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Advancing biodiversity research in the agroecosystem: Project BioMonitor4CAP in focus

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ABSTRACT

The EU Biodiversity Strategy 2030 recognizes farmers' dual role in safeguarding and impacting biodiversity. Within this policy context, the Horizon Europe project BioMonitor4CAP addresses monitoring of agroecosystem biodiversity and stakeholder-informed policy design to contribute perspectives and guidance in advance of the next Common Agricultural Policy period. The project integrates above- and below-ground indicators—pollinator insects, farmland birds, soil microbiota, and landscape structure—by pairing traditional methods with state-of-the-art tools across a network of European research sites. In Carinthia, six sites spanning low-elevation and high-elevation areas are used for testing traditional and state-of-the-art workflows targeting farmland birds, pollinator insects, soil communities, vegetation plots, and landscape structure. Sampling timing is based on a growing degree-day (GDD) approach. Carinthia University of Applied Sciences leads regional implementation, device feasibility testing, GDD scheduling, and remote sensing case studies, contributing to systematic reviews, indicator frameworks, and data infrastructure. A socio-economic component of the project engages farmers, advisors, and policymakers through focus groups, co-creation workshops, and a discrete choice experiment on subsidy trade-offs, complemented by mapping a Europe-wide network of ~600 agrobiodiversity observatories. Early findings highlight operational feasibility, ethical considerations, and context dependence of methods; regulatory and site constraints necessitated adaptive designs. BioMonitor4CAP is synthesizing evidence to deliver results-based monitoring guidance and policy options that reconcile practicality of monitoring approaches with conservation effectiveness. The project underscores that no single measure fits all farms, but co-designed, evidence-based approaches can align agricultural production, biodiversity outcomes, and circular economy goals for Europe.

KEYWORDS

- Agroecosystem
- Biodiversity monitoring
- Common Agricultural Policy
- Socio-economics
- Indicator species

Förderung der Biodiversitätsforschung im Agroökosystem: Projekt BioMonitor4CAP im Fokus

ZUSAMMENFASSUNG

Die EUBiodiversitätsstrategie 2030 erkennt die doppelte Rolle der Landwirte bei der Bewahrung und der Beeinflussung der biologischen Vielfalt an. Vor diesem politischen Hintergrund befasst sich das HorizonEuropeProjekt BioMonitor4CAP mit der Überwachung der Biodiversität in Agrarökosystemen und der an Stakeholdern orientierten Politikgestaltung, um Perspektiven und Leitlinien im Vorfeld der nächsten Förderperiode der Gemeinsamen Agrarpolitik (GAP) bereitzustellen. Das Projekt integriert ober- und unterirdische Indikatoren – bestäubende Insekten, Feldvögel, Bodenmikrobiota und Landschaftsstruktur – durch die Kombination traditioneller Methoden mit modernsten Werkzeugen über ein Netzwerk europäischer Forschungsstandorte hinweg. In Kärnten werden sechs Standorte, die Tieflagen und Hochlagen abdecken, für Tests traditioneller und moderner Arbeitsabläufe zu Feldvögeln, Bestäuberinsekten, Bodengemeinschaften, Vegetationsaufnahmen und Landschaftsstruktur genutzt. Die zeitliche Planung der Probenahmen basiert auf einem Gradtag(GDD)Ansatz. Die Fachhochschule Kärnten leitet die regionale Umsetzung, die Praxistests von Geräten, die GDDTerminplanung und FernerkundungsFallstudien und leistet Beiträge zu systematischen Übersichten, Indikatorenrahmen und Dateninfrastruktur. Eine sozioökonomische Komponente des Projekts bezieht Landwirtinnen und Landwirte, Beratende und politische Entscheidungsträger durch Fokusgruppen, CoCreationWorkshops und ein DiscreteChoiceExperiment zu FördermittelTradeoffs ein; ergänzt wird dies durch die Kartierung eines europaweiten Netzwerks von rund 600 AgrobiodiversitätsObservatorien. Erste Ergebnisse heben die praktische Umsetzbarkeit, ethische Erwägungen und die Kontextabhängigkeit der Methoden hervor; regulatorische und standortbezogene Einschränkungen machten adaptive Designs erforderlich. BioMonitor4CAP synthetisiert Evidenz, um ergebnisorientierte MonitoringLeitlinien und politische Handlungsoptionen zu entwickeln, die die Praktikabilität von Monitoringansätzen mit der Wirksamkeit des Naturschutzes in Einklang bringen. Das Projekt unterstreicht, dass es keine Maßnahme gibt, die für alle Betriebe passt; gemeinsam entwickelte, evidenzbasierte Ansätze können jedoch landwirtschaftliche Produktion, Biodiversitätsergebnisse und Ziele der Kreislaufwirtschaft in Europa miteinander verbinden.

