these birds. The total area of arid land covered by this measure has been 2,150 ha.

b) Annual contracts for the maintenance of fallow land for the great bustard:

Since 2018, incentives have been provided for the maintenance of annual fallow land for the reproduction of the great bustard. With an average implementation of 60 ha/year of fallow land in three "hot" areas for the species, the conservation of the great bustard's breeding territories is being achieved.

c) Annual contracts for the conservation of harrier nests:

Through premiums for the conservation of unharvested enclosures in cereal fields, an average of 70 chicks per year have been saved over the last five years.

Keywords: compensatory measures, biodiversity, agriculture, steppe birds



10. A MAJOR TOOL FOR THE SUSTAINABILITY OF THE AGRICULTURAL MODEL IN SPAIN: THE VALORIZATION AND RESTORATION OF TRADITIONAL AND HISTORICAL IRRIGATION SYSTEMS

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Traditional and Historical Irrigation Systems (THIS) are communal, centuries-old, complex socioecological systems present across the globe. THIS are highly valuable for their contribution to biodiversity conservation, the sustainable use of natural resources (namely water, but also energy and construction materials) and mitigate climate change and natural disasters (droughts, floods, etc.), while –at the same time– contributing to sustainable agriculture, food sovereignty, population fixation, social justice, constructive conflict resolution, direct democracy and social and cultural heritage protection. Threats to THIS includes agriculture intensification which, at the same time, is one of the major biodiversity–decline drivers, globally and notably in Europe.

Aware of THIS values, since 2014 the Laboratory of Biocultural Archaeology of the University of Granada, MEMOLab-UGR, have been researching, revitalizing and restoring THIS in South Spain, in direct cooperation with the Irrigation Communities (IC, *Comunidades de Regantes*) that govern these systems. Results include the direct restoration of 120 km of acequias (THIS irrigation channels) supported by 5.000 volunteers, in direct cooperation with more than 100 Traditional and Historical Irrigation Communities. Additional support to IC provided by MEMOLab-UGR includes governance tools (e.g. Administrative and Land Stewardship Agreements, Participative Management Plans), technical and scientific advisory, conflict mediation with other (generally public) bodies, and search for funding (e.g. call for proposals).

This support has been mutually beneficial for the strategic goals of the MEMOLab-Universidad de Granada (research, knowledge transfer, social impact, etc.) as well for the Irrigation Communities involved (better working conditions, experience sharing, networking, social recognition, self-esteem, etc.) and the territories where THIS take place. Also importantly, these THIS support has contributed to promote a more sustainable agricultural model based on THIS environmental, economic and social values and, at the same time, provide a very relevant diversity of services (including ecosystem services) to the general society, rural populations and their territories.

Keywords: *restoration, traditional and historical irrigation systems, commons, recognition, sustainable agriculture*



11. CO-DESIGNING SUSTAINABLE LIVING LABS: A HACKATHON-BASED MULTI-ACTOR APPROACH TO VALUE PROPOSITION AND BUSINESS MODEL DEVELOPMENT

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Living Labs (LLs) have emerged as multi-actor innovation ecosystems aimed at accelerating the transition toward sustainable agricultural systems. However, many LLs struggle to move beyond project-based experimentation and lack clear value propositions and sustainable business models that ensure long-term continuity. This contribution presents the design and organizational framework of a hackathon conceived as a strategic co-creation instrument within the LivingSoiLL project (Horizon Europe), focused on permanent crops, particularly olive groves in Southern Spain.

The hackathon brings together two key target groups: (A) end users (farmers, cooperatives, olive mills, irrigation communities, and agricultural intermediaries) and (B) knowledge and solution providers (universities, research centers, agri-tech companies, and service providers). The objective is threefold: (1) to explore stakeholders' perceptions of the Living Lab; (2) to co-define a compelling value proposition aligned with real agronomic, economic, and social needs; and (3) to identify viable business model configurations that could ensure the LL's sustainability beyond public funding.

The methodology combines structured interviews, focus groups, and collaborative workshops inspired by the Value Proposition Canvas and Business Model Canvas frameworks. Participants jointly identify professional "jobs to be done," barriers to success, ecosystem dependencies, and opportunities for circular value creation. The hackathon is designed not as a technological competition, but as a governance and innovation exercise aimed at strengthening stakeholder engagement, trust-building, and knowledge transfer.

This contribution discusses the hackathon structure, methodological design, and its expected role as a catalyst for transforming Living Labs from experimental research settings into resilient, self-sustaining innovation ecosystems embedded in local agri-food systems.

Keywords: living Labs; co-creation; sustainable agriculture; business models; olive groves; knowledge transfer



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