biodiversa+
European Biodiversity Partnership

EUROPEAN PARTNERSHIP

D5.6 Reinforcing the use of European and global research infrastructures

(by biodiversity researchers in the European Research Area)

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What is Biodiversa+

Biodiversa+ is the European co-funded biodiversity partnership under Horizon Europe, supporting excellent research on biodiversity with an impact on policy and society. It was jointly developed by BiodivERsA and the European Commission (DG Research & Innovation and DG Environment) and was officially launched on 1 October 2021.

Biodiversa+ aims at making the bridge between science, policy and practice as part of the European Biodiversity Strategy for 2030.

Biodiversa+ currently gathers more than 80 research programmers and funders and environmental policy actors from 40 European and associated countries to work on 5 main objectives contributing to a sustainable ecological transition in Europe:

1. Plan and support research and innovation on biodiversity through a shared strategy, annual joint calls for research projects and capacity-building activities
2. Set up a transnational network of harmonized schemes to improve the monitoring of biodiversity and ecosystem services across Europe
3. Contribute to high-end knowledge for deploying Nature-based Solutions and valuation of biodiversity in the private sector
4. Ensure efficient science-based support for policy-making and implementation in Europe
5. Strengthen the relevance and impact of pan-European research on biodiversity in a global context

More information at: https://www.biodiversa.eu/

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Introduction: Internationalization, Research Infrastructures and biodiversity monitoring data

One of the primary objectives of the Biodiversa+ work on internationalization is a better use of global biodiversity infrastructures by European researchers. During the years 2022 and 2023, several activities were deployed to:

1. Start and intensify the engagements between Biodiversa+ and the different infrastructures;
2. Explore the current status of the use of research infrastructures by biodiversity researchers in the European Research Area;
3. Identify possible barriers to the use of infrastructures;
4. Signal opportunities for better and more integrated use of infrastructures by researchers;
5. Design potential future Biodiversa+ (led) activities to help overcome such barriers and promote opportunities.

The engagement with research infrastructures (RIs) not only relates to Biodiversa+'s ambitions for internationalization but also closely aligns with the objective of enhanced transnational cohesion of biodiversity monitoring efforts.

This report gives an overview of the activities conducted and provides recommendations as to how Biodiversa+ can help reinforce the use of European and global research infrastructures (including earth observation programs) by biodiversity researchers in the European Research Area.

1. Approach and steps taken

As per usual practice, Biodiversa+ activities are a joint effort by a subset of partners, this activity were led by the Dutch Ministry of Agriculture, Nature and Food Quality with support from the operational team. The main activities were the survey and dialogue workshop as described in sections 1.3 and 1.4 below. The design of these was built upon several other meetings which are mentioned in paragraph 1.2.

1.1. Role of active partners

The activities described in this report were initially designed by a small group of active partners: the Dutch Ministry of Agriculture, Nature and Food Quality (NL), the Finnish Ministry of Environment, the German Aerospace Center and the Italian Ministry of University and Research. Some of the preparatory meetings in the next paragraph additionally also benefitted from the active participation of further Biodiversa+ partners.

1.2. Preparatory meetings

The following initiatives helped design the 'Biodiversa+ survey on Research Infrastructures and Earth Observation' (1.3) and the 'Biodiversa+ workshop with global research infrastructures' (1.4).

1.2.1. Online workshop on 'Data architecture and workflows of major international / European initiatives' (1st of September 2022)

This workshop on data interoperability and harmonization[1] was primarily conducted as part of the Biodiversa+ workstream on biodiversity monitoring. It however also provided a good space for building and intensifying the relations with representatives of the Research Infrastructures that took part.

1.2.2. Data beyond borders: a joint GBIF-Biodiversa+ event (6th of October 2022 in Brussels)

During this event organized by GBIF in conjunction with Biodiversa+, collaboration was explored and catalysed across multiple EU institutions (DGENV, DGINTPA, JRC Knowledge Centre for Biodiversity, DG Research and Innovation), GBIF Secretariat and GBIF nodes. This was aimed to exploit fully the opportunities for scaling up and harmonizing efforts to improve the availability of data for implementation of European and global biodiversity objectives. Contributions were also made by representatives from EuropaBON, EEA, ESFRI, and Agence Française de Développement.

The overall objectives of this day were:

- To explore and clarify the emerging landscape across EU-based institutions to support the provision of reliable biodiversity information supporting decision-making and research;
- To discuss and start to catalyse the collaborations needed to ensure coordination across national, regional and global scales to meet biodiversity information needs without duplication of effort;
- Demonstrate the relevance of EU-based initiatives for supporting the global activities and objectives of GBIF

This event also led to interactions with and more awareness of two EU-funded initiatives which also have (elements of) alignment among Research Infrastructures and Earth Observation programmes in their work packages: BioDT (Biodiversity Digital Twin) and BiCIKL (Biodiversity Community Integrated Knowledge Library).

