Bio Monitor 4CAP

Advanced biodiversity monitoring for results-based and effective agricultural policy and transformation

Deliverable D5.1
Database of relevant observatories/networks (database)

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Executive summary

This deliverable presents the outcomes of Task 5.1, which focused on identifying, classifying, and documenting institutions involved in agrobiodiversity monitoring across Europe. The work was based on a systematic methodology guided by the PRISMA-P protocol and a structured set of eligibility criteria. Using a mixed top-down and bottom-up approach, the team combined online searches, AI-assisted tools, and expert knowledge to build an initial list of relevant institutions.

Each institution was then reviewed, validated, and assigned a classification based on its relevance to agrobiodiversity. Two shared working files were developed during this process: Excel1, which documented the search and review workflow, and Excel2, which contains the final validated entries with detailed, standardised metadata.

To improve accessibility and support policy relevance, the data were visualised through a dedicated Looker Studio dashboard, offering interactive filters, geographic visualisation, and user-friendly navigation. In parallel, the team created two Google Forms to engage directly with listed institutions, validate information, and collect additional inputs. These tools also serve as a mechanism for ongoing updates and expansion of the network.

Deliverable 5.1 provides a searchable directory of institutions involved in the field of (Agro)Biodiversity, constituting an initial, evolving basis for structuring a network and facilitating the coordination of monitoring efforts in Europe. It lays the foundations for future collaboration, data sharing and alignment with broader initiatives such as EuropaBON and the EU Biodiversity Strategy for 2030. In this context, the deliverable supports future coordination with these networks to maximise complementarities and ensure consistency with broader biodiversity monitoring objectives in Europe.

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1. Introduction

The facts are clear: one million species are currently threatened with extinction worldwide. Global biodiversity is under immense pressure from human activities such as pollution, land use change, and climate change. These stressors continue to degrade ecosystems and diminish the variety of life on Earth. Strong and effective strategies are urgently needed to monitor biodiversity loss and recovery across spatial and temporal scales. In Europe, key strategies such as the *EU Biodiversity Strategy for 2030* and the *Farm to Fork Strategy* aim to halt biodiversity loss while preserving both food security and human well-being.

With approximately half of the EU's land area used for agriculture, **unsustainable agricultural practices represent one of the primary threats to biodiversity in rural landscapes.** The ongoing pressure on natural habitats underscores the need for a fully integrated and evidence-based approach to the implementation of these strategies. **Monitoring the status and trends of Agrobiodiversity is essential for effective ecosystem management and the formulation of appropriate and impactful biodiversity policies.** This requires advanced biodiversity monitoring systems that can capture relevant indicators across diverse agricultural contexts in Europe.

The establishment of **a coordinated network of Agrobiodiversity Observatories** is especially relevant for the Common Agricultural Policy (CAP), as it directly supports its core objectives on sustainability, resilience, and evidence-based governance. Such a network can provide essential data for evaluating eco-schemes and agri-environmental measures, support performance-based policy approaches, and help align CAP implementation with broader EU strategies such as the Biodiversity Strategy for 2030 and the Farm to Fork Strategy. One of the main ways to monitor Agrobiodiversity is through the collection and analysis of relevant indicators. However, **the large number of observatories and monitoring networks across Europe creates a challenge**: many are dispersed, fragmented, and not easily identifiable or accessible to stakeholders unless one already knows of their existence. This lack of coordination and visibility limits opportunities for data sharing, harmonisation, and policy uptake**.**

The BioMonitor4CAP project, funded by the Horizon Europe research and innovation programme, seeks to address these challenges. Its objective is to develop user-friendly, advanced tools and methods for monitoring Agrobiodiversity, in support of results-based and transformative agricultural policy. These approaches will be tested, calibrated, and demonstrated in five European regions representing major agro-ecological zones, as well as in one region in Peru — one of the world's biodiversity hotspots. The project brings together a multidisciplinary team of ecologists, agronomists, ornithologists, entomologists, soil scientists, acoustic and geospatial data experts, data scientists, economists, and conservation practitioners from 23 partner and associated partner organisations in ten European countries and Peru.

A key step in this effort is **Task 5.1,** which focuses on ensuring upscaling for science-policy interfaces. This step is accomplished by **identifying and mapping existing institutions and networks involved in Agrobiodiversity monitoring in Europe.** A key output of **Task 5.1 is Deliverable 5.1, a structured directory and database of relevant observatories and data providers that include their specialisations, indicator types, ease of data accessibility, and contact information.**

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Deliverable 5.1 **aims to fill a critical knowledge gap regarding where and how agro-environmental data are collected across Europe**. It is intended to serve as a valuable resource for policy-makers, researchers, land managers, and other stakeholders engaged in Agrobiodiversity conservation and the design of evidence-based policies. Ultimately, this foundational work will support the creation of a more integrated and coordinated European observatory network, thereby strengthening science-policy interfaces and facilitating the upscaling of monitoring systems at the EU level.

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1. UNDERSTANDING OF TASK 5.1 OBJECTIVE

1.1 Grant Agreement and reminder of task guidelines:

Box 1 - *Task 5.1 Description.* ***Source:*** *Project 101081964 — BioMonitor4CAP, Grant Agreement, Work package WP5 – Ensuring replication, and implementation*

> *"**Deliverable D5.1 – Database of relevant observatories/networks (database)***
> ***Deliverable Name:*** *Database of relevant observatories/networks (database)*
> ***Due Date:*** *May 2025 (month 30 of the project)*
> ***Description:*** *The electronic database with a complete set of European institutions collecting data on agri-environmental issues with listing of the types of indicators collected. The deliverable will present the structured directory of institutions, including their official names, addresses (including postal and electronic), specialisation, examples of related work outputs, types of data accessibility, etc. The output will include: 1) the report describing in detail the structure of collected information,*
> *issues with collecting this information and recommendations for further expansion, and 2) electronic database of the collected information."*

1.2 Understanding of the EC guidelines and objectives set by the team 5.1:

The objective is to provide a basis for an extended European network of coordinated observatories for Agrobiodiversity monitoring, expanding existing networks to ensure replication and upscaling of BioMonitor4CAP biodiversity monitoring methods and tools.

Our approach is to identify relevant European observatories, institutions and networks that collect Agrobiodiversity data, information, and expertise to facilitate access to this information through a centralized database. By amalgamating the information in a clear and structured way, the database will facilitate the development of Agrobiodiversity monitoring systems in Europe.

The final Deliverable 5.1 includes:

- **A descriptive report** specifying the structure of the information collected, documenting the methodology used for its collection and challenges encountered during the process, and providing recommendations for future expansion and integration.

- **An electronic database** containing information on a complete set of European institutions involved in collecting data on agri-environmental issues, including selected non-EU institutions active within the broader European region. The database includes institutional details, areas of specialisation, types of collected Agrobiodiversity indicators, data accessibility levels, and links to relevant outputs.

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The database is visualised through a dedicated user-friendly web platform, allowing for intuitive browsing, filtering, and access to the data by policy-makers, researchers, and practitioners. Importantly, the platform is designed as a dynamic resource that will continue to be updated and expanded beyond the official delivery of this report, ensuring long-term usability and relevance for science-policy integration in Agrobiodiversity monitoring.

Box 2 - Conclusion on Understanding of T5.1 objectives

Task 5.1 must identify and centralize information on the institutions directly or indirectly involved in the monitoring of Agrobiodiversity.

2. TASK 5.1 WORKFLOW AND STAGES

To ensure the relevance, reliability, and usefulness of the collected information on Agrobiodiversity observatories and indicators, a structured and transparent methodological approach was developed. The research team applied the PRISMA-P protocol as the foundation for systematic data identification and extraction, complemented by additional digital tools such as ChatGPT, Google Board, Miro Board, and strategic use of search engines. Together, these tools supported efficient data collection, screening, synthesis, and collaborative validation across multiple sources and formats.

2.1 Methodology Framework – PRISMA-P Approach

As a first step, it was necessary to define a clear and structured methodology for identifying existing Agrobiodiversity institutions and the indicators they use. This methodology had to ensure that the information collected would be relevant, reliable, and useful for policy decision-makers, researchers, and other stakeholders involved in biodiversity monitoring and policy.

To achieve this, the team adopted the **PRISMA-P (Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols)** framework. PRISMA-P provides a rigorous and transparent approach for conducting systematic reviews, offering step-by-step guidance for literature identification, screening, eligibility assessment, and data extraction. Its structured nature helps to reduce selection bias and improve reproducibility — essential qualities for building a credible and policy-relevant database. By using this protocol, the team aims to ensure that the data collection process was methodologically sound, well-documented, and aligned with the principles of evidence-based research.

The Team for Task 5.1 also produced a dedicated methodological document (**Milestone MS9**), which served as a foundational reference and guiding framework for the task's implementation. While

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certain key elements and decisions are revisited in this report, the full methodological document can be consulted here.

2.2 Eligibility Criteria

Inclusion and exclusion criteria formed the basis for assessing the eligibility of data sources considered in this study. These Eligibility Criteria (EC) established clear and objective standards to guide the selection process and ensure the validity and quality of the results by including only relevant and reliable information. The criteria were structured and referenced using a coding system (e.g., EC0, EC1, EC2), allowing for transparency and traceability throughout the selection process.

- **Inclusion criteria** referred to the characteristics or conditions that potential sources had to meet in order to be considered eligible for analysis. These criteria defined the essential attributes or qualities required for inclusion and ensured that selected sources were relevant, trustworthy, and aligned with the research objectives.
- **Exclusion criteria**, in contrast, identified features or limitations that disqualified certain sources from inclusion. These criteria were used to exclude data sources that lacked sufficient quality, relevance, or objectivity.

The research team developed a set of selection criteria based on the quality and relevance of data and institutions to be included. These criteria were discussed and refined within the group, and decisions regarding their application were made collectively, drawing on the team's combined expertise.

2.2.1 EC0 – Linguistic restriction:

Question raised: Should we introduce a criterion for excluding or including a data source based on the language of that source?

Decision: No linguistic restriction.

The research team decided not to impose any language restrictions on eligible data sources. This meant that sources were considered eligible regardless of the language in which they were available.

This decision was based on several considerations. Advances in current technologies — particularly artificial intelligence (AI) and machine translation tools — have made it possible to effectively overcome language barriers. These tools facilitate the reliable conversion of documents from one language to another, enabling access to relevant information across linguistic boundaries.

In addition, eliminating language restrictions helped promote inclusiveness and diversity in the research process. As biodiversity is a global issue, important information may exist in many languages. Including non-English sources contributed to a broader and more nuanced understanding of Agrobiodiversity, avoiding linguistic or geographical bias.

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Overall, the decision supported the goal of conducting inclusive and globally-informed scientific research, while taking advantage of technological means to bridge language gaps.

2.2.2 EC1 – Type of sources:

*Question raised: Do we limit ourselves to **databases** (such as FAO, Eurostat, etc.) or do we also integrate other types of sources (e.g., scientific articles, etc.)?*

Decision: Structured databases were prioritised initially, followed by a broader inclusion of diverse, reliable sources to comprehensively map Agrobiodiversity data providers.

The research team initially prioritised the systematic exploration of structured databases deemed most relevant to the study objectives. These included international, European, and national agri-environmental data repositories. The results retrieved from these databases were catalogued using the PRISMA-P protocol.

In a secondary phase, the search strategy was broadened to include additional sources of information. This included other data repositories and digital platforms identified through search engines or cross-references, as well as relevant scientific literature and institutional reports and other grey literature. The strategy retained flexibility to adjust its parameters and incorporate further sources if they were found to contain relevant and reliable information on Agrobiodiversity monitoring.

Within the framework of Task 5.1, the concept of an **"institution"** was interpreted in a broad and inclusive way. It encompassed any **structured organisation actively involved in the production, management, or dissemination of data, knowledge, or expertise related to Agrobiodiversity.** This definition extended to research programmes, collaborative platforms, and multi-stakeholder projects, provided they demonstrated institutional visibility (e.g. maintained a website) and had a recognisable identity and operational structure.

By not limiting the scope strictly to observatories, the research aimed to reflect the fragmented and multi-actor nature of the Agrobiodiversity monitoring landscape and to ensure comprehensive mapping of relevant actors contributing to the objectives of *BioMonitor4CAP*.

A typology of institution categories was developed progressively throughout the project as new entries were identified. The categories reflect the diversity of the ecosystem of data providers and knowledge holders.

- Observatory
- Government Agency
- Research Institute

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- University/Academic Institution
- Data Consortium/Collaborative Platform
- Museum/Cultural Institution
- Protected Area Management Authority
- Private Sector/Consultancy
- Program/Project
- Citizen Science Group
- International Organization
- Non-Governmental Organization (NGO)
- Other

***Box 3**. List of Institutions categories. **Source:** T5.1 BioMonitor4CAP.*

2.2.3 EC2 – Origin of the source:

Question raised: Which types of organisations meet our eligibility criteria?
This point raises the question of the reliability and credibility of the data sources that we include or omit in our research: Are we exclusively inclined to include officially recognised public observatories / institutions in our data set, or shall we consider a wider network of observatories?

Decision: All eligible sources were included and classified as Public, Private, NGO, or Other to ensure transparency and representativeness.

All sources that met the PRISMA-P inclusion criteria were considered eligible for integration into the dataset, regardless of their formal status or affiliation. However, to ensure transparency and enable meaningful analysis of the data landscape, each source was classified into one of four origin categories: **Public**, **Private**, **NGO,** or **Other**. This categorisation helped delineate the institutional background of each data source and offered insight into the potential accessibility and governance of the information provided.

- The **Public** category included sources affiliated with governmental or publicly funded institutions, typically characterised by a high degree of transparency and data availability for use by researchers, policymakers, and civil society.
- The **Private** category referred to sources from privately owned organisations or entities that retained control over their data. Such sources often had limited accessibility and could require licences, agreements, or permissions for data use.
- The **NGO** category includes non-profit organizations that operate independently from governments and the private sector. They are generally dedicated to public-interest missions.
- The **Other** category encompassed sources that did not clearly fit into the public or private classifications. This included specialised initiatives, hybrid collaborations, or unique institutional formats that nonetheless contributed valuable information to the dataset.

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This approach ensured a more inclusive and representative mapping of the agrobiodiversity monitoring landscape while maintaining clarity regarding data origin and accessibility.

2.2.4 EC3 – Geographic scope:

Question raised: What should be the geographical scope of the observatories included in the study? Should the focus be limited to the European Union as a political entity, to the wider European continent, or should it extend globally?

Decision: Focus on the entire European continent, with more exhaustive coverage in EU countries and minimum-one-observatory approach in non-EU countries.

In accordance *with the initial request from the European Commission, the study focused specifically on the* ***geographical region of Europe****, encompassing all 50 countries that form the continent.*

Within this region, a two-tiered approach was adopted:

- For **European Union (EU) Member States**, a more rigorous and comprehensive strategy was applied. The objective was to conduct an exhaustive search in order to identify **all relevant biodiversity observatories** operating within each EU country.

- For **non-EU countries within Europe**, a less stringent approach was used. The goal was to identify **at least one biodiversity observatory** per country. This flexible approach accounted for potential disparities in data availability and accessibility, while still ensuring broad coverage of biodiversity monitoring efforts beyond EU borders.

This strategic distinction was designed to optimise research efficiency and guarantee that the resulting database would offer a representative picture of the Agrobiodiversity monitoring landscape across the entire European continent.

2.2.5 EC4 – Ecosystem parameter:

1st Question raised: Should the scope of Task 5.1 focus exclusively on Agrobiodiversity, or should it also encompass broader biodiversity data ? Given the blurred boundaries and ecological interdependence between agricultural and natural systems, is it appropriate to integrate general biodiversity data into our analysis?

1st Decision: Both Agrobiodiversity and broader biodiversity data were included, with clear classification to reflect their ecological interdependence.