BACKGROUND AND DEVELOPMENT

The European Union Biodiversity Strategy 2030 (EU BDS) underlines the role that farmers play in preserving biodiversity while at the same time acknowledging that certain agricultural practices are key drivers of biodiversity decline and soil degradation. Farmland birds, pollinator insects, and soil microbiota are key indicators of the health of agroecosystems and are vital for food security. In the EU BDS, one target is to ensure that at least 10 % of agricultural area within the European Union contains high-diversity landscape features (e.g., hedgerows, flower strips, fallow, buffer strips, ponds, and non-productive elements), supporting these indicator species [1].

The EU Common Agricultural Policy (CAP) requires agricultural producers to comply with nature protection regulations such as the Birds Directive and Habitats Directive, while formally protecting against environmental degradation in conservation areas within the agricultural landscape [2], [3], [4]. To support farmers' implementation of environmentally friendly practices, the CAP is the primary tool to provide financing mechanisms for compensation and incentivization. Program cycles are periodically revisited. The current CAP period extends through 2027.

The Horizon Europe-funded project "Advanced biodiversity monitoring for results-based and effective agricultural policy and transformation" (BioMonitor4CAP) is designed to address monitoring biodiversity in European agroecosystems in parallel with analysis of farmer and policy maker perspectives on monitoring. Project outputs are intended to provide insights to help guide the policies of the next CAP period. Key indicator groups encompassing above-ground and below-ground biodiversity are in focus: pollinator insects, farmland bird species, soil microbial communities, and landscape structure. Indicators should represent key aspects of above-ground and below-ground biodiversity. During the field work, a comparative monitoring approach is implemented where traditional monitoring methodologies are performed alongside state-of-the-art approaches for each indicator group. In order of monitoring intensity, research sites are designated as "major," "selected," and "demonstration" grids representing a variety of land use situations.

BioMonitor4CAP activities are divided into three research themes representing scientific topics, in addition to project management, outreach, and ethics. The research themes address: 1) conceptualization and implementation of field monitoring activities; 2) detailed investigation of agrobiodiversity indicators, programs, and policies; and 3) socio-economic research.

PROJECT PARTNERS

BioMonitor4CAP includes 23 participating organizations across nine EU countries—plus the UK and Peru—and represents diverse major agroecological regions of Europe (Figure 1). The lead partner is Leibniz Institute for the Analysis of Biodiversity Change, nested within the Museum Koenig, Bonn, Germany. Project partners include public and private research institutes, universities, and agricultural societies (Table 1). Inclusion of Peruvian field research sites is designed as independent validation of the applicability of selected methodologies. All partners provide specialized expertise and connections to diverse stakeholder perspectives. Faculty involvement from Carinthia University of Applied Sciences (CUAS) allows regional application of research techniques and promotes Austrian stakeholder perspectives in project activities.