1.2.3. Advanced facilities for the ecological research: the European Research Infrastructures: symposium organized by LifeWatch (24th of November 2022 in Metz)

Biodiversa+'s activities for 'reinforcing the use of European and global research infrastructures by biodiversity researchers' were presented in a symposium organized by LifeWatch ERIC (Alberto Basset) alongside presentations by representatives of LifeWatch ERIC (the European e-Science Infrastructure

[1] See https://www.biodiversa.eu/2022/09/06/biodiversity-monitoring-data-interoperability-and-harmonisation/. A follow-up workshop was held on the 4th of November (morning) on the same topic but targeting more national/ sub-national biodiversity monitoring databases and how these databases feed international or European databases such as GBIF.

for Biodiversity and Ecosystem Research), the ecosystem component of ICOS ERIC (the Integrated Carbon Observation System), eLTER RI (the Long Term Ecological Research site network), DiSSCo (the Distributed System of Scientific Collections), Danubius-RI (the International Centre on Advanced Studies on River-Sea Systems), and from the marine Research Infrastructures EMBRC ERIC, EMSO ERIC and Jerico-RI. This symposium was particularly helpful for the design of the survey (paragraph 1.3).

1.2.4. 'Environmental observation for biodiversity' session at EuroGEO 2022 (8th of December 2022 in Athens)

A major boost to the inclusion of and exchange with Earth Observation related programmes was provided by the EuroGEO 2022 event[2]. In a session jointly led by Antonello Provenzale (CNR) & Gaëlle Le Bouler (European Commission/REA), Biodiversa+ participated in an exchange of ideas and experiences with EuropaBON, GBIF, eLTER, LifeWatch ERIC and ANAEEE (along with several pitches of some newly Horizon Europe funded projects related to the field of Earth observation and data technology[3]). The EuroGEO 2022 event also provided additional insights related to some specific EU-funded initiatives which also have (elements of) alignment among Earth Observation related infrastructures in their work packages: e-Shape – EuroGEO showcases[4] and three ESA 'Biodiversity+ Precursors projects'[5].

1.3. Biodiversa+ survey on 'Research Infrastructures and Earth Observation'

Based on the above-mentioned preparatory steps and in line with an earlier Biodiversa+ 'survey on collaboration with IPBES & MEAs', a survey was designed to explore 'the use of European and global research infrastructures and Earth Observation Programs by biodiversity scientists in the European Research Area'. See annex 1 for the full details[6].

The survey was held between the 10th of December 2022 and the 20th of January 2023 and in addition to exploring which infrastructures are most used, it also aimed to identify possible barriers and assess what the Partnership can do to overcome these[7].

The targeted audience was the consortium coordinators of research projects funded through BiodivERsA and Biodiversa+ (including related joint Co-fund actions such as BiodivClim, BiodivRestore etc.)[8].

[2] See https://www.greekgeo.noa.gr/egw2022/index.php/programme.
[3] GUARDEN (A new approach to safeguarding biodiversity and essential ecosystem services across sectors and scales), B-USEFUL (marine biodiversity conservation and spatial planning), B3 (B-Cubed: using cloud computing and global infrastructure in repeatable workflows), MAMBO (Modern approaches to the monitoring of biodiversity), Nature FIRST (Forensic Intelligence and Remote Sensing Technologies for nature conservation). For more info, see footnote 4.
[4] With one showcase 'myEcosystem' that includes three biodiversity related sub-pilots developed to maximize services to user groups both in their specific topical areas, but specifically through integrating and jointly using information from remote sensing (mySPACE; led by ECOPOTENTIAL), in-situ observation (mySITE; led by eLTER) and high-level indicators verification and testing with an exemplary focus on biodiversity (myVARIABLE, led by GEO BON).
[5] Named EO4Diversity (Terrestrial ecosystems), BiCOME (Coastal ecosystems), and BIOMONDO (Freshwater ecosystems).
[6] One participant in the workshop (see paragraph 1.4), provided the following comment to the survey: "*CEOS is not here (https://ceos.org/) Since November 2022 we have had a Task Force on Ecosystems with a first objective on mapping Ecosystems Extent globally from EOS data (contact for Europe: sandra.luque@inrae.fr)*".
[7] Note that this survey is different from (and additional to) the survey on National Research infrastructures (aimed at Biodiversa+ partners) that was also circulated towards the end of 2022 in the context of task 6.2 (maintenance of the Biodiversa+ databases, including their integration to the Biodiversa+ e-platform).
[8] https://www.biodiversa.eu/research-funding/past-calls/

1.4. Biodiversa+ workshop with global research infrastructures (5th of April 2023)

This workshop with global 'Research Infrastructures' was held online on the fifth of April. An invitation was sent out to a limited set of global research infrastructures. Where applicable this invitation was also shared with their European counterparts, because of their specific potential to fulfil a bridging role between the global infrastructures and the European context.

The workshop was organised in two sessions, the first one on the possible barriers to the use of research infrastructures by biodiversity scientists in the European Research Area and the second one on the Biodiversa+ Flagship programme (see complete agenda in Annex 2).