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The research team decided **not to limit the scope strictly to Agrobiodiversity**, but instead to include **biodiversity in a broader sense**, recognising the strong and often inseparable links between agricultural and non-agricultural ecosystems. This inclusive approach reflected the complex interdependencies between biodiversity domains and allowed for a more comprehensive representation of ecological processes relevant to Agrobiodiversity.

This decision was grounded in ecological reasoning. For example, species such as insectivorous birds nesting in natural areas often contribute essential ecosystem services to neighbouring agricultural zones, such as pest regulation. These interactions illustrate that biodiversity "boundaries" are conceptual rather than ecological, and that monitoring both domains is critical for understanding and supporting sustainable agricultural systems.

The team adopted the **common working definitions** developed within WP4 of *BioMonitor4CAP*, which were used consistently throughout the study:

> *"**Biodiversity** encompasses all living and non-living species of animals, plants, and other organisms and their genes, as well as the diversity of habitats in which they live."*
> *"**Agrobiodiversity**, in a broad sense, refers to the number and variety of species on farms or in agricultural landscapes. In a narrower sense, it includes species, genes, organisms, and landscapes that contribute directly to agricultural operations, food production, and food security.*
> *Agrobiodiversity is shaped by both planned components (e.g. cultivated crops and livestock) and associated components (e.g. wild species such as pollinators, birds, and natural enemies). Landscape diversity also contributes by creating various habitats and supporting key ecological processes such as pollination and pest control". (Source: BioMonitor4CAP WP4 Working Definitions)*

> *2nd Question raised: Given that the aim of the project is to identify observatories collecting data on Agrobiodiversity and biodiversity indicators, should the research focus strictly on **agricultural ecosystems**, or should it extend to other ecosystems that interact with or influence agricultural systems? How should an "agricultural ecosystem" be defined, particularly in areas where ecosystem boundaries are ambiguous?*

> *2nd Decision: All terrestrial ecosystems were included due to their interconnection with agriculture; marine ecosystems were excluded.*

The research team recognised the ecological reality that terrestrial ecosystems are inherently interconnected, and that strict categorisation between agricultural and non-agricultural environments is often artificial. Therefore, the decision was made to include all terrestrial ecosystems, both above and below ground, while explicitly excluding marine ecosystems from the study's scope.
This inclusive approach acknowledged that biodiversity relevant to agriculture often resides in adjacent natural areas and ecological interfaces — such as forest edges, field margins, and transitional zones. For example, forest-dwelling bird species may provide pest control services to neighbouring agricultural fields. Such cases illustrate how ecological processes span multiple ecosystem types and cannot be fully understood when constrained by rigid boundaries.

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The blurred distinction between Agrobiodiversity and general biodiversity — identified early in the project — emerged as one of the most complex and cross-cutting methodological challenges of Task 5.1. It required extensive conceptual discussion, iterative adjustments to the research framework, and sustained internal consultation within both the Task 5.1 team and the broader *BioMonitor4CAP* consortium. The depth and persistence of this issue significantly shaped the orientation of the study and the structure of its findings.
A more detailed examination of this methodological challenge will be provided in Section III.c Challenges Related to AgroBiodiversity Focus.

2.2.6 EC5 – Temporal Scope and Frequency:

Question raised: What time frame and data update frequency should be required for biodiversity observatories to be included in the study? Should the research focus only on recent data, and should observatories be required to update their data at regular intervals (e.g. annually)?

Decision – Time frame: While priority was given to institutions currently active, the selection process remained flexible to include any institution capable of contributing valuable data or expertise, including those not presently active, especially when providing important long-term datasets.

The research will prioritise institutions that are still active at the time of the study. This basic criterion was intended to ensure that the selected sources were active and capable of providing real-time or recent data relevant to current policy needs. However, the team recognised the potential for a broader contribution from institutions that are no longer “active”. Long-term monitoring of biodiversity is essential for identifying ecological trends and understanding the dynamics of agroecosystems. Therefore, any institution that could potentially offer data or expertise covering different time periods (whether still active or not) was also considered useful, as long as the data and other inputs were still available.

Decision – Time frequency: No minimum update frequency required; approach adapted to diverse observatory practices.

No fixed criterion was imposed regarding the **update frequency** of the data. In other words, data sources were not excluded based on how often they renewed their information. This decision reflected the practical reality that data collection frequency varies widely across observatories, depending on their objectives, capacities, and methodologies. Maintaining flexibility in this aspect allowed for the inclusion of a diverse range of observatories and ensured a more comprehensive mapping of the European Agrobiodiversity monitoring landscape.

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This balanced approach enabled the research to draw on a broad spectrum of data sources—both recent and longitudinal—while remaining sensitive to the operational capacities and constraints of data providers.

2.2.7 EC6 – Biodiversity indicator definition:

Question raised: What constitutes a "biodiversity indicator"? While some databases explicitly provide variables labelled as biodiversity indicators, others may contain relevant indicators without using this specific terminology. For instance, soil health may not be categorised as a biodiversity indicator per se, yet it may reflect underlying biodiversity-related processes. It was necessary to define clear criteria for identifying relevant indicators, even in the absence of consistent labelling.

Decision: A validated indicator list was developed with expert input to guide consistent identification.

The research team decided to develop a **preliminary list of biodiversity indicators**, in close collaboration with the experts from **WP1, WP2, and WP4** — who provided domain-specific guidance and validation — and with input from *BioMonitor4CAP* Deliverable 1.2. This list served as a foundational reference to guide the identification and classification of indicators throughout the data collection process.

The research team decided to develop a preliminary list of biodiversity indicators, working closely with experts from WP1, WP2 and WP4, who provided advice and validation specific to their field, and drawing on the contribution of deliverable 1.2 of BioMonitor4CAP. This list was intended to serve as a fundamental reference to guide the identification and classification of indicators throughout the data collection process.

In particular, this list made it possible to target the search for institutions by using keywords and categories specific to each indicator, thus broadening semantic and contextual searches.

However, the search for Agrobiodiversity indicators linked to the institutions identified proved more complex than expected. Specific (Agro)biodiversity indicators are not systematically available on institutional websites. Consequently, information likely to reflect the potential presence and nature of (Agro)Biodiversity indicators was collected. For example, lists of taxa — such as ‘squirrels, bats, orchids’ — were sometimes mentioned in the ‘Indicators’ field of the Excel2 file. This approach aims to provide initial guidance on the available data, despite the limitations related to the availability and accuracy of the published information. The preliminary list of indicators thus played a key role in guiding this information gathering.

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Box 4 - Conclusion on Selection Criteria

A deliberate choice was made to establish broad and flexible eligibility criteria, taking into account the challenges associated with the strong interactions between biodiversity and Agrobiodiversity.

Given the difficulty of clearly delineating the boundary between biodiversity and agrobiodiversity, Task 5.1 made the strategic decision to adopt a broad and inclusive approach to identifying relevant institutions. All institutions potentially holding information, data, or expertise related to Agrobiodiversity were considered for inclusion. The use of the term Agrobiodiversity here is intentional, reflecting the varying degrees of institutional involvement: some entities focus specifically on agricultural biodiversity, while others operate more broadly in the fields of biodiversity, environmental monitoring, or ecological research, without necessarily having a direct connection to Agrobiodiversity.

This inclusive approach aimed to create the most comprehensive mapping possible of the existing institutional landscape, based on the principle that any structure holding potentially relevant resources for Agrobiodiversity monitoring should be taken into account. It was considered essential not to exclude institutions that, although not explicitly dedicated to Agrobiodiversity, may possess data or expertise indirectly relevant to agricultural biodiversity monitoring in Europe. *For example, an institution specializing in forest biodiversity monitoring would not, at first glance, fall within the strict scope of our study. However, it might hold valuable data on bird species inhabiting forest ecosystems, whose population dynamics are influenced by surrounding agricultural systems (e.g. feeding in agricultural landscapes).* Restricting our scope to institutions explicitly labeled as working on Agrobiodiversity would thus risk overlooking a substantial number of actors capable of providing highly relevant data for a comprehensive European monitoring framework.

This strategic choice was further validated in later stages of our work: only a small number of institutions explicitly identified themselves as working within the domain of Agrobiodiversity. The vast majority operate in the broader fields of biodiversity, environment, agriculture, or academic research more generally (see Section III. Results and main challenges).

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2.3 Search Strategy

To identify biodiversity observatories across Europe, the research team applied a combined search strategy based on both "TOP-DOWN" automated methods and "BOTTOM-UP" expert-driven approaches (Fig. 1). These complementary processes were designed to ensure comprehensive and reliable identification of relevant observatories, supported by verification checkpoints and iterative refinement.

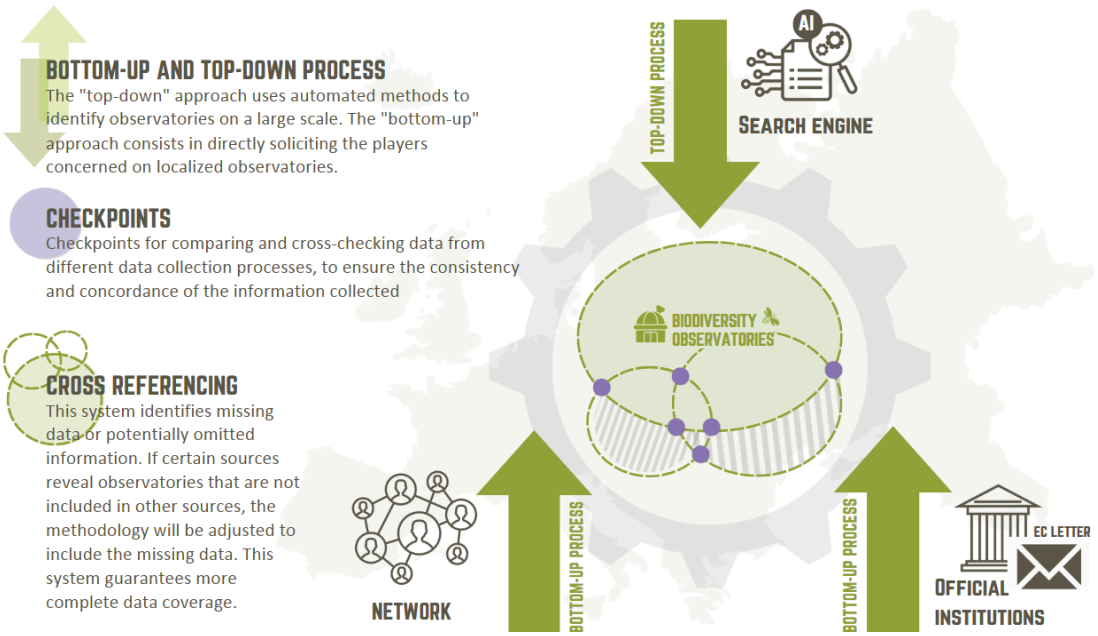

***Fig. 1**. Illustration of BOTTOM-UP and TOP-DOWN research processes. **Source:** BioMonitor4CAP, Task 5.1.*

2.3.1 TOP-DOWN Process

The TOP-DOWN approach was used to obtain an initial overview of the availability and distribution of biodiversity observatories across Europe. It was implemented using search engines and AI-assisted tools capable of executing structured keyword-based queries.

A curated list of keywords and search terms, derived from the inclusion criteria and indicator definitions (see Section II.b ELIGIBILITY CRITERIA), served to guide automated queries. The keyword list was refined using text mining techniques.

Search tools used:

- **Google search engine**
  With global reach and advanced ranking algorithms (e.g. PageRank), Google provided reliable, high-quality search results. Its AI capabilities, including intent recognition and personalised suggestions, improved both precision and coverage.

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- **Bing search engine - Microsoft Edge**
  Microsoft Edge, integrated with Bing, offered strong indexing capabilities and advanced in-browser tools for annotating, organising, and analysing search results — facilitating collaborative validation and structuring of data.
- **ChatGPT**
  ChatGPT was used to generate, verify, and contextualise search results. It supported the semantic interpretation of data and assisted in identifying relevant institutions and indicators not explicitly labelled in conventional search outputs. ChatGPT was also used during the information gathering phase relating to the institutions. It served as a research support tool to guide the inquiry process. All information obtained through the model was systematically cross-verified using conventional search engines, including Google and Bing, to ensure accuracy and reliability.

All results were recorded in a dedicated shared file (Excel1), which documented the source of each identified observatory (e.g. Google, Bing, ChatGPT). This allowed for systematic comparison, triangulation of results, and identification of overlaps or divergences between platforms.

2.3.2 BOTTOM-UP Process

The BOTTOM-UP approach mainly relied on existing networks (EuropaBON, *BioMonitor4CAP consortium, etc.)*

Experts and stakeholders provided direct input and advice, helping to identify less visible observatories through automated searches or publicly indexed databases. This layer of expertise was particularly valuable in identifying national, local or domain-specific initiatives. The EuropaBON list of observatories was a very useful source for identifying relevant institutions and monitoring initiatives.

2.3.3 Cross-Referencing

After collecting the data, the results obtained using the TOP-DOWN and BOTTOM-UP approaches were cross-referenced and analysed (see Section Cross-Referencing results). Institutions identified by several sources were flagged up through cross-checking.

During the research phase, the number of occurrences in which an institution was identified by different sources was counted. The more an institution was mentioned by various sources, the greater its visibility in the ecosystem, and partly confirming the method's ability to effectively map the network.

This cross-checking aims not only to obtain an overview of the effectiveness of the institutional landscape referencing, but also to highlight the effectiveness of the complementarity of the different methods used.

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2.3.4 Distribution of research work by Agrobiodiversity institutions

The research work within **Task 5.1** was distributed among project partners on a **country-by-country basis** (Fig.2). The allocation took into account each partner's **language competencies** and **available work effort**, in order to maximise efficiency and ensure high-quality results across the European region.

REGION	COUNTRY	PARTNERS 1st SEARCH	Done	PARTNERS DOUBLE CHECKING	Done
EU	Belgium	FE	☑	DLG	☑
EU	Bulgaria	F4S	☑	IRWIR PAN	☑
EU	Czechia	IRWIR PAN	☑	S4G	☑
EU	Denmark	DLG	☑	FE	☑
EU	Germany	DLG	☑	FE	☑
EU	Estonia	FE	☑	IRWIR PAN	☑
EU	Ireland	S4G	☑	F4S	☑
EU	Greece	FE	☑	DLG	☑
EU	Spain	S4G	☑	F4S	☑
EU	France	FE	☑	DLG	☑
EU	Croatia	CUAS	☑	IRWIR PAN	☑
EU	Italy	CUAS	☑	F4S	☑
EU	Cyprus	CUAS	☑	F4S	☑
EU	Latvia	FE	☑	CUAS	☑
EU	Lithuania	FE	☑	CUAS	☑
EU	Luxembourg	IRWIR PAN	☑	S4G	☑
EU	Hungary	S4G	☑	IRWIR PAN	☑
EU	Malta	CUAS	☑	IRWIR PAN	☑
EU	Netherlands	DLG	☑	FE	☑
EU	Austria	CUAS	☑	F4S	☑
EU	Poland	IRWIR PAN	☑	S4G	☑
EU	Portugal	S4G	☑	F4S	☑
EU	Romania	F4S	☑	IRWIR PAN	☑
EU	Slovenia	CUAS	☑	IRWIR PAN	☑
EU	Slovakia	IRWIR PAN	☑	S4G	☑
EU	Finland	FE	☑	DLG	☑
EU	Sweden	DLG	☑	FE	☑
ExtraEU	United Kingdom	F4S	☑	IRWIR PAN	☑
ExtraEU	Iceland	FE	☑	IRWIR PAN	☑
ExtraEU	Liechtenstein	FE	☑	IRWIR PAN	☑
ExtraEU	Norway	FE	☑	IRWIR PAN	☑
ExtraEU	Switzerland	FE	☑	IRWIR PAN	☑
ExtraEU	Bosnia and Herzegovina	FE	☑	IRWIR PAN	☑
ExtraEU	Montenegro	FE	☑	IRWIR PAN	☑
ExtraEU	Moldova	IRWIR PAN	☑	FE	☑
ExtraEU	North Macedonia	IRWIR PAN	☑	FE	☑
ExtraEU	Albania	IRWIR PAN	☑	FE	☑

***Fig. 2**. Table of the distribution of countries between T5.1 partners. **Source**: BioMonitor4CAP, Task 5.1 (Excel1).*

Each assigned partner conducted an **initial search** for Agrobiodiversity-related institutions in their designated countries. This first phase combined multiple methods:

- **Top-down**: use of Google search engine with advanced search functions;
- **Bottom-up**: leveraging personal and institutional knowledge networks, as well as national biodiversity directories and the *BioMonitor4CAP* partner network;
- **AI-assisted**: ChatGPT was used for orientation and identification of potentially relevant institutions or indicators. All AI-suggested results were subsequently **verified using traditional sources** (Google, partner networks, etc.) to ensure accuracy and reliability.