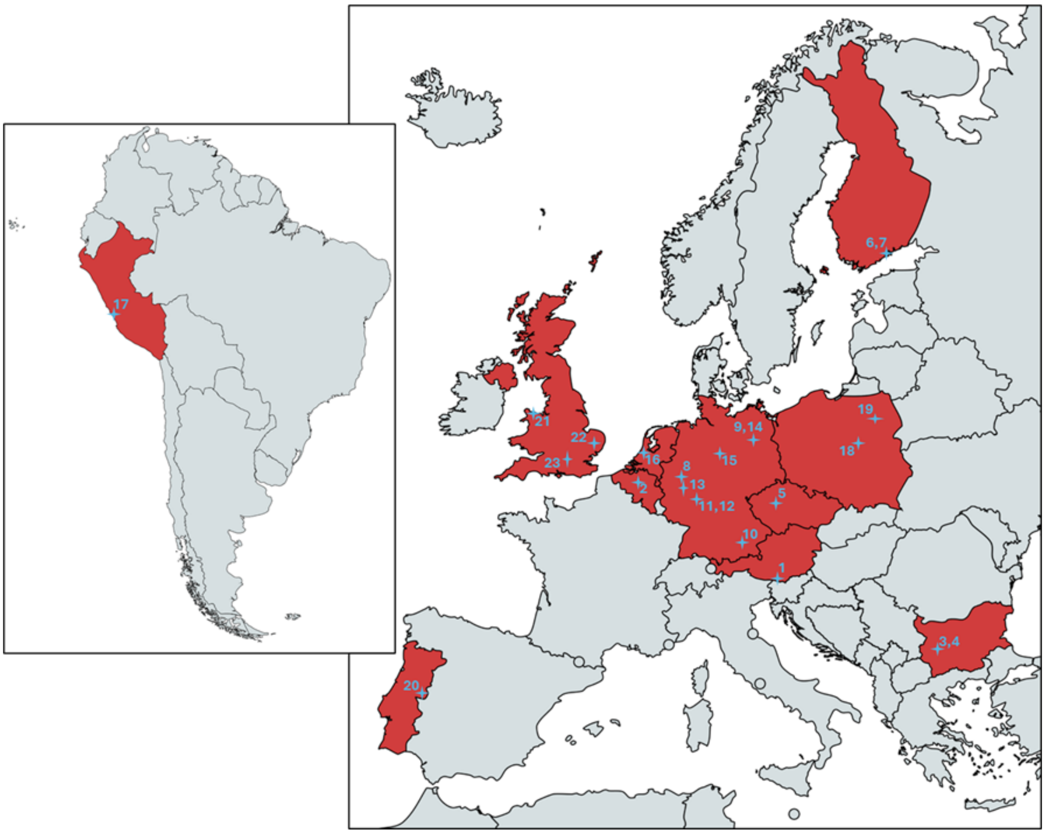

Fig. 1

Figure 1: Participating countries in BioMonitor4CAP. South American continent (inset) is not shown to scale. Source: Maps created with https://www.mapchart.net under a Creative Commons Attribution-ShareAlike 4.0 International License.

Abbildung 1: *Teilnehmende Länder in BioMonitor4CAP. Der südamerikanische Kontinent (Ausschnitt) ist nicht maßstabsgetreu dargestellt. Quelle: Karten erstellt mit https://www.mapchart.net unter einer Creative Commons Attribution-ShareAlike 4.0 International Licence.*

Tab. 1

Table 1: Project partners and associated partners participating in BioMonitor4CAP. Reference number matches the marker identifiers in Figure 1.

Tabelle 1: *Projektpartner und assoziierte Partner, die an BioMonitor4CAP teilnehmen. Die Referenznummer stimmt mit den Markerkennungen in Abbildung 1 überein.*

Reference number	Acronym	Country	Institution name
1	CUAS	Austria	Carinthia University of Applied Sciences
2	FE	Belgium	Farm Europe
3	BSPB	Bulgaria	Bulgarian Society for the Protection of Birds
4	IBER	Bulgaria	Institute of Biodiversity and Ecosystem Research
5	CSO	Czechia	Czech Society for Ornithology
6	LUKE	Finland	Natural Resources Institute Finland
7	UH	Finland	University of Helsinki
8	Bayer	Germany	Bayer AG
9	LfU	Germany	Brandenburg State Office for the Environment
10	IDMT	Germany	Fraunhofer Institute for Digital Media Technology
11	DLG	Germany	German Agricultural Society
12	IVA	Germany	German Crop Protection Association
13	LIB	Germany	Leibniz Institute for the Analysis of Biodiversity Change
14	ATB	Germany	Leibniz Institute of Agricultural Engineering and Bio-economy
15	SUH	Germany	University of Hildesheim
16	S4G	Netherlands	Space4Good
17	UCSUR	Peru	Scientific University of the South
18	IRWIR PAN	Poland	Institute of Rural and Agricultural Development Polish Academy of Science
19	WSA	Poland	School of Agribusiness in Lomza
20	F4S	Portugal	Food4Sustainability
21	BU	UK	Bangor University
22	BTO	UK	British Trust for Ornithology
23	NM	UK	NatureMetrics