2. Outcomes of survey and workshop with global research infrastructures

2.1. Biodiversa+ survey on 'Research Infrastructures and Earth Observation'

The survey of the use of European and global research infrastructures and Earth Observation Programs was answered by 36 biodiversity scientists. The geographical spread of the organisations/labs the respondents represented is indicated in Figure 1.

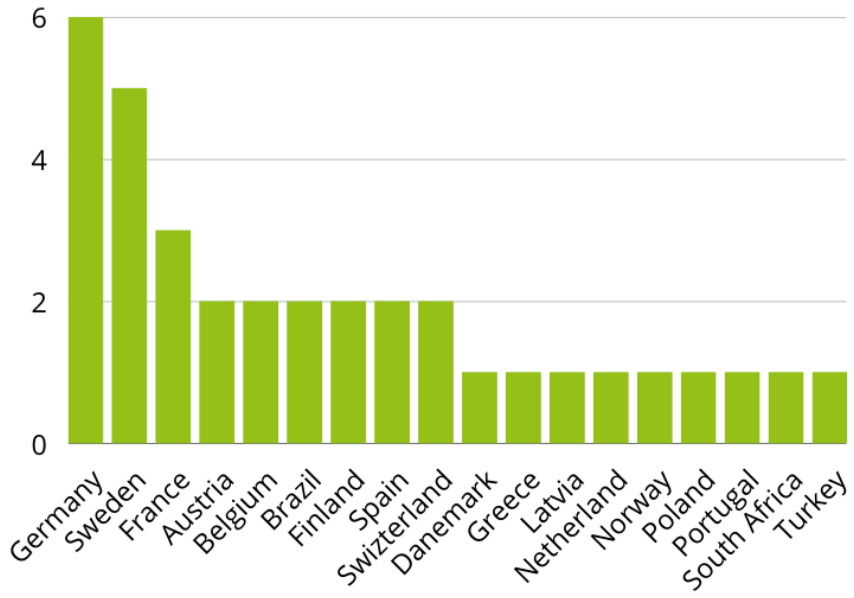

Figure 1: Geographical distribution of respondent's organisation/lab

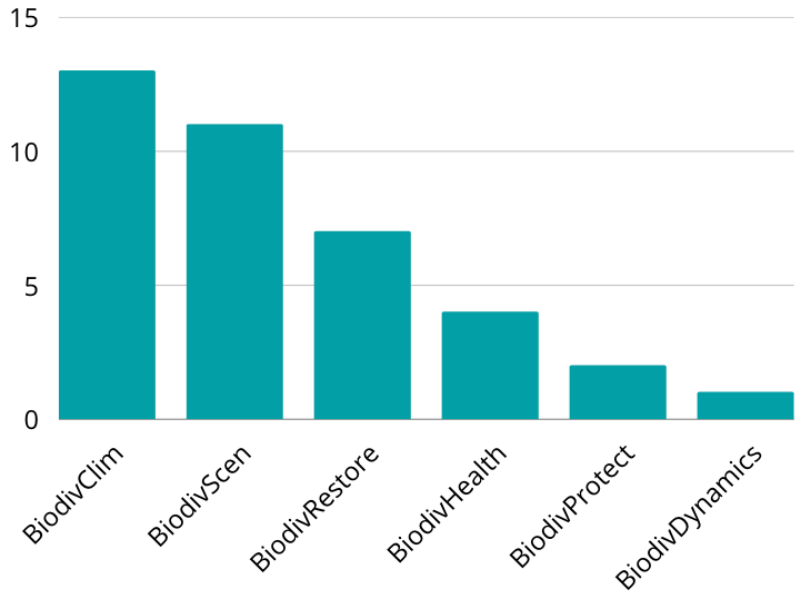

Figure 3 : Distribution respondent's per Biodiversa call

Figure 2 shows the distribution of BiodivERsA or Biodiversa+ funded projects in which the respondents are involved over the different calls. Given the limited overall size of the dataset and the wide variety of project types within each call, we have decided not to split it up to analyse the responses in relationship to the different calls the respondents represent.