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Upon completion of the initial search, a **second-level cross-verification process** was launched. For each country, another Task 5.1 partner conducted a **secondary search**, using an **alternative search engine (e.g. Microsoft Edge with Bing)**, and their own networks and data sources. This redundancy was introduced to reduce bias, fill potential gaps, and improve the overall robustness of the database.

This **two-layered, partner-driven structure** allowed for iterative refinement of results and ensured comprehensive coverage across all European countries included in the study.

2.4 Data Collection Process

The data collection process followed a **structured research and data entry protocol**, ensuring that each record relating to an Agrobiodiversity institution was entered in a **standardised, systematic, and traceable** manner. This approach aimed to ensure consistency, accuracy, and comparability across the dataset.

All data were recorded in a shared **Google Sheet**, referred to as **Excel1**, which served as the central working file for the identification and documentation of institutions connected to Agrobiodiversity across Europe.

📄 **Excel1 - Research & Selection Process**

For each institution, the following fields were systematically recorded:

- **Institution Name**
- **Country Code** (ISO 2-letter code)
- **Institution Website URL**
- **Source(s) of Identification** (e.g., Google, Microsoft Edge, partner network, ChatGPT, etc.)
- **Primary Source** (used for statistical analysis of source efficiency)
- **Keywords Used** during the search process

See Section Excel1- Institution reference and selection file for more details on Excel1.

To maintain consistency across the team, a **methodological guide** was developed and shared with all Task 5.1 contributors. This document outlines the data entry protocol, provides definitions of fields, and describes the overall workflow to be followed during the data collection phase.

This systematic process ensured traceability, facilitated quality control, and supported the reproducibility of results for further research, analysis, and policy use.

2.5 Stakeholder Engagement and Outreach (TOP-DOWN and BOTTOM-UP Statistics)

Quantitative insights into the distribution of sources identified through top-down and bottom-up processes are documented in Statistics Excel1, including the relative proportion of institutions found via tools such as Google, Microsoft Edge, and AI-assisted searches (e.g. ChatGPT). These data help assess the performance and complementarity of the different search methods and provide an initial picture of the institutional landscape covered.

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2.5.1 Bottom-Up – Stakeholder Engagement

Following the initial compilation of institutions, the WP5.1 team prepared a memo (*Fig. 3),* aimed at the general public to invite additional stakeholders to join the network of Agrobiodiversity institutions. This communication was distributed via the BioMonitor4CAP partner network and supported by a dedicated messaging channel for collecting responses.

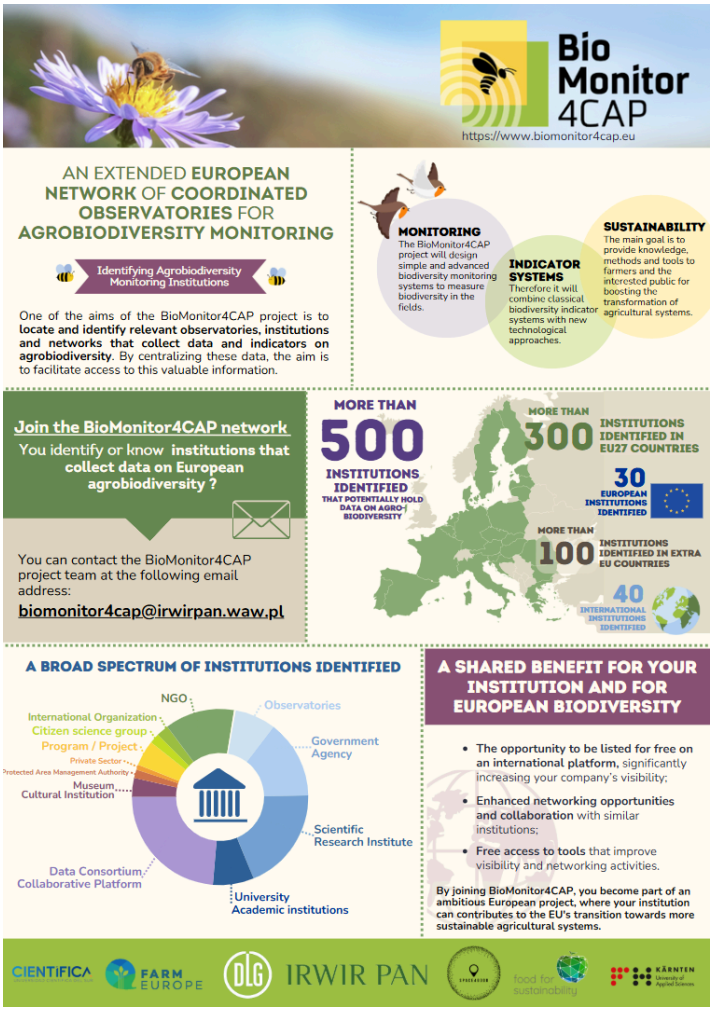

Fig. 3. *Task 5.1 Communication document - call to join the Network.*

Despite our numerous attempts to mobilise people via social media, the response has been very limited so far, with only one reply received to date via the email address mentioned in the communication document. Nevertheless, we are actively continuing to send out calls for contributions in the hope of generating more responses and further enriching our data collection. This low level of engagement is a significant challenge and highlights the limitations of this channel of communication in the specific context of our initiative.

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In addition to public outreach, a targeted call for input was shared within the BioMonitor4CAP consortium. This took place during the project's annual meeting in Poland, where Task 5.1 and its objectives were presented and discussed. The call was then followed up by email, and the compiled list of institutions was circulated to all partners.

Partners were asked to:

- ➔ Suggest any relevant Agrobiodiversity institutions not yet included;
- ➔ Review and comment on the existing list, indicating corrections or additions.

These stakeholder engagement actions aimed to enrich the coverage of the database, validate the initial findings, and strengthen the collaborative foundation of the BioMonitor4CAP institutional network.

In total, just **over 30 institutions were identified through the BioMonitor4CAP consortium network** (see section 3.2.1 Statistics). Mainly through the knowledge network of the Task 5.1 team and work carried out by the BioMonitor4CAP project *(Deliverable D1.2 - Review of farmland biodiversity indicators).* Calls for contributions during the event and by email identified five new institutions. The BioMonitor4CAP consortium mainly provided feedback in the form of comments on Excel1 on the institutions listed in Task 5.1. Most of the comments concerned 'corrections' to the description of institutions (name, country, etc.).

2.6 Selection Process

Following the initial listing of institutions, a multi-step **selection and validation process** was implemented. Each institution was **independently reviewed** by designated members of the Task 5.1 team to assess its relevance based on the previously defined inclusion/exclusion criteria (see PRISMA-P protocol).

To manage this next phase of work, a second shared file — referred to as **Excel2** — was created. While **Excel1** documented the raw results of the search phase, **Excel2** served as the dedicated working file for storing the outcomes of the selection process and subsequent metadata attribution.

Institutions were assigned to one of **three levels of inclusion**:

- **Exclusion**: The institution did **not meet** the selection criteria (e.g. no activity in Europe, focus exclusively on marine environments, or no biodiversity data available).
- **Inclusion I**: The institution **fully met** the PRISMA-P-based criteria. All relevant information was recorded in **Excel2**.
- **Inclusion II**: The institution **partially met** the research criteria but was considered potentially useful for stakeholders. These were also recorded in **Excel2**, with **limited information fields** completed.

In parallel, each institution was classified into a category using a predefined standard classification (see section EC1 – Type of sources).

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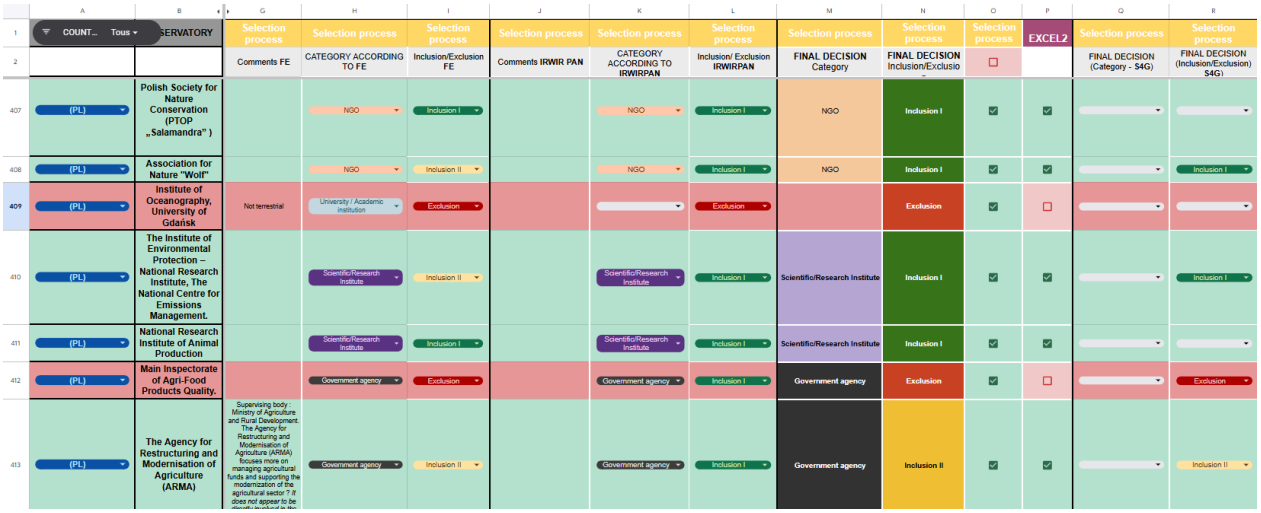
To ensure **consistency and transparency**, a methodological guide was prepared for all reviewers involved in the selection phase (*"Selection process guide" document*). This document outlined inclusion/exclusion rules, definitions, and categorisation guidance.

An institution was confirmed as "included" only after **two independent reviewers agreed** on both the inclusion level and the institutional category. In cases of disagreement, a **third evaluator** was designated to act as mediator and make a final decision after discussion.

Three project partners were involved in the selection process:

- **IRWiR PAN** and **Farm Europe**: responsible for primary review and classification;
- **S4G** (Space4Good): designated as the **final evaluator** in cases of disagreement.

This process helped ensure consistency in how institutions were assessed and contributed to the overall reliability of the BioMonitor4CAP institutional database. The workflow used for this process is illustrated in **Fig.3**, based on the structure implemented in **Excel1**.



	A	B	G	H	I	J	K	L	M	N	O	P	Q	R
1	COUNT... Tous	SERVATORY	Selection process	Selection process	Selection process	Selection process	Selection process	Selection process	Selection process	Selection process	Selection process	EXCEL2	Selection process	Selection process
2			Comments FE	CATEGORY ACCORDING TO FE	Inclusion/Exclusion FE	Comments IRWIR PAN	CATEGORY ACCORDING TO IRWIRPAN	Inclusion/ Exclusion IRWIRPAN	FINAL DECISION Category	FINAL DECISION Inclusion/Exclusio	☐		FINAL DECISION (Category - S4G)	FINAL DECISION (Inclusion/Exclusion) S4G)
407	(PL)	Polish Society for Nature Conservation (PTOP „Salamandra")		NGO	Inclusion I		NGO	Inclusion I	NGO	Inclusion I	☑	☑		
408	(PL)	Association for Nature "Wolf"		NGO	Inclusion II		NGO	Inclusion I	NGO	Inclusion I	☑	☑		Inclusion I
409	(PL)	Institute of Oceanography, University of Gdańsk	Not terrestrial	University / Academic institution	Exclusion			Exclusion		Exclusion	☑	☐		
410	(PL)	The Institute of Environmental Protection – National Research Institute, The National Centre for Emissions Management.		Scientific/Research Institute	Inclusion II		Scientific/Research Institute	Inclusion I	Scientific/Research Institute	Inclusion I	☑	☑		Inclusion I
411	(PL)	National Research Institute of Animal Production		Scientific/Research Institute	Inclusion I		Scientific/Research Institute	Inclusion I	Scientific/Research Institute	Inclusion I	☑	☑		
412	(PL)	Main Inspectorate of Agri-Food Products Quality.		Government agency	Exclusion		Government agency	Inclusion I	Government agency	Exclusion	☑	☐		Exclusion
413	(PL)	The Agency for Restructuring and Modernisation of Agriculture (ARMA)	Supervising body : Ministry of Agriculture and Rural Development. The Agency for Restructuring and Modernisation of Agriculture (ARMA) focuses more on managing agricultural funds and supporting the modernization of the agricultural sector ? It does not appear to be	Government agency	Inclusion II		Government agency	Inclusion I	Government agency	Inclusion II	☑	☑		Inclusion II

Fig. 3. Illustration of the conducted selection process within Excel1. **Source :** Excel1, T5.1, BioMonitor4CAP.

2.7 Institution Attributes

Once the initial listing of Agrobiodiversity institutions and the selection process were completed, the third phase of the work involved the **attribution of detailed metadata** to each included institution. This **data sorting** phase represented a key methodological step in the overall process. All sources selected and validated through the PRISMA-P protocol were systematically linked to a set of structured information fields, referred to as **"attributes".** This phase served a dual purpose:

1. **Stakeholder relevance:**
   The structured attribution of data provided a rich and detailed database, enabling

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stakeholders to access relevant, actionable information on institutions contributing to agrobiodiversity monitoring and the sustainability of European agricultural landscapes.

2. **Web platform development:**
   As part of the planned web-based directory, each institution was assigned a digital **"identity card"** composed of its core attributes. These profiles formed the basis for a searchable, user-friendly interface, where users can filter observatories by criteria such as geographic scope, institutional type, or biodiversity focus.

2.7.1 Definition of information to be collected (Attributes)

The first step in this phase consisted in defining the complete set of information (attributes) to be collected for each institution. The final structure of attributes was organised into **two main categories**:

1. **Basic institutional information**:
   Including structural and contact details such as name, website, country code, and organisational type.
2. **Thematic and technical details related to (Agro)biodiversity activities**:
   Including data types collected, indicator relevance, thematic focus, accessibility, institutional outputs, and collaborations.

The **level of inclusion** (I or II) determined the level of detail required:

- **Level I institutions** (fully included) were described using the complete set of attributes.
- **Level II institutions** (partially included) had only basic metadata recorded, limited to institutional identity and contact details.

This tiered approach ensured both **completeness and proportionality** in data collection, reflecting the varying relevance of each institution to the objectives of *BioMonitor4CAP*.

Information category	Inclusion level	Type of information provided
STRUCTURE INFO	Inclusion I & II	"Code Name", "Official Name (EN)", "Acronym", "Inclusion Level", "Official Name", "Category", "Type", "Specialisation", "Country", "Country Code"
CONTACT INFO	Inclusion I & II	"Website Link", "Contact Mail", "Contact Link", "Contact Phone", "Contact Link", "Website Language", "Website EN", "Head Office", "Map Location"
ORGANISATIONAL STRUCTURE	Inclusion I	"Administrative Top" , "Link To"
DESCRIPTION AND OBJECTIVES	Inclusion I	"Official Presentation", "Official Presentation (EN)", "Objectives", "Year of creation", "Resources Type", "Geographic Scope", "Keywords"
DATA AND INDICATORS	Inclusion I	"(Agro)Biodiversity Services", "(Agro)Biodiversity Ressources", "Tools & Technologies", "Data Access", "Database Portal", "(Agro)Biodiversity Indicators", "(Agro)Biodiversity Indicators (EN)"

Fig.4 *- Institutional attributes.* ***Source:*** *Excel2 BioMonitor4CAP. (See Part Excel2 - BioMonitor4CAP Institutions Network for more details).*

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2.8 Standardization of Fields

Once the list of institutional attributes had been defined, the team agreed to introduce a system of **partially standardised responses** to ensure consistency, clarity, and interoperability across the dataset. This approach helped to harmonise information entries and to facilitate subsequent data analysis, especially in fields such as geographical coverage or technical tools.