STUDY SITES IN AUSTRIA

BioMonitor4CAP researchers utilize seven study sites located in Austria. One site is located in Lower Austria, a Bayer ForwardFarming field (Bayer Austria GmbH) that serves as an affiliated learning site for the Hollabrunn Agricultural Vocational School. The remaining six sites are located in Carinthia, and personnel from the CUAS Interdisciplinary Center for Ecosystem Services and Biodiversity (ICEB) perform site visits and data collection (Figure 2). Project-wide, study sites should include areas containing carbon-rich soils, grassland habitats, and agroforestry sites, with some sites located within conservation areas or other biodiversity-rich regions. The Carinthian study sites represent these principles. Most sites are rich in habitat diversity, including areas with diverse tree species, commercially planted wine grapes and vegetables, and grassland areas managed with low-input techniques. The high-elevation sites are adjacent to the Salzburger Lungau & Kärntner Nockberge Biosphere Reserve. One low-elevation site is a degraded marsh that is in early phases of restoration. All sites are nested within the agroecosystems of their respective regions.

Fig. 2

Figure 2: BioMonitor4CAP study sites in Carinthia, Austria. Blue-colored icons indicate high-elevation sites centered around Ebene Reichenau, and red-colored icons indicate low-elevation sites in proximity to Klagenfurt. Source: KAGIS.

Abbildung 2: *BioMonitor4CAP-Untersuchungsflächen in Kärnten, Österreich. Blaue Symbole zeigen hochgelegene Stätten rund um Ebene Reichenau an, rote Symbole zeigen niedrig gelegene Stätten in der Nähe von Klagenfurt. Quelle: KAGIS.*

By design, BioMonitor4CAP study sites should contain at least five sampling points arranged in a regular pattern within a 1000 m × 1000 m square, with at least 200 m separating the points. In Carinthia, geographic factors and sizes of study sites required modification of the intended sampling point layout at nearly all sites.

In the project, indicators are evaluated using traditional approaches in comparison to state-of-the-art approaches. To monitor pollinator insects, certain institutions perform lethal trap captures, followed by expert-based identification, for comparison against camera trapping. No traditional lethal insect collection traps are used at CUAS-managed sites; to compensate for this, we apply supplemental insect camera trapping arrays for experimental testing. For birds, traditional point count surveys are performed by experts during the breeding season in parallel to technology-based automated acoustic recording. For soils, standard soil samples are collected alongside soil environmental DNA collections for inference on the soil fungal, bacterial, and invertebrate communities. For landscape features, project partners gather earth observation data at specific points of the season, and UAS flights occur at certain sites, based on the capacities of the research team managing the field work. At CUAS, the research team at the ICEB Spatial Informatics for ENvironmental Applications (ICEB-SIENA), perform UAS missions at three research sites.

To coordinate sampling strategies across the different European climates, a growing degree-day (GDD) approach is used (Figure 3). GDD can help explain development of organisms based on the amount of heat accumulated at a site over time. To calculate GDD, at least two recent years of daily weather data were drawn from weather stations near field sites to approximate average daily temperatures at research grids. The simplest calculation—called the *max + min method*—uses the daily high and low temperatures while accounting for the base temperature, T_{base} [5], a theoretical value below which plant or insect development does not occur, and a daily maximum temperature threshold, T_{max}, as an upper limit to physiological development. Calculations provide daily degree-day values that are added to the previous day's running cumulative total, producing GDD. Daily degree-day values of less than 0 are assigned a value of 0. T_{base} and T_{max} are usually assumed at 10 °C and 30 °C, respectively, while T_{base} of cool season grasses is adjusted to 0 °C [6]. Actual temperatures limiting development of individual species can be calculated after studies under controlled conditions [7], [8]; however, simple GDD calculations are suitable for general forecasting. In BioMonitor4CAP, a benchmark 300-GDD monitoring interval was chosen after analyzing GDD accumulations near field sites, assuming T_{base} and T_{max} of 10 °C and 30 °C, respectively.