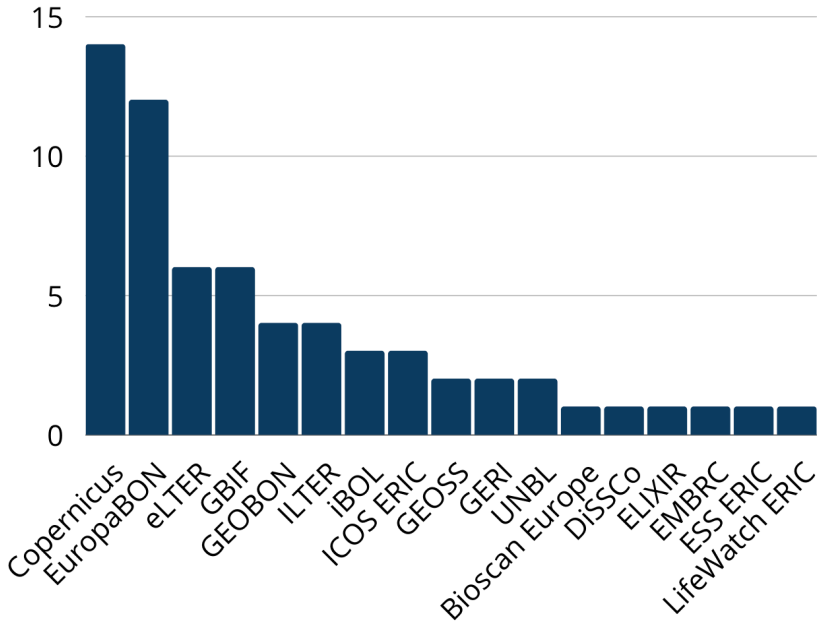

Figure 2: Types of research infrastructures in which respondents are involved.

28 out of the 36 respondents answered 'yes' to the question: '*Is your organisation currently using products or services provided by one or several Research Infrastructures or Earth Observation Programmes?*' The ones answering 'no' to this question did not answer the question: '*If not, is there any specific reason for that?* '

The distribution of the responses to the question '*With which Research Infrastructure or Earth Observation Programme are you as the respondent currently involved?*' is indicated in Figure 3.

Figure 4 summarizes the answers to the question '*In which capacity are you currently involved with those Research Infrastructures or Earth Observation Programmes?*'.

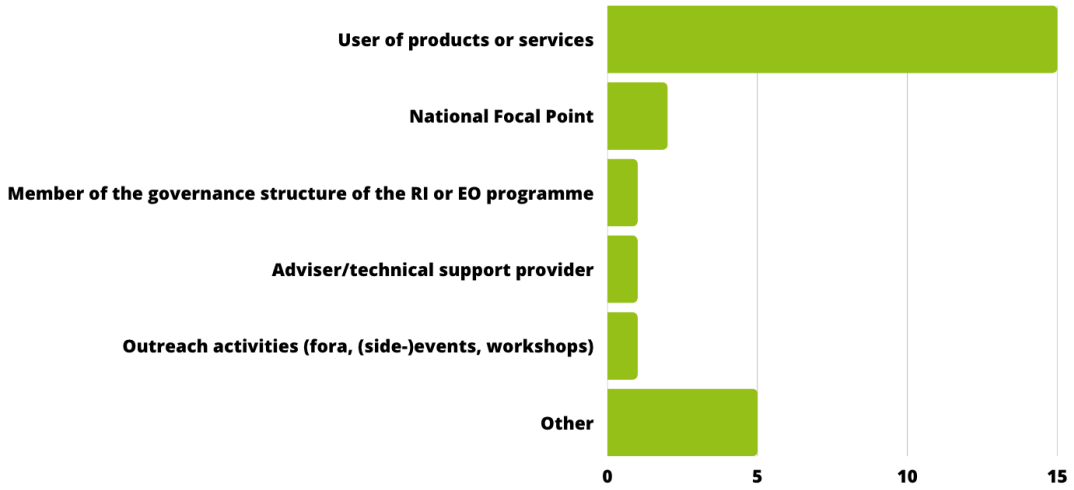

Figure 4: Types of involvement of respondents with Research infrastructures

The question '*Please give details on your response here, e.g., if you have different forms of engagement with different Research Infrastructures or Earth Observation Programmes*', was answered by 19 respondents. Five of these are indicated to be users of one infrastructure and data contributors or organisers of another one. Four were indicated to be 'just' data users. Five responses were along the lines of the respondents themselves being only involved in one infrastructure, but their institutions as a whole in multiple ones. Lastly, four responses were on specific details, partly commenting on the survey as a whole and partly providing info on individual activities.

The feedback by the respondents in response to the question '*According to you, for which Research Infrastructures or Earth Observation Programmes would it be helpful to have Biodiversa+ activities aiming to overcome possible barriers to their use?*' was distributed as indicated in Figure 5. GBIF and the Copernicus programme are particularly often mentioned.

And the question '*You may provide details on your responses here (type of barriers and potential Biodiversa+ activities to help overcome these)*', evoked 10 reactions. Three of these suggest efforts to improve data availability of sorts. And five responses related to the relevance of having a better overview

or findability of infrastructures. One respondent made a case for specific training opportunities and another one referred to the relevance of '*a system of social-ecological observatories or living laboratories. There are several initiatives, but they are scattered and seem to have problems with ensuring long-term commitments*.