Predefined dropdown lists were created for selected fields. For example, the use of ISO codes and consistent spelling for **countries** was applied to avoid duplication and enhance data aggregation. Similarly, for technical fields such as "Tools and Technologies", a predefined list of options was established to standardise input. Below is a sample of standardised options used for that field:

- Remote Sensing
- Field sampling / Data collection
- Soil analysis
- Artificial Intelligence
- Plant and animal species recognition applications
- Genetic tools (eDNA)
- Indicators
- Sensor technologies
- Geographic Information Systems (GIS)
- Analysis software
- Modelling tools
- Statistical analysis
- Bioinformatics
- Genetic tools & technologies
- Digital tools & technologies
- Visualisation platforms
- Solutions for Data Processing Tools and Platforms
- Collaborative databases on agricultural biodiversity
- Solutions / technological innovations for the conservation / management of agrobiodiversity
- Information sharing networks between researchers / farmers
- Metadata management tools for databases
- Tools for disseminating research results and best practices
- Management platforms for sustainable agricultural practices
- Agro-technological solutions / innovations
- Data-driven farm management applications
- Traceability solutions for agricultural products related to biodiversity
  Performance indicators for new technologies in biodiversity
- Decision-support tools
- Simulation tools

The **complete set of response options** was not treated as static. Additions were made when necessary, depending on the characteristics of specific institutions encountered during the data

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completion phase. All proposed additions to dropdown lists were subject to **team validation**, ensuring that new entries did not duplicate existing categories and were clearly defined.

See Section *Excel2 - BioMonitor4CAP Institutions Network* for more details on predefined dropdown lists.

2.9 Database Construction

Excel2 was developed as the final, structured institutional registry resulting from the inclusion and attribution phases of Task 5.1. It contains detailed metadata on (Agro)biodiversity institutions, with entries classified as either **Inclusion I** (fully validated) or **Inclusion II** (partially validated).

The database was created in **Google Sheets format** to enable seamless integration with the **Looker Studio** platform. This format allows **real-time updates**, automated synchronisation, and user-friendly **data visualisation**.

The fields (attributes) collected in Excel2 were organised into two levels:

1) **Basic institutional information**: name, country, type, website, source
2) **Agrobiodiversity-specific metadata**: tools & technologies, indicators, etc.

To ensure **data consistency and comparability**, a system of **standardised dropdown lists** was introduced for selected fields (e.g. *Tools and Technologies*, *Country Codes*). These were collaboratively developed and validated by the WP5.1 team.

To guide all contributors, a **detailed methodological guide** (*"Filling Excel2 with Excel1 data" document*) was prepared, outlining:

- The structure of Excel2;
- Attribute definitions;
- Instructions for standardised data entry;
- Examples of correct formatting.

The **data entry task** was distributed among Task 5.1 partners based on:

- Country allocation (as in the initial search phase);
- Linguistic competence;
- Estimated workload, which varied by the number of institutions per country.

This collaborative and structured approach ensured that the database met the technical and scientific standards of the BioMonitor4CAP project while also supporting the **usability** of the planned web platform and ensuring **interoperability** with related initiatives.

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PARTNER	Work Effort (%)	Theoretical number of Institutions	Countries distribution	Total Institutions	Progress
IRWIR PAN	*0,6*	284	Poland; Romania; Bulgaria; Ireland; Italy; Cyprus; Hungary; Malta; Slovenia; Czechia; Estonia; Latvia; Lithuania; EU	197	☑
FE	*0,2*	67	France; Belgium; Spain; Finland; Greece	116	☑
S4G	*0,05*	17	Netherlands; Luxembourg	26	☑
CUAS	*0,05*	17	Austria; Coratia; Slovakia	26	☑
UCSUR	*0,05*	17	World	36	☑
F4S	*0,05*	18	Portugal; Sweden	29	☑
DLG	*0,05*	18	Germany; Denmark	32	☑

Table. 1. *Distribution of work by country within Team 5.1 for completing Excel2.* ***Source:*** *Excel1, Task 5.1 BioMonitor4CAP.*

2.10 Web Interface Design (Looker Studio)

As part of Task 5.1, the team initially planned the development of a fully dedicated website to host and visualise the directory of agrobiodiversity institutions across Europe. Several meetings were held with web designers, and a technical requirements document was created to outline the interface expectations — including advanced filters, dynamic visualisation, interactive mapping, and integration of institutional metadata. However, following internal discussions and analysis of the financial implications, it was concluded that the project budget could not support a custom-built web platform for WP5.1.

As a result, the team opted for an alternative solution: **Looker Studio** — a web-based data visualisation tool provided by Google. This choice was unanimously agreed upon by WP5.1 partners due to its multiple advantages:

- **No additional cost**, as Farm Europe (Task 5.1 lead) already held access
- **Direct integration with Google Sheets (Excel2)**, allowing real-time data synchronisation
- **Automated updates**, so changes in the source database are reflected on the dashboard
- **Advanced filtering options** to query institutions by country, type, AgroBiodiversity focus, etc.
- **Interactive mapping**, enabling users to visualise the geographical spread of observatories
- **Customisable dashboards**, easy to read and share, including charts, tables, and visual profiles

To facilitate user navigation and access to relevant information, the interface incorporates a **structured organisation system** based on the "attributes" developed during the database phase. These include:

- **Keywords**, highlighting the main topics, tools or roles of each institution
- **Standardised categories**, such as country, type, tools used, and thematic orientation
- **Filter options**, allowing users to search and refine results by multiple criteria

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One of the core components of the platform is the visual **highlighting of "Top Institutions"**, based on two criteria:

- **Top Administrative**: assigned manually by the country lead partner to institutions holding a significant position in national-level administrative or policy frameworks. These are typically institutions that play a central coordinating role and would be strategic for European-level engagement.
- **Top Agrobiodiversity**: automatically assigned to any institution with a clear and declared specialisation in Agrobiodiversity, based on metadata and keyword annotations.

These statuses help users quickly identify key institutions and are displayed with differentiated visual indicators on both the dashboard and the map.

In addition, the interface includes several essential visualisation features:

- **Charts and summary tables**, giving overviews of institutional types, geographic distribution, and tools used
- **Interactive map**, providing a geographic view of institutions across Europe, with clickable elements leading to detailed profiles
- **Visual distinction of "Top Institutions"**, improving strategic analysis and decision-making

While Looker Studio does not support two-way communication (e.g. discussion forums), it fulfils all the essential dissemination and analysis requirements of WP5.1. Moreover, it allows **embedding into partner websites**, expanding the visibility and accessibility of the results.

Web interface design brief, see section 6.3 Looker Studio).

2.11 Institutional Feedback Forms

As the final phase of the data collection workflow, the WP5.1 team developed two tailored questionnaires on **Google Forms** to engage directly with the listed institutions. These tools aim to validate the existing dataset and collect new, relevant information related to Agrobiodiversity.

- The **Agrobiodiversity Form** is designed to collect detailed qualitative and quantitative data on institutions' expertise, tools, and ongoing work in Agrobiodiversity monitoring.
- The **Verification Form** enables institutions to confirm or correct the data already recorded about them in the Excel2 database.

Both forms are personalised and distributed automatically via email, using the contact information gathered during the initial research phases. Institutions receive a direct link to the Agrobiodiversity Form and are invited to proceed to the Verification Form upon completion.

These tools are essential not only for improving data quality, but also for establishing active links between the project and potential long-term partners in the European Agrobiodiversity network.

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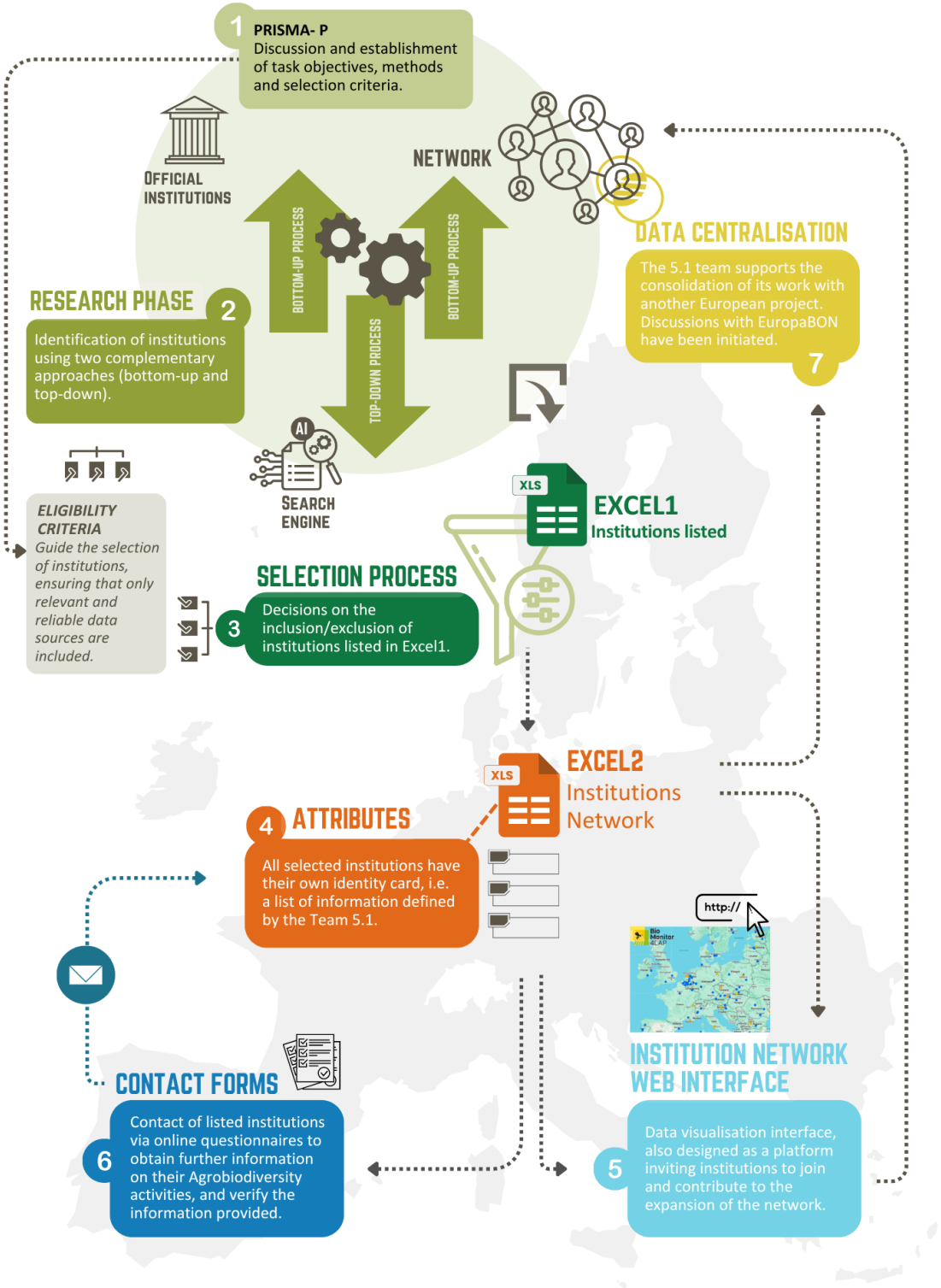

Infographic.1. *Work flow and stages of Task 5.1 BioMonitor4CAP.* ***Source:*** *Task 5.1, BioMonitor4CAP.*

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3. RESULTS AND MAIN CHALLENGES

3.1 Summary of Outputs

The key results of Task 5.1 include the creation of a comprehensive institutional database (Excel2), a dynamic online interface using Looker Studio, and dedicated outreach tools to improve engagement and data accuracy.

- **Excel2** serves as a centralised registry of institutions relevant to Agrobiodiversity monitoring across Europe. It contains structured metadata, standardised fields, and includes both fully and partially validated entries based on inclusion level.
- The **Looker Studio**-based website transforms this database into an accessible, interactive online platform. It features structured categories, advanced filters, keyword searches, geographic visualisation through an interactive map, and highlighting of priority institutions using "Top Administrative" and "Top Agrobiodiversity" markers.
- To complement the database and interface, the team developed two dedicated **Google Forms**: the Agrobiodiversity Form, collecting detailed thematic and technical information from institutions, and the Verification Form, allowing institutions to review and correct their profiles. These personalised forms are distributed via email and feed directly into the refinement of the dataset.

Together, these outputs constitute both the technical infrastructure for ongoing institutional mapping and the strategic mechanism for stakeholder engagement. More details on the feedback tools are available in Section II.j.

3.2 Key Statistics

This section presents a statistical overview of the research and validation process conducted under Task 5.1. The figures offer a quantitative synthesis of the methodologies used (top-down vs. bottom-up), the types and distribution of institutions identified, and the diversity of their thematic specialisations. These data provide essential context for evaluating the scope, coverage, and methodological choices underpinning the institutional mapping exercise and form the basis for future analysis, engagement, and integration efforts.

3.2.1 Statistics on the research phase and initial list of institutions

The 571 institutions listed in the Excel1 database were mainly identified through online research (top-down approach), existing databases (such as EuropaBON), and the knowledge and networks of the BioMonitor4CAP consortium. Approximately 70% *(69,7%)* of institutions were identified through a top-down research approach (online searches). The overall distribution of institutions by type of research process is shown in **Fig. 6.**

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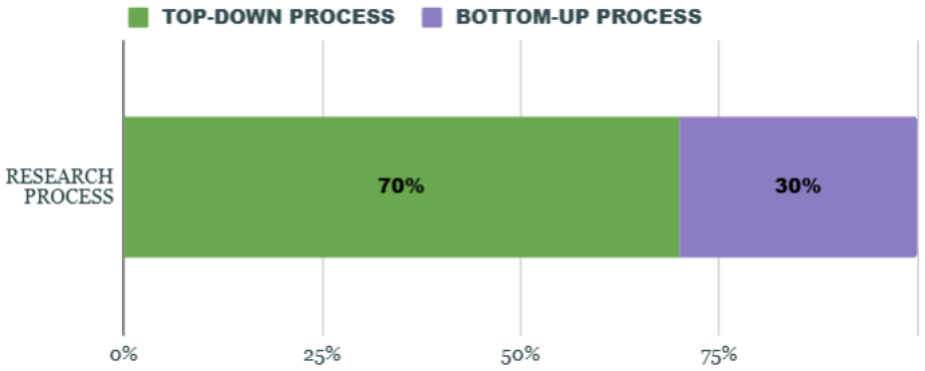

Fig.6. Distribution of institutions by type of research process (Top-down and Bottom-up). **Source:** Excel1 Statistics, Task 5.1, BioMonitor4CAP.

It should be noted that the statistics only take into account the source that enabled an institution to be identified for the first time. Thus, if an institution was found through several search channels, only the first used channel is retained.

Top-down research produced the majority of results, with Google search engine leading the way, identifying 34% of institutions. This is a logical and consistent result, as Google was the search engine used in the first phase of the research. Microsoft Edge Bing search engine, used during the additional research, proved its effectiveness, identifying 13% of institutions, highlighting the value of a double search. ChatGPT contributed to the identification of 23% of institutions. It should be noted that we took a very cautious approach with this tool: its main role was to guide the search, and each piece of information provided by ChatGPT was carefully verified before being included.