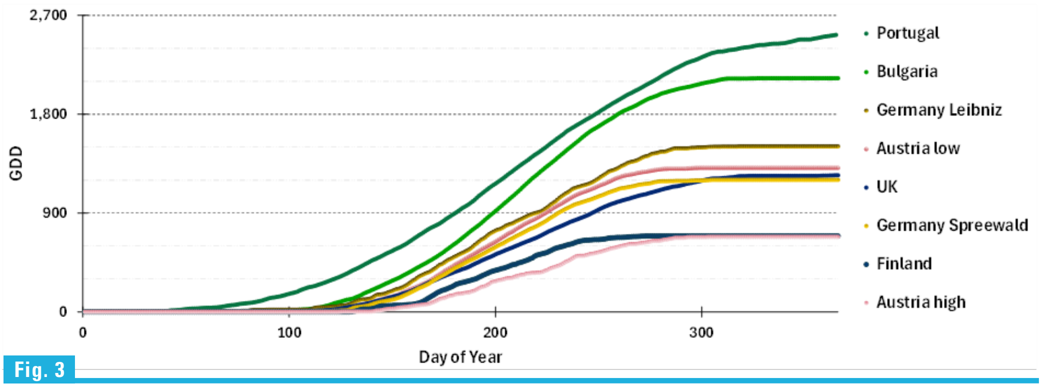

Fig. 3

Figure 3: Growing degree-day (GDD) curves for regions containing BioMonitor-4CAP study sites.

Abbildung 3: *Kurven der Wachstumsgradtage (Growing Degree-Days, GDD) für Regionen mit BioMonitor4CAP Untersuchungsflächen.*

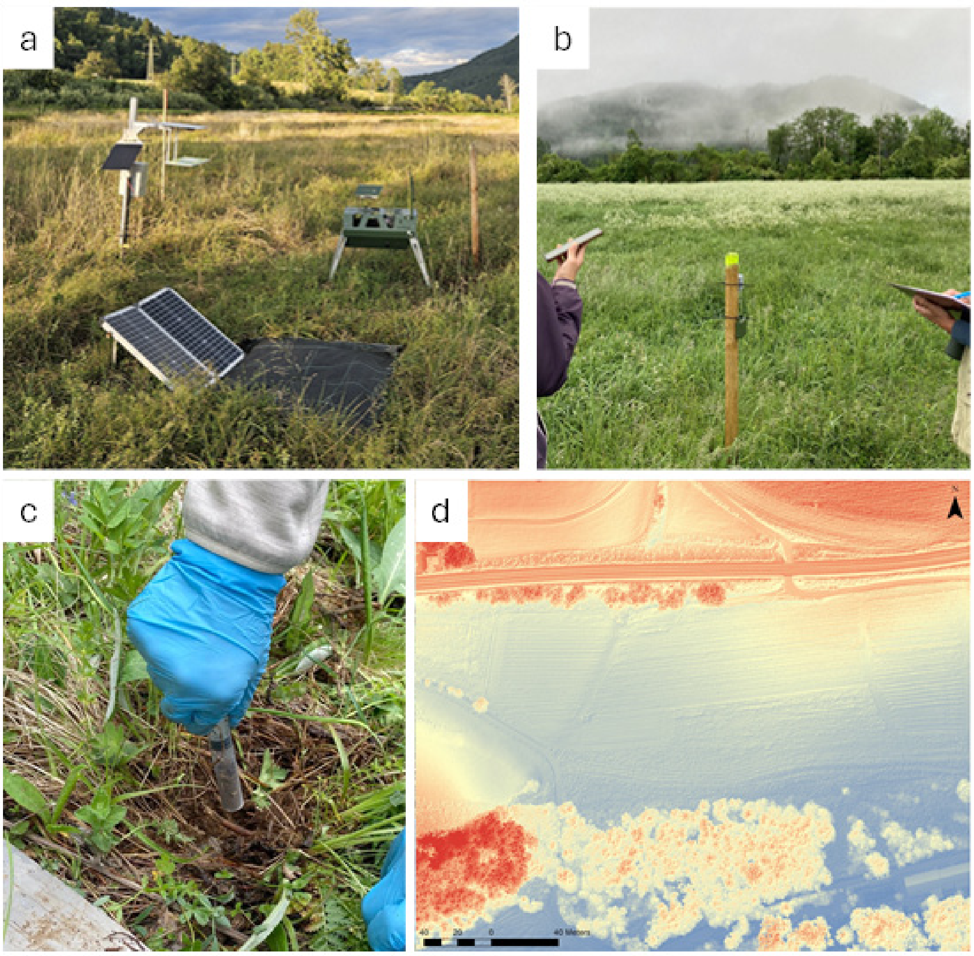

Fig. 4

Figure 4: Advanced methods for biodiversity monitoring at BioMonitor4CAP field sites in Carinthia. Optical sensors (a), acoustic sensors and point counting (b), soil sampling (c), and UAS flights (d) all provide comparative approaches for monitoring. Sources: Photos © Ilja Svetnik (a); Daniel Dalton (b, c); digital surface model © ICEB-SIENA, Carinthia University of Applied Sciences (d)