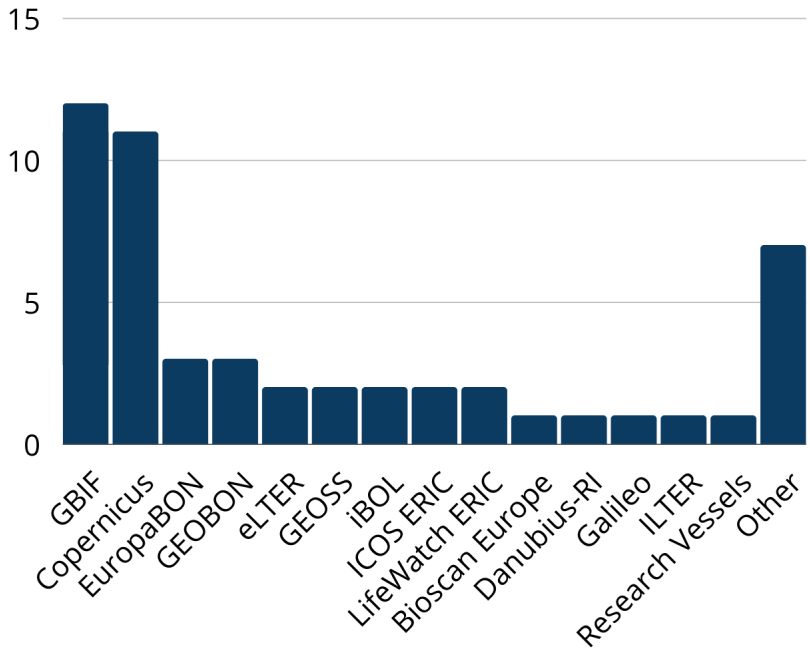

Figure 5 : Distribution of responses to the question on potential Biodiversa+ activities aiming to overcome barriers to the use of Ris and Earth Observation programmes

2.2. Possible barriers to the use of research infrastructures by biodiversity scientists in the European Research Area

Three main issues came out of the survey and the workshop as important current barriers to the use of infrastructures (table 1). These three aspects are further elaborated in the paragraphs below.

Table 1: Barriers

Topic	Barrier	Potential role for Biodiversa+
Data availability	Findability, (free) availability	Support harmonisation and data flows associated with monitoring of biodiversity data

Findability of research infrastructures	Lack of overview	Build a "map/diagram" in which the connections among infrastructures are established, indicating what each of them provides/needs, and how they feed into different workflows (e.g. towards GBF, BDS 2030...)
Interdisciplinarity and long term sustainability of research infrastructures	Coherence, lack of long term commitments	Support the (further) federation of research infrastructures

2.2.1. Findability and availability of data (data use and data contribution from projects)

Research infrastructures and earth observation programmes do not themselves primarily perform research, but rather provide services for researchers. To be able to do so optimally, they however require that (reciprocally) research data is made available by that same research community. Today the latter however is still not common practice for many researchers. Upon data publication also metadata needs to be made available and after publication, data need to remain easily accessible and findable. Or more generally speaking, all aspects of the FAIR[9] data principles need to be applied to avoid '*the option of just dumping data into a repository where it will never be found or re-used*' (as one of the participants aptly put it).

Lack of geographical and taxonomical coverage of the data that are being made available by research infrastructures may impair the use of such infrastructures by researchers in their projects. So it is of general importance to improve data coverage. Biodiversa+ can focus on the fact that researchers are at the same time both users and providers of data and could (continue to)[10] develop activities to make sure that within the EU research systems, requirements and incentives to share data are strong enough. Additionally, through its activities on biodiversity monitoring, Biodiversa+ works towards a better geographical and taxonomical coverage of data collection in Europe.

There are potential measures that Biodiversa+ (or more precisely its research funding partners) or the EC could take to stimulate the use of research infrastructures as well as data sharing. They could for example recommend the use of infrastructures or put mandatory requirements when issuing calls for research projects to be funded. To be able to do so, a prerequisite would be to have a better understanding of the landscape and better connection between research infrastructures, as this could allow the EC and Biodiversa+ in their upcoming calls to also call for cooperation with RIs within the funded

[9] Findable, Accessible, Interoperable and Reusable.
[10] Joint activities with GBIF in this respect are already planned to take place in the context of Biodiversa+ task 1.2 (Promotion of the use and impact of the funded projects outcomes).

projects. From the perspective of the participants in the workshop with global research infrastructures, there would not so much need to be a mandatory use of infrastructures but rather the best that can be done is providing guidance (including on data standards) and promoting the understanding of the capabilities of the infrastructures. General (mandatory) requirements in terms of data sharing and open data could however be considered.

Regarding the use of Earth Observation Systems data, an additional potential barrier was reported, related to technical expertise. "*Both the remote sensing community and the ecological research community each do have their specialized knowledge. Interdisciplinary cooperation and training of both communities on each other's fields of expertise would be helpful to overcome this barrier*", one participant stated. On the other hand it was also remarked that "*such cooperation already happens in research that integrates for example climate and biodiversity*". At least it was reported to be seen as something normal in NBS projects working on climate-related aspects.