With regard to the bottom-up process, existing networks (online databases) and the knowledge and contacts of the BioMonitor4CAP consortium were mobilised, enabling 30% of the listed institutions to be identified. It should be noted that at this stage, very few institutions have been added from official lists provided by official institutions (a few have been added via national directories). Before approaching these structures, it was essential to build an initial map based on exploratory research, using available resources, internal knowledge and open databases. This initial research phase laid the foundations for the targeted European institutional landscape and structured a coherent database, ahead of the validation and expansion work.

With this in mind, a new stage is now beginning: a new bottom-up process that will involve directly contacting the institutions already listed to present the initiative, verify the data collected and, above all, identify any relevant institutions that may have been omitted. This dynamic of spontaneous enrichment of the network will enable it to be expanded in a more collaborative manner, without requiring too much manpower or time.

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RESEARCH PROCESS	Number of listed institutions by source	%
TOP-DOWN PROCESS	**398**	**70%**
Google	192	34%
Microsoft edge	73	13%
Chat GPT	133	23%
BOTTOM-UP PROCESS	**173**	**30%**
Network *In wich :*	167	29%
Bio4CAP Network	*32*	*19%*
EuropaBON	*83*	*50%*
GEO BON	*16*	*10%*
IUCN SSC	*20*	*12%*
SBIF advisory group	*10*	*6%*
Official Institutions	6	1%

Fig. 7. Distribution of institutions by type of research process (Top-down and bottom-up). **Source:** Excel1 Statistics, Task 5.1, BioMonitor4CAP.

The listing of institutions is based on **two phases of research:**

- The **first phase** involved a demanding and time-consuming **top-down** approach, combined with a bottom-up approach. It was mainly based on exploratory research, combining online resources, internal expertise and consultation of open databases. This step laid the foundations for the European institutional landscape by structuring a coherent and usable first version of the database.
- The **second phase**, scheduled **after the deadline of Deliverable 5.1**, will continue with a **bottom-up** approach. It will consist of directly contacting the institutions already listed in order to verify existing data, enrich it based on feedback received, and spontaneously identify new relevant actors. This second phase, once initiated, requires less human resources, as the institutions themselves become spontaneous contributors to the process.

3.2.2 Cross-Referencing results

Analysis of the institution inventory shows that **25% of institutions were identified by more than one source*** (See Excel1 Statistics). If cross-checking was not a selection criteria, but intended to analyse the institution research process, his relatively low rate would ideally have been higher to strengthen the robustness of the research process.

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**counting only European institutions whose final status was Inclusion I or II.*

The double-checking system and the BOTTOM-UP and TOP-DOWN processes were implemented to improve the reliability of the research and, above all, to **ensure complementarity** between the different processes.The low level of redundancy therefore highlights the complementarity of the research processes.

It should also be noted that calls for contributions, particularly within the BioMonitor4CAP consortium, generated a limited number of responses. Few proposals were made to add new institutions to the initial list. This low response rate may suggest that the list of institutions established at the outset was already relatively exhaustive. As a result, the low number of responses means that there are few cross-checks or multiple sources for some institutions. This may highlight two observations: on the one hand, the initial list appears to have captured a majority of visible institutions in the sector; on the other hand, the lack of significant responses limits cross-validation between sources. It is therefore difficult to strike a conclusion between the need for complementarity and redundancy of the research results.

Thus, the 25% institutions identified by more than one source, which may reflect the core of the visible network, highlights the importance of a research approach combining multiple sources. It also highlights the **need to continue the direct contact phase with the institutions identified** to confirm and enrich the data collected (see section IV.c Provisional Validation Measures).

3.2.3 Statistics on the final list of institutions and their information

The post-selection phase consisted of completing the second Excel table (referred to as Excel2) by entering all the pre-selected institutions (inclusion level I or II), as well as various descriptive information on each validated institution (see section 6.2 Excel2).

This Excel2 file is the final version of the network of institutions identified. It includes 370 institutions recorded as of the deadline in May 2025. It should be noted that this list does not yet include non-European institutions (Extra-EU), which are still being evaluated as part of the selection process.

The high number of institutions recorded reflects a deliberately inclusive approach, based on a broadening of the selection criteria. This methodological choice was made to maximise the coverage of institutions likely to have relevant information or expertise in the context of the project's objectives.

3.2.4 Composition of the BioMonitor4CAP Institutions Network

The breakdown of institutions according to their geopolitical status is as follows:

- **75%** of the institutions belong to European Union Member States (EU27).

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- **15%** are European institutions, i.e. bodies directly under the European Union (European agencies, etc.). *Example: Joint Research Centre (JRC)*
- **9%** are international organisations, i.e. institutions located outside the European framework, such as United Nations agencies, major international NGOs, etc. Although some of these institutions are not based in the European Union, they may have expertise or access to sectoral data of interest to the project.

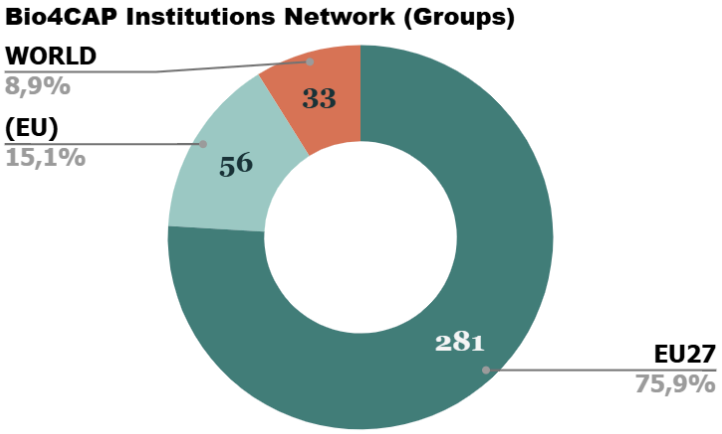

Fig.8. Distribution of the BioMonitor4CAP institutions network by type of group . **Source:** Excel2 Statistics.

3.2.5 Geographical distribution of the 271 institutions within the EU Member States

A total of **281 institutions were identified across the 27 Member States** of the European Union. However, as shown in the chart below (Fig.9), this distribution is highly uneven. Some countries, such as France (44 institutions), the Netherlands (18) and Germany (16), have a high number of institutions listed, while others, such as Hungary (3), Lithuania (3) and Slovakia (4), are much less represented.

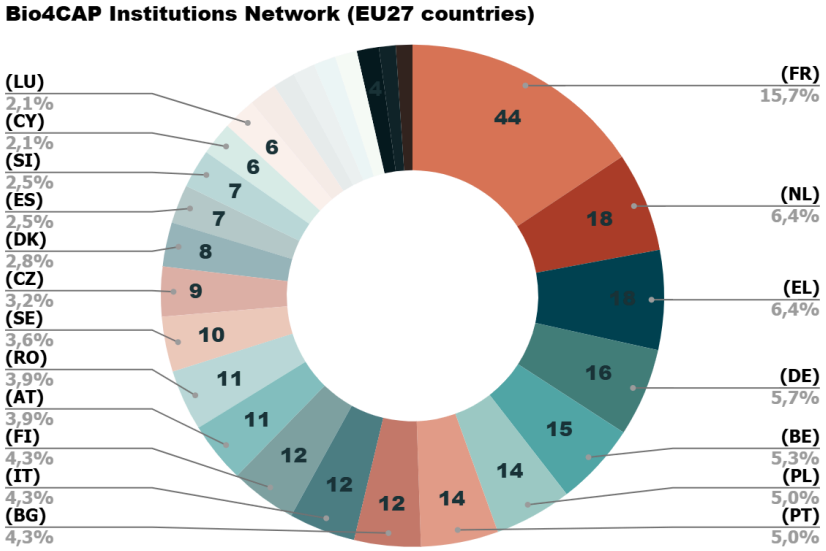

Fig. 9: Distribution of the BioMonitor4CAP EU27 institutions network by

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countries . **Source:** Excel2 Statistics.

Several factors explain this disparity:

- **Methodological bias:** Although each country was reviewed by two separate partners as part of the double-checking process, and final validation was carried out by a panel of three people, the identification of institutions remains influenced by the profiles of those involved. Their prior knowledge of the country, their sensitivity to local administrative structures or their thematic experience inevitably introduce a bias in the identification of relevant institutions.
- **Linguistic and cultural familiarity:** The team responsible for task T5.1 did not include native speakers for all member countries. It is also significant that the countries represented in the team (France, the Netherlands, Poland, Germany, Portugal and Austria) are all among those with the most institutions identified. This reflects a structural bias linked to language and cultural familiarity, which facilitates access to information, understanding of institutional systems and, consequently, the comprehensiveness of the inventory.
- **National administrative complexity:** Some countries have particularly complex administrative structures, which tends to increase the number of institutions identified. This is particularly the case in France, where national institutions are often linked to regional or local entities, which themselves have projects or specialised agencies. This institutional stratification has been partially taken into account in the 'link_to' column (see section XX), which allows hierarchical or functional relationships between entities to be noted.
- **Institutional weight and country size:** Finally, it is logical that some countries, due to their size, political weight or level of institutional development, have a higher number of actors that are potentially relevant to the project. This may reflect a denser administrative ecosystem and a stronger historical involvement in the themes covered by the project.

The distribution of institutions by country reflects both national institutional differences and biases related to the selection process (language, local knowledge, administrative complexity). Contact with these listed institutions should then naturally expand the network, ensuring comprehensive and relevant coverage of the institutional landscape, particularly in countries less familiar to the project team.

3.2.6 Classification of listed institutions

The final network identified includes a variety of institutional categories. This diversity reflects both the actual complexity of the institutional landscape and methodological factors (mentioned above).

"Data consortium / and Collaborative Platforms" are the most widely represented category, accounting for nearly **21%** of the institutions recorded. These structures reflect attempts to facilitate access to data, centralise it and promote its sharing. This multiplication of initiatives, although driven by a desire for coordination, can lead to the creation of a dense network, which paradoxically tends

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to fragment it. It can be difficult to clearly identify centralisation points. This lack of clarity affects both users and data managers, who can find themselves lost in the diversity of existing structures, exposed to redundancies or overlapping initiatives.

In this context, the T5.1 team hopes that the expanded BioMonitor4CAP network will help map the current landscape, clarify interconnections, and improve the visibility of institutions within a particularly dense network.

Furthermore, **this reflection highlights the need for integration and harmonisation of the BioMonitor4CAP network with broader initiatives. The aim is to contribute to the centralisation of information, avoid the creation of an additional isolated platform, and thus limit the risk of dispersion or redundancy.** (see part 5.3 Recommendations for continuity)

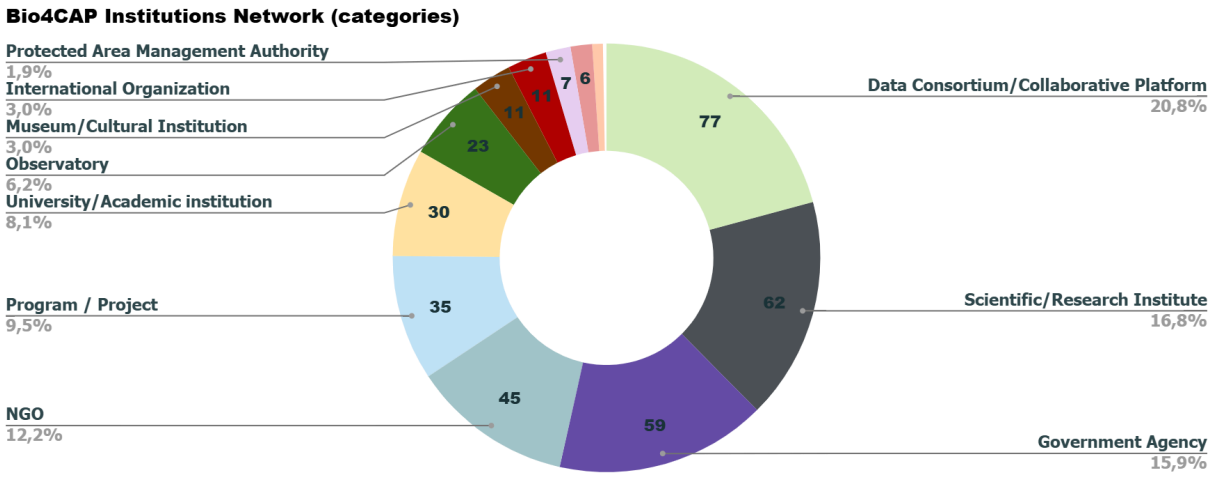

Fig. 10. Distribution of the BioMonitor4CAP EU27 institutions network by categories . **Source:** Excel2 Statistics.

3.2.7 Analysis of the specialisations of the institutions recorded

An examination of the specialisations listed for the institutions reveals a trend that confirms the need to establish a broader network.

- **Low reported specialisation in "Agrobiodiversity":** Few institutions were explicitly identified as specialising in "Agrobiodiversity", only 2%. This specialisation, which is central to our research, is under-represented as a direct mention of specialisation.
- **Predominance of references to the environment and biodiversity:** The vast majority of institutions are identified as specialising in broader fields such as "Biodiversity" (26%) and "Environment" (19%).

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Few institutions explicitly identify themselves as specialising in Agrobiodiversity, often falling into broader categories such as “Environment” or “Biodiversity”. However, the absence of formal specialisation does not preclude potential contributions to the field of Agrobiodiversity. Indeed, detailed analysis of the activities of many institutions with little specialisation reveals that their expertise, data and contributions have significant potential in the Agrobiodiversity field. This finding justifies the choice of a broad network, as limiting the selection to only explicitly specialised institutions would have considerably restricted the panel. By including institutions classified as “Environment” or “Biodiversity”, we included key institutions whose potential contributions to Agrobiodiversity go beyond their official specialisation.

For example, in France, the French Biodiversity Agency (OFB) does not present itself as specialising in Agrobiodiversity, but rather in biodiversity in the broadest sense. However, it holds advanced Agrobiodiversity indicators. If we had not included it initially on behalf of not being formally specialised, we would have missed out on a major source of expertise and data.

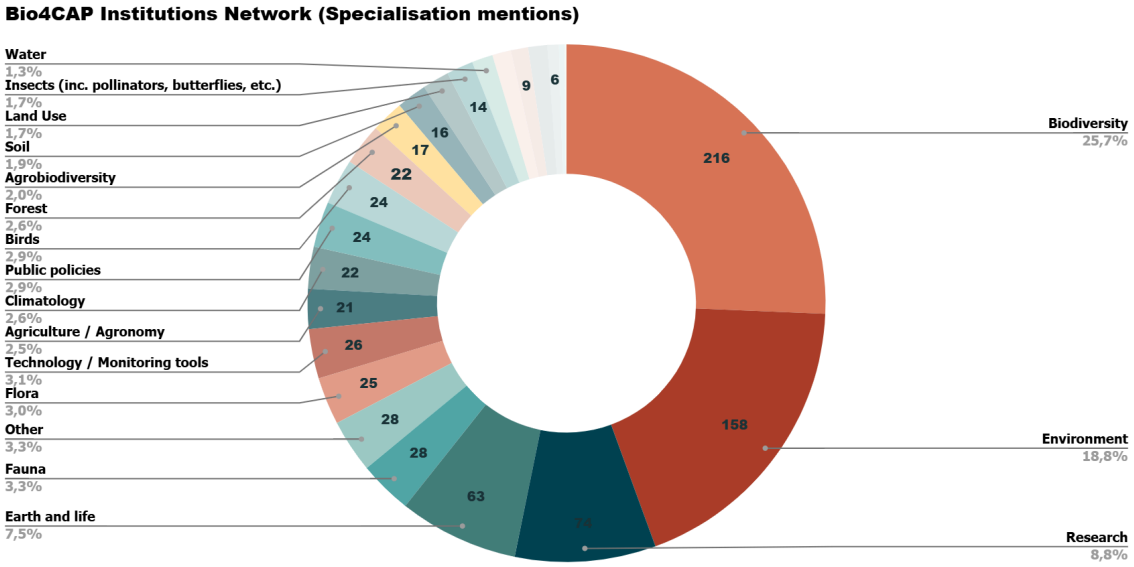

Fig. 11. Distribution of the BioMonitor4CAP EU27 institutions network by specialisation . **Source:** Excel2 Statistics.