Abbildung 4: *Moderne Methoden für das Biodiversitätsmonitoring an BioMonitor-4CAP-Untersuchungsflächen in Kärnten. Optische Sensoren (a), akustische Sensoren und Punktzählungen (b), Bodenprobenahme (c) und Drohnen-Flüge (d) liefern vergleichende Ansätze für das Monitoring. Quellen: Fotos © Ilja Svetnik (a); Daniel Dalton (b, c); digitales Oberflächenmodell © ICEB-SIENA, Hochschule Kärnten (d)*

CUAS contribution: At the project outset, the ICEB Management of Conservation Areas (ICEB-MCA) team calculated GDD curves for each European region involved in the project. This helped determine the optimal timing of field monitoring activities prior to implementation. We test about 15 different devices or approaches spanning the four indicator groups and evaluate each of them for scientific performance, ecological suitability, operational criteria, analytical factors, ethical issues, and strategic value (Figure 4). CUAS was among three project partners who used the experimental DIOPSIS sensor—an experimental automated camera trap for insects—in 2025. With the remote sensing expertise of ICEB-SIENA, we are uniquely situated to provide Carinthian case study information on landscape structure [9].

FIELD TESTING

The advancement of agrobiodiversity monitoring tools is a key goal of BioMonitor4CAP. This theme is realized through conceptualization and implementation of monitoring at field sites (Table 2). Feasibility analysis of the various technologies was conducted based on past work. Configurations of devices—along with their settings—were adjusted based on initial test runs.

Tab. 2

Sampling Round	SR1						SR2						SR3						SR4						SR5					
Grid	01	02	03	04	05	06	01	02	03	04	05	06	01	02	03	04	05	06	01	02	03	04	05	06	01	02	03	04	05	06
Year 2023																														
acoustic							25						29						34											
UAS	22						25												38											
soil													29												42	42				
CT: Outdoor camera							25						26																	
Year 2024																														
acoustic	18	18	21				21	21	24				24	24	26															
point count / Merlin	19	19	21				21	21	24				24	24	27															
UAS	11	10	13					21							29				26						38	38	38			
soil			21	21	21		22	22				22																		
CT: Outdoor camera																				30						34				
Year 2025																														
acoustic	17	17	20				19	19	23				22	22	26															
point count / Merlin	17	17	20				20	20	23				22	22	26															
UAS		14	15					22	24											31	31					40	41			
soil									23	23	23		22	22				22												
CT: DIOPSIS														25	26					34						38				
CT: Insect Detect															29					34							38			
CT: Time Lapse													29	29	29				34	33	34				38	38	38			
Vegetation							19	19	23	23	23		22	22	26			22	34	34	34									

Table 2:
Device types and timing of use over three field seasons of work in BioMonitor4CAP based on growing degree-day (GDD) accumulations. SR = sampling round; UAS = uncrewed aerial system; CT = camera trap; CW = calendar week. Study site grids are color-coded based on elevation classification.

Tabelle 2:
Gerätetypen und Einsatzzeiten über drei Feldsaisons in BioMonitor4CAP basieren auf den wachsenden Gradtagakkumulationen (GDD). SR = Stichprobenrunde; UAS = unbemanntes Luftsystem; CT = Kamerafalle; CW = Kalenderwoche. Die Raster der Untersuchungsflächen sind farblich codiert basierend auf der Höhenklassifikation.

Elevation	Range (GDD)	End CW	End date
Low	0-300	25	18-Jun
	300-600	29	15-Jul
	600-900	33	12-Aug
	900-1200	37	13-Sep
	1200-1500	53	31-Dec
High	0-300	30	23-Jul
	300-600	38	17-Sep
	> 600	53	31-Dec

Grid 01 – Low-elevation selected research site

Grid 01 was established in summer 2023 near St. Veit an der Glan. Wooden posts were installed at four sampling points within a 5-ha parcel containing a young planting of wine grapes, experimental horticultural tree species, low-input grassland, and a small patch of riparian forest. Outdoor cameras (Ricoh WG-70, Ricoh Company, Ltd., Tokyo, Japan) were installed at two posts using an established approach for documenting flower-visiting insects [10]. The ICEB-SIENA team performed UAS missions over the grid at specific intervals. Soil samples for physicochemical analysis and for eDNA metabarcoding were taken from the four sampling points at two time periods: July and October. Acoustic recorders included Song Meter (Wildlife Acoustics, Inc., Maynard, MA, USA) series devices and AudioMoth (Open Acoustics Devices, Oxford, UK) devices that were installed on all four posts.