In the context of the Copernicus programme, scientists use the Sentinel satellites' data. It may however be difficult for them to process the raw data themselves. So, it is important to provide tools on top of the data. That is why nowadays there is a vast availability of ready-to-use satellite datasets (i.e. Copernicus land variables) that can be collected and pre-processed to provide harmonized long-time series[11]. By now there are different of such Copernicus services (tools on top of the raw data) available on marine, atmosphere, etc. However, no such services on biodiversity are operational yet. There is work ongoing to look at what is necessary to extend existing services (for Copernicus data) towards the biodiversity domain[12]. A challenge related to this work is the findability and availability of field data necessary to train models (ground-truthing of satellite data). The (massive) use of artificial intelligence in this respect further enhances the need for even vaster amounts of field data to train the machines. So in this respect, it is important to increase the accessibility of data. As indicated in the introduction to this report this closely aligns with the Biodiversa+ objective of enhanced transnational cohesion of biodiversity monitoring efforts[13].

2.2.2. Lack of overview of Research Infrastructures

Following from the above, there is a need to find or create an environment where all the data sets and tools are not only open and accessible for the community[14] but also calibrated, harmonized and validated[15]. The proliferation of platforms, however, is an issue for researchers. There is a lack of guidance for scientists in finding the data and how to analyse the available data. Lots of scientists lose time to find the data that are already available and also time gets wasted to pre-process data. Scientists

[11] Several countries provide platforms to download directly pre-processed Sentinel data (ex. https://www.data-terra.org/en/). See also CEOS ready data https://ceos.org/ard/
[12] In this respect one of the workshop participants referred to the report "Earth Observation in support of EU policies for biodiversity - A deep-dive assessment of the Knowledge Centre on Earth Observation" (https://publications.jrc.ec.europa.eu/repository/handle/JRC132908).
[13] Specifically concerning data management (Task 2.2) and to the use of monitoring data in research (Task 2.4.1).
[14] One workshop participant remarked: "*Lots of data are open and accessible - see extensive in situ biodiversity observations available through European portals, such as GBIF as well as plant trait databases (such as TRY, GLOPNET, BROT, GRooT).*"
[15] in such a way that it is possible to derive reliable Essential Biodiversity Variables (EBV's, see paragraph 2.2.3 for more details) and RS-enabled EBV's by using the right ecological models.

would be helped by having clean data (prepared data sets) readily available to be used for their models. All of this needs a level of expertise and interdisciplinary work.

A potential role for Biodiversa+ would be to continue mapping the different infrastructures and how they connect (possibly including the type of data requirement each of them has), to help researchers to navigate the landscape of research infrastructures. An update of the Biodiversa+ "Biodiversity Research Infrastructure database" is ongoing (whilst at the same time turning the catalogue into an online tool). A visualisation of the infrastructure landscape could be part of this effort. When doing so, close collaboration with the efforts of ESFRI[16] and ENVRI-FAIR[17] should be safeguarded (at least for the European level).

Also, GEO BON is performing mapping exercises of infrastructures and is doing so particularly in the context of the workflow that allows an individual to move from data to indicators[18]:

- Infrastructures collecting the data (data holders);
- Data curation holding infrastructures;
- Infrastructures using the data to define trends, modelling etc., and
- Infrastructures in charge of holding the products for use.

There is a need to map infrastructures along this workflow to identify the gaps. It would be an opportunity for Biodiversa+ to play a role in this. In the context of the Global Biodiversity Framework, it will be good to have such mapping ready before CBD COP 16 to know '*what we have in hand and what we need to build upon*'.

2.2.3. Lack of coherence and long term sustainability of Research Infrastructures

Both in terms of enhanced usage of research infrastructures as well as to secure the long-term sustainability of them, there is merit in having a federation approach & networking. Not one single platform can (pretend to) be the solitary reference point.

There are roughly speaking two main approaches towards the use of infrastructures and types of data: either be strict on data types that then can be directly compared and aggregated, or allow for all different kinds of data types but consequently cater for other ways to merge these data in the workflows between data collection towards usable products.

GEO BON advocates for an open process to move from observations to indicators, with so-called Essential Biodiversity Variables (EBVs) as an intermediate step between data collection and the use of indicators in policymaking. For such an approach, cooperation along the entire workflow is needed with different infrastructures specializing in the different steps along the chain (Processing workflow). This may also help in filling the gaps regarding capacity and data: '*Where are we falling short to understand changes in Biodiversity and the drivers of it?*'. When also connecting the joint efforts to link up with time series derived from earth observation data this further enhances the opportunities for computation of

[16] https://www.esfri.eu/
[17] https://envri.eu/home-envri-fair/
[18] GEO BON mission: Improve the acquisition, coordination and delivery of biodiversity observations and related services to users including decision makers and the scientific community

EBV's or other standards. Allowing to connect the dots between the raw data to usable products also creates enhanced opportunities to have a feedback loop back to observation (i.e. where to critically enforce data collection to have the best return on investment). For all of this, it is important to build a network of capacities, expertise, modelling skills and observation systems.