It should be noted that the specialisations were provided by the T5.1 team, sometimes based on personal interpretation or assessment, as the specialisations were not specifically stated in writing by the institutions.

Furthermore, some institutions have several specialisations (e.g. ‘Biodiversity’ + ‘Soil‘ + ‘Agriculture’), which is why the total number of specialisations exceeds the total number of institutions. This methodological choice was made in order to capture the multidisciplinary nature of the actors, thus avoiding reducing the thematic scope of the institutions.

Box 5 - Conclusion on **Key Statistics**

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The BioMonitor4CAP network includes 370 institutions, mainly from EU Member States (75%). This expanded network reflects a broad inclusion strategy justified by the low level of explicit specialisation in Agrobiodiversity (only 2%). Most institutions claim to work in broader fields such as the environment or biodiversity, while possessing data/information/expertise that is mostly relevant to the field of Agrobiodiversity.

3.3 Challenges Related to the AgroBiodiversity Focus

As the statistical analysis indicates, a limited number of institutions explicitly self-identify as being specialised in the field of Agrobiodiversity. As noted in earlier sections, the WP5.1 team made a deliberate methodological choice to adopt a broad and inclusive approach, listing institutions that could potentially contribute to Agrobiodiversity monitoring — even if not explicitly labelled as such.

This decision led to a high number of institutions being identified, reflecting the fragmented and multidisciplinary nature of biodiversity-related efforts across Europe. Two primary challenges emerged from this outcome:

- **Structuring and organising the results**: Given the large number and heterogeneity of institutions, it was necessary to implement a structured system that would allow for meaningful analysis of their relevance and potential contribution. This required the assignment of standardised attributes and filtering criteria.
- **Qualifying institutional links to Agrobiodiversity**: In many cases, the available institutional descriptions were insufficient to clearly determine Agrobiodiversity relevance. Therefore, the team applied a "potential-level" qualification strategy — interpreting available data (e.g. through reference to remote sensing, ecosystem services, etc.) and assigning relevance based on indirect indicators.

This approach, while necessary, also introduced limitations in precision and highlighted the need for direct institutional validation. The feedback forms developed in Task 5.1 are expected to help refine and confirm these potential links and improve the dataset's reliability over time.

The broad inclusion strategy remains one of the central trade-offs of the methodology: it allowed for comprehensive mapping, but also introduced complexity in assessing thematic alignment with the core focus of the *BioMonitor4CAP* project.

Box 6 - Conclusion on Challenges Related to the Agrobiodiversity Focus

The deliberate choice to include a broad range of institutions led to a large number being listed, for which identifying potential links to Agrobiodiversity proved to be complex.

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It was essential to design a clear, interactive, and user-friendly interface to present the extensive dataset effectively. Additionally, a complementary process will be required to collect more detailed and validated information about the connections between listed institutions and Agrobiodiversity, aiming to achieve a higher level of accuracy and reliability.

3.4 Challenges Related to Institutional Interlinkages

A significant challenge faced by the WP5.1 team concerned the complex interrelationships between institutions. The inclusive methodological approach adopted by the team — incorporating observatories, programmes, collaborative platforms, and research projects — revealed a networked ecosystem with overlapping roles.

For example, a programme (e.g. Program A) might be the joint initiative of Institution B and Institution C. This raised a structural question: should only the programme be listed, or all participating institutions? Omitting any element could obscure important data contributions; listing them all risked redundancy and inflating the dataset.

One proposed solution involved referencing institutional initiatives (e.g. “Institution B is part of Program A”) within the descriptive field, without generating separate entries. However, this strategy proved impractical due to the complexity of governance structures and the variability of publicly available information. Exhaustively documenting administrative hierarchies or partnership relations would have required significant additional resources and was not feasible within the scope of Task 5.1.

To address this, the team adopted a pragmatic strategy: all relevant entities (e.g. programs, institutions, projects) were listed independently in the database. A dedicated metadata field — **"link to"** — was introduced to indicate known relationships between entries without attempting to define the nature of those links (e.g. governance, coordination, collaboration). This approach preserved the richness of the network while enabling future users of the data to navigate and interpret the institutional landscape more effectively.

3.5 Metadata Gaps and Interpretation Limits

One of the most persistent challenges encountered during Task 5.1 was the limited availability of detailed and structured information on institutional websites. In many cases, institutional webpages lacked explicit descriptions of data activities, thematic specialisations, or technological tools used in the field of Biodiversity or Agrobiodiversity. This information gap made it difficult to fully assess the relevance and scope of each institution’s contribution to the objectives of *BioMonitor4CAP*.

As a result, the team occasionally had to rely on indirect interpretations or speculative associations. For example, if a website mentioned remote sensing or species monitoring without elaborating on agricultural relevance, the team made an informed assumption that the institution might contribute

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to Agrobiodiversity monitoring. This approach, while pragmatic, introduced limits in accuracy and required careful documentation.

To address this limitation and improve the robustness of the database, the project team initiated a validation phase involving direct institutional outreach (see Section 2.11 Institutional Feedback Forms). The personalised Google Forms—sent to institutions listed in Excel2—are intended to refine, correct, and supplement the available metadata. This step is crucial not only for improving data reliability but also for establishing more dynamic and lasting connections with stakeholders across Europe.

3.6 Validation Tools: Forms

The two Google Forms developed as part of Task 5.1 play a strategic role in validating and Their purpose within the results phase is threefold:

- To collect detailed, standardised data from listed institutions on their Agrobiodiversity activities and expertise;
- To verify and correct existing information already collected through top-down and bottom-up approaches;
- To initiate a direct engagement process with institutions across Europe, laying the groundwork for future collaboration.

These tools are critical to improving the quality, depth, and credibility of the WP5.1 outputs, and their responses will be used to update the database and inform the ongoing development of the web-based platform.

3.7 Pending Feedback from EC

This section acknowledges the expected feedback from the European Commission, particularly regarding the structure and scope of the institutional directory developed in Task 5.1. While no formal input had been received from the Commission at the time of writing, a feedback mechanism remains open, and the WP5.1 team is prepared to incorporate any recommendations or revisions following review.

The outcomes of this exchange will be used to refine the dataset and improve alignment with policy priorities and future use cases. Any such feedback and corresponding adjustments will be reported in future project deliverables or updates to the online platform.

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4. IMPROVEMENTS AND STRATEGIC ADJUSTMENTS

This section focuses on adjustments made during Task 5.1 to overcome technical and methodological challenges identified throughout the research and implementation process. These adjustments improved usability, stakeholder engagement, and long-term relevance.

4.1 Interface Adjustment

The project initially considered building a custom-designed website to display the results of Task 5.1. However, following several meetings with designers and budget consultations, this approach was deemed financially unfeasible. The team opted for an alternative solution: Looker Studio. This tool allowed full integration with the Excel2 database hosted in Google Sheets, enabling automated updates, custom visualisation, and geographic mapping. The Looker Studio-based website was selected unanimously due to its low cost, real-time synchronisation, and ease of sharing and embedding across partner websites.

4.2 Directory Network and Exchange Platform

Another key aim of Task 5.1 was to create a directory network of biodiversity observatories in Europe. This directory is not only a structured registry (Excel2) but also a strategic tool to enhance collaboration and communication between institutions engaged in Agrobiodiversity efforts across the continent.

A complete directory is now available via the Looker Studio interface, bringing together the institutional contacts and information gathered throughout the project. This platform serves as a central reference point for accessing data, expertise, and facilitating institutional engagement.

To take this a step further, the WP5.1 team envisioned a simple and accessible channel for exchange—such as a contact email or Google Form integrated directly into the platform interface—to enable feedback, suggestions, and contributions from users. This type of light-touch mechanism was considered more sustainable and goal-oriented than a full online forum, which would require ongoing moderation and could invite broader, less focused debate. A user-friendly contact link could encourage targeted input from stakeholders and support continued refinement and expansion of the institutional network.

However, due to the technical and financial constraints of Task 5.1, such an interactive communication system could not be implemented. The functionalities required for this type of network exceed the capabilities of Looker Studio, which is designed primarily for data visualisation and reporting.

Nonetheless, **the team encourages future development of this platform in upcoming phases or projects. It is believed that such an initiative would not only encourage greater participation in the network, but also enhance data quality and strengthen the long-term sustainability of collaborative monitoring frameworks. The team recommends including this platform in future work packages or related projects, as it could significantly enhance cooperation and stakeholder engagement.**

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4.3 Provisional Validation Measures

Recognising the challenges related to incomplete metadata and unclear institutional links to Agrobiodiversity, the WP5.1 team developed two Google Forms to initiate direct feedback from listed organisations. These forms — the **Agrobiodiversity Form** and the **Verification Form** — support stakeholder involvement, enable corrections and refinements, and serve as a mechanism for ongoing improvement. In addition to their role in data validation, these tools can also be reframed and promoted as a primary contact channel for users of the platform, offering a simple and sustainable means of communication. Their use also addressed methodological gaps linked to data interpretation, especially when institutions' online presence lacked explicit content.

4.4 Managing Institutional Interlinkages

A specific challenge involved the frequent overlaps between programmes and institutions. Rather than oversimplify these connections or risk data loss, the team added a "link to" field to the database. This enabled relational mapping between entries while preserving the distinct identity of each institution or initiative. This solution facilitated richer analysis without inflating the dataset or introducing redundancy.

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5. POST-PROJECT VISION AND RECOMMENDATIONS

While Task 5.1 concludes with the delivery of a functional database and interactive web interface, its ultimate value depends on continued use, integration, and expansion. This section outlines the vision and strategic recommendations for the post-project period.

5.1 Post-Task 5.1 Management

The outputs of Task 5.1—including Excel1, Excel2, response forms, and the Looker Studio interface — have been structured for longevity. These resources can be maintained indefinitely due to their no-cost technological setup.

To ensure sustainability:

- **IRWiR PAN** will coordinate ongoing maintenance of the institutional directory, including managing stakeholder responses received via the integrated Google Forms. These forms will also serve as the main channel for external feedback and suggestions related to the platform.
- **Farm Europe** will be responsible for the technical maintenance of the Looker Studio interface, ensuring that updates or changes to the data or functionality are implemented as needed.

All documents are stored on a secure shared drive accessible to both core partners.

5.2 Strengthening Post-Project Infrastructure

The institutional directory and associated tools developed during Task 5.1 have the potential to evolve into a long-term asset for the European Agrobiodiversity community. While no formal branding or network identity is proposed at this stage, the structure is designed for integration into broader collaborative efforts.

The WP5.1 team emphasises the importance of sustained accessibility, stakeholder engagement, and low-cost technical maintenance. Continued use of the shared Google Sheet and Looker Studio dashboard — hosted respectively by IRWiR PAN and Farm Europe — offers a practical way to ensure continuity. With low resource needs, this infrastructure can remain active after the project's end.

The system allows for progressive enrichment through new institutional submissions and validation forms. The approach is scalable and adaptable, allowing for future integration with larger biodiversity data infrastructures.

Team 5.1 worked in collaboration with other European initiatives, notably with the **EuropaBON** consortium. The team incorporated work from this cooperation, such as the **AgroEBVs**, developed on the basis of **essential biodiversity variables (EBVs)** within the framework of **WP1**. This collaboration influenced the structure of our own indicator mapping and the design of the associated Google forms.

In addition, discussions have taken place within the BioMonitor4CAP consortium to ensure consistency between task 5.1 and the related work packages. These exchanges confirm that WP5.1 is

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not a stand-alone element, but part of a broader interoperable framework, aligned with the efforts currently funded by the European Union.

A meeting was also organised with EuropaBON to examine the possibility of bringing the work of the BioMonitor4CAP network closer to that of EuropaBON. Although these discussions are still at an exploratory stage, the EuropaBON team has expressed a keen interest in centralising and interconnecting data with BioMonitor4CAP. In this context, the need to harmonise the BioMonitor4CAP database was raised. This is likely to involve a significant amount of work, raising practical questions about who will take responsibility for this and when. These technical and logistical aspects will need to be explored further once initial feedback on this task has been received from the European Commission.

Recognising the overlap between networks and the need to maximise synergies, the team fully supports the idea of a future merger or interconnection of the results of WP5.1 with existing infrastructures, such as those of EuropaBON. This approach aims to:

- **Avoiding duplication and fragmentation** across European biodiversity databases
- **Supporting policy coherence** and better data discoverability
- Leveraging **shared indicators** (EBVs, AgroEBVs) across projects

The shared interest in harmonising metadata standards and directory structures reflects a common goal: to improve the biodiversity monitoring landscape in Europe in a coordinated manner.

5.3 Recommendations for Continuity

Team 5.1 supports the merging of its work with another institution/project:

- Expand the database incrementally via institutional feedback loops;
- Use the Looker Studio and Google Forms model as a light but scalable infrastructure;
- Foster long-term connections with key institutions identified in WP5.1.

This strategy ensures that Task 5.1 results remain dynamic, relevant, and well-connected to the evolving European Agrobiodiversity policy landscape.

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6. USER GUIDE: UTILIZATION OF TOOLS DEVELOPED UNDER TASK 5.1

This section aims to detail the structure of the various documents produced as part of task 5.1. for their proper use.

Four main tools were developed as part of task 5.1:

1. **Excel1 –** This file centralises all the institutions identified during the research phase. It contains information related to the research and the selection process (inclusion/exclusion, etc.).
2. **Excel2 –** Final network of institutions. This file groups together all the institutions selected during the selection process. In this file, each institution is associated with information (country, contact details, specialisation, etc.).
3. **Looker Studio** – An interface that allows you to view the network of validated institutions in the form of an interactive map, with filters, etc. This tool facilitates the exploration, presentation and analysis of the network.
4. **Questionnaires –** Tools for collecting information from the listed institutions. Two separate questionnaires have been designed using Google Forms:
   - ➢ Form N°1: designed to better target institutions with relevant data on Agrobiodiversity.
   - ➢ Form N° 2: designed to allow listed institutions to verify, complete or correct the information concerning them.

6.1 Excel1 – Institution reference and selection file

Excel file 1 is the initial database of institutions identified during the research phase. It plays a central role in the selection process, bringing together reference data, evaluation decisions and monitoring of transfers to the final database (Excel2). This file is structured to ensure data harmonisation, decision traceability and an efficient selection process.

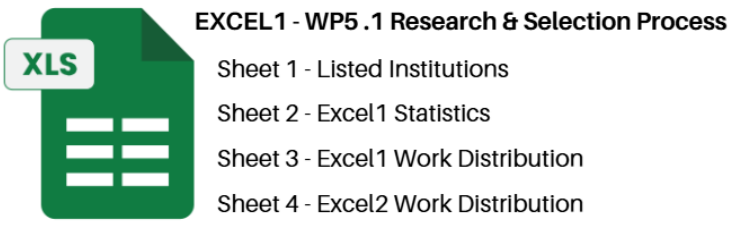

Fig. 12. *Structure of Excel1 sheets.*

6.1.1 Sheet 1 - Listed Institutions

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This page lists the institutions and information relating to their research. It is organised into two main sections:

1. General information about the institution

- **Country code** (Column A): country code for the institution's country *(selected from a drop-down list).*
- **Name of the institution** (Column B)
- **Description** (optional) (Column D): Brief presentation of the institution (activities, mandate, themes), to inform selection decisions.
- **Selection process** (Column E-J): Farm Europe and IRWiR PAN decision: comments, classification (type of institution) and proposed decision (Inclusion I, Inclusion II, Exclusion).
- **Final decision** (Column O-P): S4G decision in the event of disagreement between the two previous assessors.
- **Final status** (Column K-N): Automatic, indicating whether the selection process is finalised for the institution and the final decision.