In 2024, drone flights were conducted, but they could not be performed in 2025 due to evolving local regulations. Soil sampling occurred at all sampling points in late May of both years, while Song Meter Micro and AudioMoth acoustic devices were installed in the spring at the four posts. Traditional point counting—performed by BirdLife Austria expert volunteers—was conducted to complement the technology-based monitoring solutions. The Merlin Bird ID app (Cornell Lab of Ornithology, Ithaca, NY, USA) recorded audio on a smartphone at precisely the same time as each point count for both seasons. Camera trapping for pollinator insects was not performed in 2024 due to a required change in device type, but in 2025, camera trapping was conducted using high-resolution time lapse construction cameras (TL3000, GD Digital Ltd., Shenzhen, China). Vegetation plots were established in 2025 to measure percent ground cover and functional species groups at specific time intervals.

Grid 02 – Low-elevation selected research site

Five sampling points were installed in October 2023 near Feldkirchen in Kärnten at the Metschach Outdoor Laboratory managed by ICEB [11]. Grid 02 is a former marsh that was drained around the turn of the 20th century and converted to agricultural land. In 1990, agricultural activities ceased, and the area was left to nature with management activities restricted to periodic mowing and vegetation monitoring. Due to the late-season grid establishment in 2023, only soil samples could be taken that year for physicochemical analysis and eDNA metabarcoding.

In 2024 and 2025, drone flights, soil sampling, bird monitoring, insect monitoring, and vegetation plot analysis were performed at Grid 02. For monitoring pollinator insects in 2025, construction cameras were installed at all sampling points. Additionally, two experimental camera trap setups were trialed. Insect Detect system modules [12] were installed at two sampling points alongside DIOPSIS sensors [13].

Grid 03 – High-elevation selected research site

In early spring 2024, Grid 03 was established near Ebene Reichenau using wooden posts at five sampling points. This site is located on a grassy slope ranging from 1,250-1,350 m elevation, with patches of coniferous forest. This 40-ha parcel is used primarily for hay and cattle production and has been managed by the same family for generations. A portion of the area is hand-scythed due to the steep topography, and another area is left with standing grass until late summer, promoting a highly diverse grassland plant community. In 2024 and 2025 the Grid 03 monitoring program closely paralleled the activities at Grid 01 and Grid 02, except that most activities began later due to climatic differences. In addition to soil sampling, acoustic monitoring, drone-based orthophoto collection, and vegetation plot assessment, in 2025 one Insect Detect system and one DIOPSIS sensor were installed at Grid 03, along with construction cameras at each of the five sampling points.

Grids 04-06 – Demonstration research sites

Demonstration research sites contained sampling points that were recorded using a high-precision global navigation satellite system device (Viva GS 16, Leica Geosystems AG, Heerbrugg, Switzerland), rather than marking with wooden posts. Grids 04 and 05 were established near Ebene Reichenau in spring 2024. Monitoring activities at these high-elevation demonstration grids were restricted to soil sample collection and analysis in 2024 and 2025, and vegetation plot documentation in 2025. Grid 04 is located within a heavily forested parcel on the north face of a steep slope. Three sampling points are established in clearings near the roadside, the fourth point located entirely within a closed forest and the fifth sampling point located in the middle of a field used for hay production. Grid 05 is located in a wide grassland that is bisected by a small river. One sampling point is located in a wet low-lying area of the field, while the other four points are located on ancient river terraces.

In 2024 Grid 06 was established following intensive consultation with the many landowners utilizing a large field near Maria Saal. This low-elevation grid most closely matches the intended project sampling point layout, with only slight deviations based on access restrictions. Grid 06 features nine sampling points where soil samples were collected in May 2024 and 2025. Vegetation plot documentation additionally occurred in 2025. Most sampling points are located in grassland habitats, with the remaining sampling points located at forest edges.

Biodiversity indicators, systems, programs, and policies

A background investigation of suitable agrobiodiversity indicators was performed early in the project. Project partners developed a framework for data collection and evaluation, including intensive research into the types of indicators that can be monitored effectively in the agricultural landscape. Project partners performed an exhaustive meta-analysis of more than 3,400 review papers covering the four indicator groups. A data storage platform was established, and a web-based interface was developed to provide visitors access to uploaded data. This interface will be managed until the conclusion of the project.