Biodiversa+ will update its Strategic Research and Innovation Agenda next year and when doing so will include more aspects related to research infrastructures. From the perspective of the EC, it is good to have an overview of what exists, but it would additionally be helpful to identify what is missing and what should be funded. An assessment of how infrastructures complement each other and what are the gaps would also be useful for the long-term biodiversity research agenda.

Biodiversa+ could put general references to the use of research infrastructures in its joint calls. Given the very different models in infrastructures and earth observation programmes (ranging from international, large infrastructures, to initiatives that are run as projects; all differing in funding mechanisms, governance structures and flexibility of their agendas), it is difficult to mention specific ones.

2.3. Further suggestions from the research infrastructures regarding ongoing and upcoming Biodiversa+ flagship programmes

During the workshop with global research infrastructures a second session was held, focussing on presenting the current and ongoing Biodiversa+ flagship programmes to the representatives of the infrastructures and other participants. Also, suggestions for further Biodiversa+ activities were collected.

Table 2: Suggestions on Biodiversa+ flagship programs

Topic	Suggestion
Key Biodiversity Areas	Develop best practices and training resources
Taxonomy	Follow up on position paper on what taxonomic facilities need regarding long-term research collaboration
Nature Based Solutions (NBS) / Societal Transformation	Connect NBS and Societal transformation projects with Ris
Nature restoration	Mobilise RIs to help implement GBF target 2 and the proposed European Nature Restoration Law

2.3.1. Key Biodiversity Areas

Support that research infrastructures could provide in relation to area protection could be:

- Help to use data in the most effective possible way to define protected areas
- Work with the Key Biodiversity Areas (KBA) partnership in developing best practices and training resources on the way data can be used in the identification and designation of KBAs

Biodiversa+'s role would be to '*dive into the KBA concept*' and link research with biodiversity monitoring and citizen science. It could be a way to help supplement the network of protected and conserved areas. This is also the subject of its 2023 science-policy forum[19]. There is also a new Biodiversa+ project called "GAP" focusing specifically on this (Resulting from the BiodivProtect call).

Supporting the (further) federation of research infrastructures (2.2.3 above) is another opportunity to help support the determination of KBAs. In the workshop with global research infrastructures, the CEOS representative referred to their initiative to develop an ecosystem extent map, which may also be very relevant in this respect.

2.3.2. Taxonomy

In connection to taxonomic facilities for biodiversity monitoring several suggestions were made to connect with Biodiversa+ flagship programmes. There are many projects where CETAF (a Biodiversa+ Key collaborator) is involved[20]. One of these is particularly relevant: DISSCO to ensure the maximum number of specimens are available and digitalized. But also, the TETTRIS project[21] is relevant to connect with Biodiversa+ organised capacity building efforts.

During a meeting in January with G6 (group of the 6 most prominent natural history museums[22]) it was announced that a position paper will be released on what the taxonomic facility will need in the framework of the long-term research collaboration. Biodiversa+ to follow up on this. '*Use knowledge from the past, study the present to make models for the future'.*

2.3.3. Nature-Based Solutions (NBS) / Societal Transformation

Nature-based solutions (NBS) and 'Societal transformation' are both topics of upcoming Biodiversa+ calls for research proposals[23]. It was suggested '*to encourage NBS projects to further address biodiversity enhancement and monitoring and to contribute with the data produced to biodiversity data infrastructures*'. And for Societal transformation to also be linked with NBS.

[19] https://www.biodiversa.eu/2023/03/03/science-policy-forum-registrations-open/
[20] https://cetaf.org/template-activities/cetaf-projects/
[21] https://tettris.eu/ ; Biodiversa+ is part of the TETTRIs implementation board.
[22] Berlin, London, Paris, Copenhagen, Brussels, Leiden
[23] https://www.biodiversa.eu/2023/02/21/upcoming-calls/

2.3.4. Nature restoration

Given the new GBF target 2 on the restoration of degraded ecosystems, it was suggested that this is also something where research infrastructures could be of help. Nature restoration is gaining relevance and is now a priority at both the global level and the European level with the proposed Nature Restoration Law. So the question was raised whether the flagship on protection also includes some activities related to these priorities. This will be an element in the discussion regarding further flagship programmes to be considered after 2024. 'Nature restoration' is one of the candidates for this.

3. Next steps to reinforce the use of Research Infrastructures

3.1. Capacity building activities

A capacity-building workshop aimed at researchers is planned to be held in conjunction with the start of the BiodivMon research projects (or online depending on practicalities). That will be a good opportunity to put into practice some of the recommendations as captured in the above sections (for example the specific interest shown in GBIF and the Copernicus programme as indicated in Figure 5 in section 2.1). Particular attention in this respect will also be paid to early career researchers.

An opportunity to respond to the notion that '*Students have to be trained on the use of infrastructures, as they often do not know what's happening in RIs*' may be found in the summer school activities that Biodiversa+ is engaged in together with Alternet.