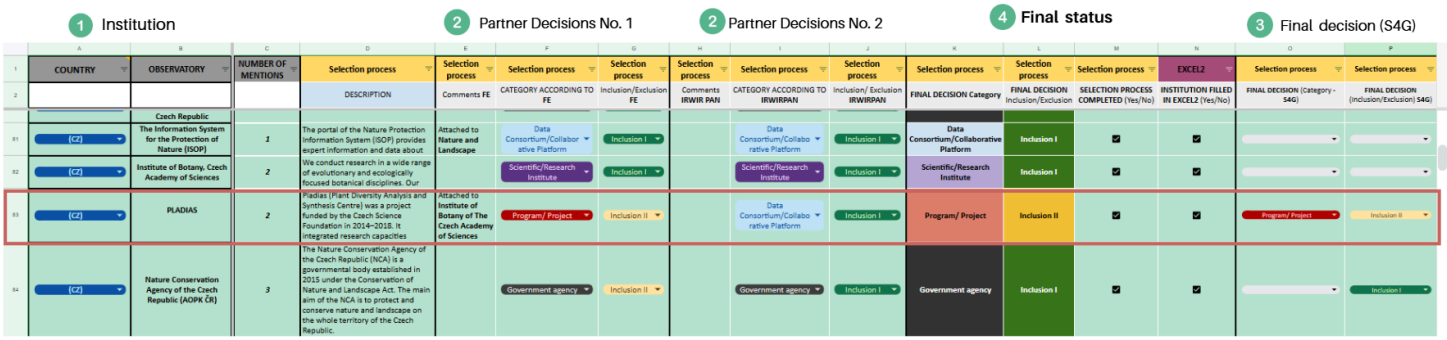

Figure 13 *- File structure and example of selection process. Source : Excel1, Task 5.1 BioMonitor4CAP.*

1. *The Czech institution PLADIA has been listed.*
2. *FE and IRWIRPAN have entered two different decisions: there is a disagreement.*
3. *S4G therefore makes a final decision.*
4. *Once the final status has been decided, these final decisions are automatically entered. The institution can be entered in Excel2 if the decision is of the Inclusion type.*

2. Information about the search process for the institution

- Top-down identification (columns Q-Y) - 'Primary source (Yes/No)' specifies whether this is the first time the institution has been listed and, if so, by which search engine. The search keywords are indicated, along with basic information (name and internet link to the institution).

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- Bottom-up identification (columns Z-AF)- 'Primary source (Yes/No)' specifies whether this is the first time the institution has been listed and, if so, who the source is. Basic information is also provided (name and internet link to the institution).
- Number of times the institution has been viewed by a channel (column C). Counts the number of times the institution was found during searches by different channels. (What does this allow you to do?)

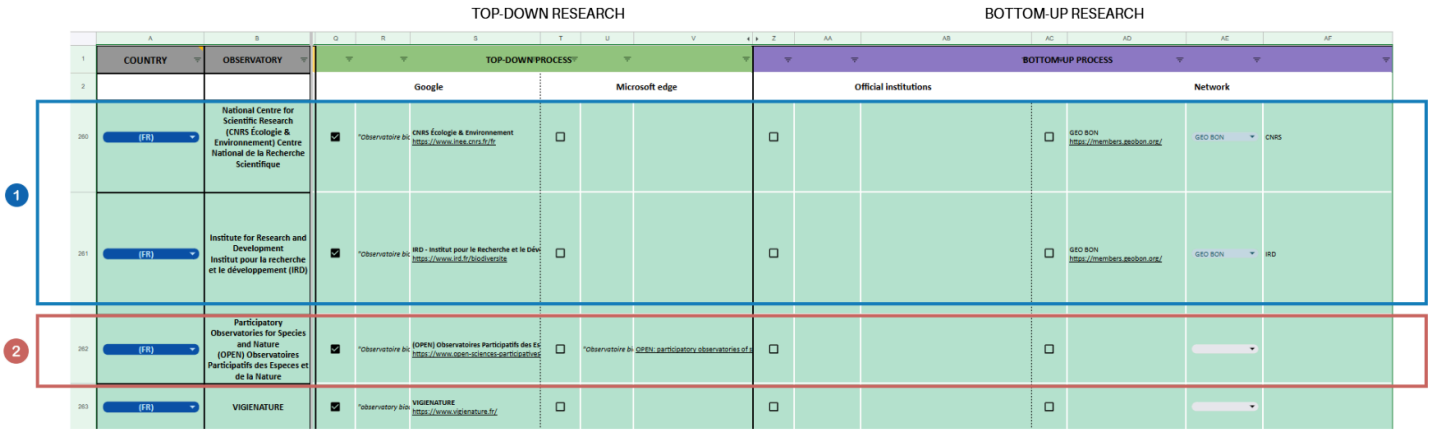

Fig. 14 *- Excel1 file structure and example of research process information.*

1. *The French institutions CNRS and IRD were listed for the first time thanks to the Google search engine. These institutions were found a second time in the GeoBON network.*
2. *The OPEN institution was listed for the first time through the Google search engine. Then a second time by Microsoft Edge (during the complementary search phase, see section X).*

6.1.2 Sheet 2 - Excel1 Statistics

Statistics concerning this initial phase of the research and selection process (see section 3.2.1 Statistics).

6.1.3 Sheet 3 - Excel1 Work Distribution

Page used to organise the division of work in the research phase (See section 2.3.4 Distribution of research work).

6.1.4 Sheet 3 - Excel2 Work Distribution

Page used to organise the division of work in the Excel2 filling (See section 2.9 Database construction)

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6.2 Excel2 - BioMonitor4CAP Institutions Network

The Excel2 file records the network of final institutions (which have been listed and selected through the selection process). In this file, all institutions are associated with information used to identify their potential contribution in the field of Agrobiodiversity.

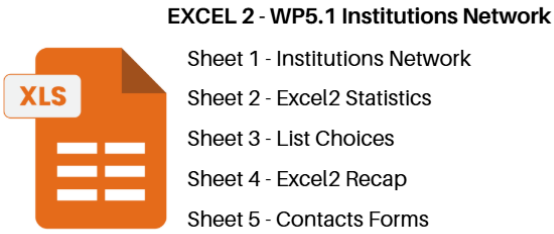

Fig. 15. *Structure of Excel1 sheets.*

6.2.1 Sheet 1 - Institutions Network

The global structure of information provided on the institutions is mentioned in section "2.7 INSTITUTION ATTRIBUTES". Please find below tables summarising the information provided on the institutions in greater detail.

Each row in the table corresponds to an identified institution, while each column represents specific information collected about it.
The first column indicates the level of progress in documenting the institution (In progress / Inclusion I / Inclusion II).
This file is a work in progress: it will be expanded over time, in particular by adding non-European institutions that have not yet been included, as well as by incorporating any suggestions or feedback identifying an institution deemed relevant.

	A	B	C	D	E	G	H	I
1	1	2	6	4	5	7	8	9
2	PROGRESS	STRUCTURE INFO	STRUCTURE INFO	STRUCTURE INFO	STRUCTURE INFO	STRUCTURE INFO	STRUCTURE INFO	STRUCTURE INFO
3		Abbreviated name in code form of the	Name of the observatory in EN. Official EN if existing,	Official acronyme of the structure in the	Inclusion I or Incluse II status. This column will be used by web	ure (is it an observatory, an observatory pr	ssential information for understanding t	nter the structure's area of specialisation her
4		CODE NAME	OFFICIAL NAME (EN)	ACCRONYM	INCLUSION LEVEL	CATEGORY	TYPE	SPECIALISATION
84	Level II complete	EU_NL_FLORON	Floristic Research Netherlands	FLORON	Inclusion I	NGO	NGO	Flora
85	Level II complete	EU_NL_NEM	Network Ecological Monitoring	NEM	Inclusion I	Observatory	PUBLIC INSTITUTION	Biodiversity
86	Level II complete	EU_AT_HDN	House of Nature Salzburg	HDN	Inclusion II	Museum/Cultural Institution	PUBLIC INSTITUTION	Earth and life
87	Level I complete	EU_AT_SBO	Sonnblick Observatory of GeoSphere Austria	SBO	Inclusion I	Observatory	PUBLIC INSTITUTION	Earth and life, Climatology
88	Level I complete	EU_AT_BOKU	University of Natural Ressources and Sciences	BOKU	Inclusion I	University/Academic Institution	PUBLIC INSTITUTION	Earth and life, Soil

Fig. 15 *- Excel2 file structure. Source : Excel2, T5.1, BioMonitor4CAP.*

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STRUCTURE INFO		INFORMATION ENTRY
CODE NAME	Abbreviated name in code form of the structure.	*Code format :* • *EU27 country : EU_COUNTRY CODE_STRUCTURE ACRONYM* • *Extra-EU country : EEU_COUNTRY CODE_STRUCTURE ACRONYM* • *EU-wide : EU_STRUCTURE ACRONYM* • *Worldwide : WORLD_STRUCTURE ACRONYM*
OFFICIAL NAME (EN)	**Name of the observatory in EN.**	*Official EN if existing, otherwise name translated into EN (use DeepL).*
ACRONYM	**Official acronyme** of the structure in the official language.	*If none exists, create one.*
INCLUSION LEVEL	**Inclusionl or Incluse II status.** This column will be used by web developers to distinguish between institutions with complete information and those with partial information.	*"Inclusion I" , "Inclusion II"*
OFFICIAL NAME	**Official name** of the structure.	*In the official Language.*
CATEGORY	Enter the **status of the structure** *(is it an observatory, an observatory project, a database tool, etc.).*	*"Data Consortium/Collaborative Platform", "Scientific/Research Institute", "Government Agency", "NGO", "Program / Project", "University/Academic institution", "Observatory", "Museum/Cultural Institution", "International Organization", "Protected Area Management Authority", "Citizen Science Group", "Private Sector/Consultancy", "Other"*
TYPE	The **structure type.** It is an essential information for understanding the context in which it operates.	*"Public Institution" , "Private" , "NGO" , "Other"*
SPECIALISATION	Enter the Institution's **area of specialisation** here.	*"Earth and life", "Environment", "Biodiversity", "Agrobiodiversity", "Agriculture / Agronomy", "Soil", "Invertebrates", "Insects (inc. pollinators, butterflies, etc.)", "Birds", "Mammals", "Reptiles", "Amphibians", "Habitat", "Flora", "Fauna", "Forest", "Water", "Land Use", "Climatology", "Public policies", "Technology / Monitoring tools", "Research", "SocioEconomics", "Multidisciplinary", "Other"*
COUNTRY	Enter the country of the structure *(Referring to its location, not necessarily its area of operation).*	*"Belgium", "Bulgaria", "Czechia", "Denmark", "Germany", "Estonia", "Ireland", "Greece", "Spain", "France", "Croatia", "Italy", "Cyprus", "Latvia", "Lithuania", "Luxembourg", "Hungary", "Malta", "Netherlands", "Austria", "Poland", "Portugal", "Romania", "Slovenia", "Slovakia", "Finland", "Sweden", "Iceland", "Liechtenstein", "Norway", "Switzerland", "United Kingdom", "Bosnia and Herzegovina", "Montenegro", "Moldova", "North Macedonia", "Albania", "Serbia", "Türkiye", "Ukraine", "Kosovo*", "Georgia", "(EU)", "World"*
COUNTRY CODE	**Official country code.**	*"(BE)", "(BG)", "(CZ)", "(DK)", "(DE)", "(EE)", "(IE)", "(EL)", "(ES)", "(FR)", "(HR)", "(IT)", "(CY)", "(LV)", "(LT)", "(LU)", "(HU)", "(MT)", "(NL)", "(AT)", "(PL)", "(PT)", "(RO)", "(SI)", "(SK)", "(FI)", "(SE)", "(IS)", "(LI)", "(NO)", "(CH)", "(UK)", "(BA)", "(ME)", "(MD)", "(MK)", "(AL)", "(RS)", "(TR)", "(UA)", "(XK[1])", "(GE)", "(EU)", "(WORLD)"*

Table 2. Structure information. **Source :** Excel2, Task 5.1 BioMonitor4CAP.

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CONTACT INFO		INFORMATION ENTRY
WEBSITE LINK	Link to the structure's homepage.	-
CONTACT MAIL	Contact email for the structure.	-
CONTACT LINK	Link to the contact page (especially if the email address cannot be found).	-
CONTACT PHONE	**Contact telephone number** for the structure.	*Don't forget the country code (Ex +33 for France).*
WEBSITE LANGUAGE	Official language of the structure's WEB site.	*"Austrian", "Belgian", "Bulgarian", "Croatian", "Cypriot", "Czech", "Danish", "Dutch", "English", "Estonian", "Finnish", "French", "German", "Greek", "Hungarian", "Irish", "Italian", "Latvian", "Lithuanian", "Luxembourgish", "Maltese", "Nederlands", "Polish", "Portuguese", "Romanian", "Slovak", "Slovenian", "Spanish", "Swedish"*
WEBSITE EN	Indicate whether the EN version is available on the institution's website.	*"Yes" , "No"*
HEAD OFFICE	Official address of the institution (head office).	-
MAP LOCATION	GPS coordinates of the address (to facilitate mapping on the website) (right-click on maps on the institution's location).	-

Table 3. Contact information. **Source :** Excel2, Task 5.1 BioMonitor4CAP.

ORGANISATIONAL STRUCTURE		INFORMATION ENTRY
INSTITUTION TOP	Indicate whether the institution is a Top Administrative Institution. "Top Institutions" can be considered at the top of the administrative hierarchy, central to the institutional landscape with strong connections to various entities. A key question to ask: Is this one of the primary institutions in the country that the EC should engage with on (Agro)Biodiversity, including indicators, data, or expertise? *Reminder ("Top Institution" & "Top AgroBiodiversity")* *"Top Institution" indicates institutions at the highest level of the administrative hierarchy.* *"Top AgroBiodiversity" specifies whether the institution has an agrobiodiversity specialization.* *Institutions marked as either Top_Administrativ or Top_AgroBiodiversity will be highlighted in a different color on the map.*	*"Top Institution" , ""*
LINK TO	List all **other** institutions that are connected to this institution in any way (e.g., through partnerships, governance structures, collaborations, other). *Do NOT list the institution itself in this column. Only include external institutions that have a relevant connection.*	*Select from a drop-down list with the code names of the institutions in the network. (A link is created to another institution listed in the Bio4CAP network.)*

Table 4. Organisational Structure information. **Source :** Excel2, Task 5.1 BioMonitor4CAP.

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DESCRIPTION AND OBJECTIVES		INFORMATION ENTRY
OFFICIAL PRESENTATION	Official description of the observatory.	*Copy and paste into official language of the official description of the institution's website (max 5-6 lines, take the part that is most relevant to the Bio4CAP project).*
OFFICIAL PRESENTATION (EN)	Official description of the structure, English version.	*If it exists on the site in EN, copy and paste, otherwise translate to DeepL.*
OBJECTIVES	Main objectives of the structure.	*"Protecting Agro/biodiversity", "Restauring Agro/biodiversity", "Facilitating access to Agro/biodiversity data", "Public information", "Agro/Biodiversity monitoring", "Provision of information on Agro/biodiversity", "Spreading knowledge", "Mobilising Agro/biodiversity stakeholders", "Nature conservation", "Knowledge management"*
YEAR OF CREATION	Year of creation of the structure.	*Year to be entered in the format: YYYY (e.g., 2021)*
RESOURCES TYPE	Indicate here the type of (Agro)Biodiversity resources that the institution could provides. **(max 5).**	*"Data", "Database", "Statistics", "Cartographic data", "Scientific publications", "Annual reports / Assessments", "Research projects", "Pilot projects", "Expertise", "Protocol", "Knowledge networks", "International cooperation platforms", "Networks and collaborations", "Research partnerships", "Collaborative projects", "Expert networks", "Working groups", "Education, Awareness, and Stakeholder Participation", "Conservation", "Awareness-raising", "Participatory initiatives for biodiversity monitoring (citizen science)", "Training", "Conservation initiatives"*
GEOGRAPHIC SCOPE	What is the scope of the structure? What area does the structure operate in?	*"Belgium", "Bulgaria", "Czechia", "Denmark", "Germany", "Estonia", "Ireland", "Greece", "Spain", "France", "Croatia", "Italy", "Cyprus", "Latvia", "Lithuania", "Luxembourg", "Hungary", "Malta", "Netherlands", "Austria", "Poland", "Portugal", "Romania", "Slovenia", "Slovakia", "Finland", "Sweden", "Iceland", "Liechtenstein", "Norway", "Switzerland", "United Kingdom", "Bosnia and Herzegovina", "Montenegro", "Moldova", "North Macedonia", "Albania", "Serbia", "Türkiye", "Ukraine", "Kosovo*", "Georgia", "(EU)", "World"*
KEYWORDS	Enter keywords associated with the observatory and its work	*Manual entry, based on the contributor's assessment*

Table 5. Description and Objectives information. **Source :** Excel2, Task 5.1 BioMonitor4CAP.