CUAS contribution: CUAS was involved in developing search terms for literature review in the fields of entomology, soil science, and remote sensing. We then provided independent assessment of journal articles for inclusion or exclusion in the final meta-analysis, a project deliverable [14]. With colleagues from Leibniz Institute for Agricultural Engineering and Bioeconomy, Potsdam, Germany, we published a methodology for how to perform a systematic review on the use of uncrewed aerial systems (UAS) in agrobiodiversity monitoring [15]. An additional article proposing new indicators for monitoring farmland biodiversity with connection to the Geo BON framework of Essential Biodiversity Variables was published [16]. These high-level outputs are targeted toward the scientific community and policy makers.

Socio-economic research

BioMonitor4CAP contains a thematic area on socio-economic research. Gathering rural stakeholder perceptions on agrobiodiversity monitoring is a key objective, where the values of agrobiodiversity data and monitoring techniques are assessed. Multiple formats of stakeholder involvement were offered. Thirty focus groups were assembled across six countries, where farmers and agricultural advisors from diverse production sectors shared their perspectives with a facilitator. Farming measures to promote biodiversity were discussed, as well as how the dimensions of environmental, economic, social, and personal well-being affected individual perspectives. In a next step, co-creation workshops took place, allowing policy makers and experts to develop policy recommendations.

To determine farmers' attitudes toward potential future changes to CAP subsidies, a discrete choice experiment (DCE) was conducted. Project partners developed a series of cards that were presented to farmers. Each DCE card indicated three hypothetical scenarios: one scenario where farmers would agree to a minor change to promote biodiversity on their farm for a small subsidy increase; one scenario where farmers would perform a major change for a large subsidy increase; and a third scenario where management would not change, but subsidies would not change either. Responses were statistically analyzed and reported in a peer-reviewed publication [16].

Lastly, to provide a framework for upscaling science-policy discussions, BioMonitor4CAP project partners gathered a comprehensive list of biodiversity observatories in Europe, with focus on those observatories that curate agriculturally-relevant information. Nearly 600 observatories were plotted on a web-based filterable map (https://www.biomonitor4cap.eu/en/project/agrobiodiversity-database) [17].

Austrian contribution: CUAS supported all socio-economic research tasks. We held five co-creation workshops, providing 10 farmers and 10 advisors the opportunity to share their perspectives on how the agroecosystem is linked to biodiversity. We held one co-creation workshop where eight advisors and policy makers came together to discuss the steps needed to improve agrobiodiversity literacy, including the successes and limitations of Austria's existing agrobiodiversity programs. We provided detailed contributions to a booklet on agroforestry [18], including translational assistance to release a German-language version. We co-authored the publication on the DCE surveys [16]. We further contributed a list of curated agrobiodiversity observatories from four European countries.

OUTLOOK AND CONCLUSION

BioMonitor4CAP project partners are currently performing data analytical steps to valorize the project findings. The goal of BioMonitor4CAP has been to develop evidence-based recommendations and case studies aimed at further harmonizing modern agriculture with habitat conservation, intended as part of a new CAP strategy. From the start, the project team was aware of the difficulty and complexity of these objectives, and despite the many complications and lessons learned, the research has advanced substantially.

In the project, ICEB has focused primarily on the topic of ecosystem monitoring and habitat protection in the agroecosystem. Trying to bring modern technologies to the farm level—and thereby to the operating farmers—was not always met with enthusiasm. However, our cooperators stood willing to engage in dialogue, a welcome finding considering the many voices that wanted to be heard in order to make a policy impact.

There will likely never be a one-size-fits-all set of measures that can be applied to all farms and agricultural areas across the EU. This was observed time and time again throughout the project. Every farm is subject to different influences and challenges, and many methods require further adaptation or are not applicable to specific situations. Furthermore, technologies continue to evolve. Many challenges that are outside of the scope of this project still stand in the way of a more comprehensive CAP strategy. What does emerge, however, is a path to jointly develop a strategy that equally satisfies the needs of consumers, policymakers, and farmers, thus promoting and preserving vital regional production in the long term through the circular economy and habitat conservation. ICEB and our project partners stand committed to aid with their expertise in this effort and to lay the ground work for further efforts and new research in sustainable agriculture.

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BACK TO CONTENT