3.2. Further engagement between Biodiversa+ and global research infrastructures

When updating the guidance document on data management[24], better highlighting of research infrastructures will be assured. Further, one-on-one engagement with infrastructures will probably be needed to get the necessary details in place. The same type of one-on-one engagement will be applied for the mapping and federation activities as referred to in sections 2.2.2 and 2.2.3 above.

A next edition of the 'Biodiversa+ workshop with global research infrastructures' is foreseen to take place in early 2025. The inputs of that occasion can then be fed into the update of the Strategic Research and Innovation Agenda (SRIA) and also inform the development of the Biodiversa+ work plans for the 2025-2028 period.

[24] https://www.biodiversa.eu/wp-content/uploads/2023/02/Biodiversa-Data-Management_WEB_2022.pdf

Annex 1: Biodiversa+ survey on 'Research Infrastructures and Earth Observation'

We aim, via this survey, to identify possible barriers to the use of research infrastructure and Earth observation programs and asses what can the Partnership can do to overcome these. This section will help the task lead to identify which areas are of priority for you. Based on the information next steps (i.e. capacity development and dialogue workshops with RI's) will be designed.

1. Is your organisation currently using products or services provided by one or several Research Infrastructures or Earth Observation Programmes? *

- Yes
- No

1. If not, is there any specific reason for that ?

2. With which Research Infrastructure or Earth Observation Programme are you as the respondent currently involved? *

- Bioscan Europe
- Copernicus – European Union's Earth observation programme
- Danubius-RI – International Centre on Advanced Studies on River-Sea Systems
- DiSSCo – Distributed System of Scientific Collections
- eLTER – European Long Term Ecosystem, critical zone and socio-ecological systems Research Infrastructure
- EGNOS – European Geostationary Navigation Overlay Service
- ELIXIR – Distributed Infrastructure for Biological Data
- EMBRC – European Marine Biological Resource Centre
- EMSO ERIC –European Multidisciplinary Seafloor and water column Observatory
- EOSC – European Open Science Cloud
- ESS ERIC – European Social Survey
- EuroGEO – Europe's part of the Group on Earth Observations (GEO)
- EuropaBON – Europa Biodiversity Observation Network
- Galileo – Europe's Global Satellite Navigation System
- GBIF – Global Biodiversity Information Facility
- GEO BON – Group on Earth Observations Biodiversity Observation Network
- GEOSS – Global Earth Observations System of Systems
- GERI – Global Ecosystem Research Infrastructure
- iBOL – International Barcode of Life
- ICOS ERIC – (the ecosystem component of) the Integrated Carbon Observation System
- ILTER – International Long-Term Ecological Research Network
- Jerico-RI – Joint European Infrastructure of Coastal
- LifeWatch ERIC – e-Science Infrastructure for Biodiversity and Ecosystem Research
- Other

3. In which capacity are you currently involved with those Research Infrastructures or Earth Observation Programmes?

- National Focal Point
- Member of the governance structure of the RI or EO programme

- Adviser/technical support provider Research Vessels
- User of products or services UNBL – UN Biodiversity Lab
- Outreach activities (fora, (side-)events, workshops)
- Other

4. Please give details on your response here, e.g., if you have different forms of engagement with different Research Infrastructures or Earth Observation Programmes.

5. According to you, for which Research Infrastructures or Earth Observation Programmes would it be helpful to have Biodiversa+ activities aiming to overcome possible barriers to their use?

Please select at most 4 options.

- Bioscan Europe
- Copernicus – European Union's Earth observation programme
- Danubius-RI – International Centre on Advanced Studies on River-Sea Systems
- DiSSCo – Distributed System of Scientific Collections
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- Other

6; You may provide details on your responses here (type of barriers and potential Biodiversa/ activities to help overcome these).

biodiversa+
European Biodiversity Partnership

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Agenda

One of the objectives of Biodiversa+ workplan is to achieve : "**A better use of global biodiversity research infrastructures**". In this context this workshop is being organised to (further) identify **possible barriers to the use of research infrastructures**, and assess what Biodiversa+ can do to help overcome these. The workshop will help Biodiversa+ to **identify which areas are of priority and to design its next activities** (i.e. capacity development or further dialogue workshops with RI's).

13:30 - 13:40	Welcome words and Tour de Table
13:40 - 13:50	Introduction
13:50 - 15:00	1st Session: Possible barriers to the use of research infrastructures by biodiversity scientists in the European Research Area

- Presentation of the results from a survey on the use of RIs by project leaders of Biodiversa funded projects.
- Open discussion around the possible barriers to the use of RIs in the ERA and what Biodiversa+ could do to overcome theses.

15 MIN BREAK

15:15 - 15:50	2nd Session: Biodiversa+ Flagship Programmes

- Presentation of ongoing Biodiversa+ Flagship programmes
- Open Discussion on input and suggestions from the RIs regarding ongoing and upcoming Flagship programmes

15:50 - 16:00	Conclusion of the day

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