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DATA AND INDICATORS		INFORMATION ENTRY
(AGRO)BIODIVERSITY SERVICES	**Programs/Services/Projects related to (Agro)Biodiversity** *Ex Copernicus services:* *- Copernicus Land Monitoring Service (CLMS)* *- Copernicus Climate Change Service (C3S)* *- Copernicus Emergency Management Service (CEMS)*	-
(AGRO)BIODIVERSITY RESSOURCES	Main types of data or information from the institution, particularly related to (agro)biodiversity (max. 5)	*"Agro-ecological Data", "Agro-biodiversity indicators", "Species inventories (fauna/flora)", "Species distribution", "Genetic resources monitoring", "Biological Collections", "Animal biodiversity", "Bird monitoring (species, populations, habitats)", "Mammal monitoring (species, populations, habitats)", "Pollinators monitoring (species, populations, habitats)", "Insect monitoring (species, populations, habitats)", "Amphibians and reptiles monitoring (species, populations, habitats)", "Invertebrates monitoring (species, populations, habitats)", "Monitoring of migratory species", "Monitoring of endangered species", "Population composition", "Genetic repositories (eDNA, barcodes etc.)", "Plant biodiversity", "Agricultural crops monitoring", "Cultivated species", "Wild plants monitoring", "Endangered species", "Local crop varieties", "Plant genetic resources monitoring", "Conservation of genetic resources (seed banks, etc.)", "Fodder crops", "Invasive species", "Genetic repositories (eDNA, barcodes etc.)", "Forests", "Soil", "Soil biodiversity (microorganisms, etc.)", "Soil characteristics (pH, organic matter, etc.)", "Soil quality", "Soil resource management", "Soil erosion", "Soil fertility", "Soil conservation", "Water", "Water resources", "Water quality", "Water use", "Aquatic ecosystems", "Irrigation systems", "Water conservation", "Water pollution", "Hydrology studies (groundwater annual shifts etc.)", "Agricultural Practices and Land Management", "Monitoring of agricultural habitats", "Crop systems", "Livestock systems", "Farming practices", "Sustainable agricultural practices", "Agricultural practices", "Agroecology", "Agroforestry", "Agricultural performance (productivity, yields, etc.)", "Transition to sustainable agricultural systems", "Carbon farming", "Organic farming", "Input management", "Pesticides/Herbicides", "LAND USE habitats land cover etc……", "Land use", "Habitat monitoring", "Vegetation cover", "Deforestation/reforestation tracking", "Community composition (habitats-species-climate)", "Climatology", "Climatology/Meteorology", "Emissions tracking", "Impact of climate change", "Climate change adaptation", "Agrobiodiversity expertise", "Impact assessments of practices on (agro)biodiversity", "Scientific expertise on the conservation/management of agrobiodiversity", "Expert recommendations for the management of agrobiodiversity", "Assessments of traditional agricultural practices and their resilience", "Socio-economic expertise on the adoption of best practices", "Knowledge of (agro)biodiversity observatory networks", "Agrobiodiversity and public policies", "Public policies and regulatory frameworks", "Environmental public policies", "Agricultural public policies", "Public policies and (agro)biodiversity (regulations, etc.)", "National/regional action plans for (agro)biodiversity", "Agricultural subsidies", "Policies for reducing pesticides and other chemicals", "Legislation on the use and conservation of local varieties", "Data on the implementation of international agreements (e.g., CBD, FAO)", "Assessments of the impact of agricultural policies on biodiversity", "Statistics on the transition to sustainable agricultural systems", "Data on green financing initiatives for sustainable agriculture", "Sustainable food systems"*
TOOLS & TECHNOLOGIES	Indicate here the types of tools & technologies the institution uses (especially for (Agro)biodiversity monitoring) **(max 5)**	*"Remote Sensing", "Field sampling / Data collection", "Soil analysis", "Artificial Intelligence", "Plant and animal species recognition applications", "Genetic tools (eDNA)", "Indicators", "Sensor technologies", "Geographic Information Systems (GIS)", "Analysis software", "Modelling tools", "Statistical analysis", "Bioinformatics", "Genetic tools & technologies", "Digital tools & technologies", "Visualisation platforms", "Solutions for Data Processing Tools and Platforms", "Collaborative databases on agricultural biodiversity", "Solutions/technological innovations for the conservation/management of (agro)biodiversity", "Information sharing networks between researchers/farmers", "Metadata management tools for databases", "Tools for disseminating research results and best practices", "Management platforms for sustainable agricultural practices", "Agro-technological solutions/innovations", "Data-driven farm management applications", "Traceability solutions for agricultural products related to biodiversity", "Performance indicators for new technologies in biodiversity", "Decision-support tools", "Simulation tools"*
DATA ACCESS	Accessibility status of the structure's data	*"Open" , 'Restricted"*
DATABASE PORTAL	Specific link on the structure's website leading directly to the place where (Agro)Biodiversity data could be found.	-
(AGRO)BIODIVERSITY INDICATORS	List of biodiversity indicators/Data that can be found in the structure's database	-
(AGRO)BIODIVERSITY INDICATORS (EN)	EN version of the list of biodiversity indicators.	*Official EN of the page if existing or translation with DeepL.*

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Table 6. Data and Indicators information. **Source :** Excel2, Task 5.1 BioMonitor4CAP.

6.2.2 Sheet 2 - Excel2 Statistics

Statistics concerning the Institutions Network (see section 3.2.3 Statistics).

6.2.3 Sheet 3 - List Choices

Sheet dedicated to the **Predefined dropdown lists**, when these are harmonised responses in list form (all and summary in the tables above, column 'Information Entry'). (See Section 2.8 Standardization of Fields)

6.2.4 Sheet 4 - Excel2 Recap

Contains the tables above summarising the information provided on the institutions.

6.2.5 Sheet 5 - Contact Forms

Still under development. Contains links to the various forms. Links required to create customised forms for each institution.

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6.3 Looker Studio Interface - Network visualisation tool

Looker Studio Link: https://lookerstudio.google.com/s/pw3EPvlk22Q

At the time of delivery, the general structure of the dashboard developed in Looker Studio is operational (although technical adjustments are still required). The interface is designed to offer intuitive navigation and quick access to key information.

The home page includes:

1- A summary of the project and its objectives.

2- An interactive map displaying geolocated institutions (currently, only entities with a complete address are shown).

3- Dynamic filters allowing institutions to be selected according to various search criteria.

4- An invitation to join the network via an email contact

5- A text search engine, facilitating the identification of institutions by keywords.

6- A summary table listing all the institutions referenced, accompanied by contextual information. These information fields are editable and can be adapted to future needs.

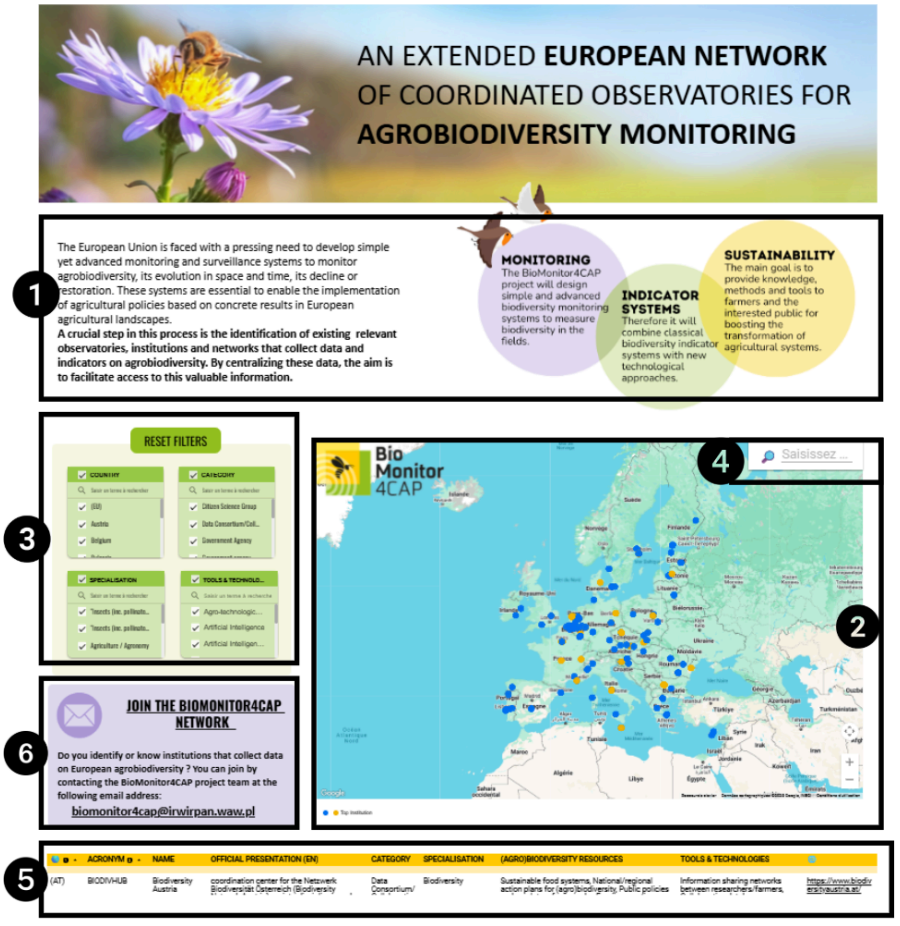

Fig. 16 *- Looker Studio Interface structure.* ***Source :*** *T5.1, BioMonitor4CAP.*

Although the main structure is in place, some technical adjustments still need to be made (particularly regarding the map and the accuracy of the filters).

One of the major advantages of Looker Studio is its flexibility: the tool allows the dashboard to be modified and improved in real time, without interrupting its online publication.

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At this stage, the platform is hosted in Farm Europe's Looker Studio space. Ultimately, it will be integrated into the websites of the various BioMonitor4CAP project partners in order to maximise its visibility and impact.

6.4 Contact questionnaires - Deepen AgroBiodiversity resources

The Task 5.1 team has developed two contact questionnaires for the listed institutions (see section 2.11 Institutional Feedback Forms):

- **Form No. 1 - Survey on (Agro)Biodiversity activities**.
- **Form No. 2 - Review of provided information.**

These two forms are currently under development. A recent meeting with the EuropaBON team highlighted the opportunity to align and potentially consolidate data between the BioMonitor4CAP and EuropaBON networks. This collaboration will require harmonisation of data structures and content to ensure compatibility with the EuropaBON database framework.

Technical aspects of the contact process of institutions

Each institution in the network will be contacted individually by email. The contact details of the institutions are stored in the database (Excel2), which allows the sending process to be automated.

The emails will be generated and sent in a personalised manner using Google Apps Script, which allows specific messages to be created for each recipient based on pre-filled fields in the Excel spreadsheet (e.g. name of the institution, etc.).

The email sent to each institution will contain a link to a **Form No. 1** (AgroBiodiversity Form), which is also personalised using the features of **Google Forms**. This form will include, among other things, the name of the institution and other contextual information specific to each entity.

At the end of Form No. 1, a link is provided to **Form No. 2** (Verification Form), which is also customised using the advanced features of Google Forms. The purpose of this second form is to validate and complete the information entered previously.

The unique links corresponding to these two forms for each institution are pre-registered in the last columns of the Excel2 spreadsheet ('AgroBiodiversity Form Link' and 'Verification Form Link').

An official **Letter of Support** for the BioMonitor4CAP project has been granted by the European Commission. It endorses the BioMonitor4CAP project's efforts to develop innovative biodiversity monitoring systems for agriculture and encourages collaboration with institutions to advance sustainable agri-environmental practices across Europe and beyond. This letter will accompany the outreach emails sent to the institutions listed in the database, with the objective of encouraging them to respond to structured questionnaires. These questionnaires are designed to collect detailed

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information on the data, indicators, and expertise they hold in relation to agrobiodiversity. The inclusion of the letter is expected to enhance the project's visibility, foster trust, and promote broader engagement in this critical data-gathering phase.

Planned Framework for Response Processing

Since the questionnaires are not yet finalized, the exact structure for processing and centralizing responses has not been established. However, the overall framework of the process has been broadly discussed.

Responses will be collected via **Google Forms**, which enables automated data capture. Each submission will automatically populate an associated **Google Sheets** spreadsheet, ensuring structured and immediate recording of the data.

However, to guarantee the quality and consistency of the collected data, it is preferable that responses are **not directly integrated into the main database (Excel2)**. Instead, an **intermediate sheet** should be created to store raw responses. This step will allow for a preliminary global review: checking completeness, format consistency, detection of potential anomalies, etc… This review can be carried out manually or in a semi-automated manner using **Google Apps Script**, before the data is transferred to Excel2, the primary database used for analysis and reporting. This two-step approach combines the advantages of automated data collection with the response validation process.

This part raises important questions regarding post-project management: who will be responsible for processing responses after the project's completion?

Box 7 - Conclusion on Contact questionnaires

The questionnaires are expected to evolve progressively, in coordination with EuropaBON, to ensure full interoperability. Questions and answer formats will be reviewed and adapted accordingly to fit their data architecture and standardisation needs.

The contact process will be fully automated and personalized for each institution using advanced features of Google Apps Script and Google Forms.

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CONCLUSIONS

As part of the BioMonitor4CAP project, Task 5.1 enabled the initial mapping of the fragmented – and often opaque – **landscape of European institutions involved in the monitoring of Agrobiodiversity**. The team responsible for Task 5.1 developed **a structured database containing more than 360 European and non-European institutions that are likely to hold relevant data or expertise in this field** *(the latter included to reflect global dynamics influencing Agrobiodiversity in Europe).*

This identification process was based on a hybrid approach, combining a top-down strategy (automated research) and a bottom-up strategy (mobilizing existing networks and stakeholder feedback), in accordance with the PRISMA-P protocol and a set of defined eligibility criteria. The selection process, as well as the information related to the identification of institutions, was documented in an Excel file (Excel1).

One of the main challenges of the project was identifying Agrobiodiversity institutions, given the often-blurry boundaries between Biodiversity and Agrobiodiversity. Few institutions explicitly define themselves as specializing in Agrobiodiversity. Most are positioned more broadly under “Environment” or “Biodiversity” themes, yet they often hold valuable resources or expertise relevant to Agrobiodiversity. This challenge led to the deliberate choice of an extended selection of institutions, for which detailed information was compiled to better assess and qualify their potential involvement in the field of Agrobiodiversity. All this data is organized in a second Excel file (Excel2).

A web interface, using the Looker Studio tool, has been developed to visualise the data collected on the institutions, improve its accessibility and ensure it is easily understood. It includes interactive filtering, institutional profiles and a searchable map.

Given the difficulty of accessing Agrobiodiversity-specific information, a further bottom-up investigation is planned. Each listed institution will be contacted through two customized forms: the first aims to explore the institution’s potential contributions to Agrobiodiversity in greater depth; the second will allow the institutions to validate the collected data themselves and encourage their direct engagement.

The results highlight the great diversity of stakeholders involved, as well as the limited visibility of structures explicitly focused on Agrobiodiversity. The broad and inclusive approach adopted by the team proved necessary to grasp the complexity of the Agrobiodiversity monitoring landscape and opened up prospects for improved coordination between science and policy.

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