bioagora

Bio Knowledge Agora: Developing the Science Service for European Research and Biodiversity

State of Knowledge

D3.2. Knowledge synthesis report of existing and ongoing projects and initiatives

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LIST OF ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Meaning / Full text
BDS2020	EU Biodiversity Strategy 2020
BioAgora	Bio Knowledge Agora: Developing the Science Service for European Research and Biodiversity Policymaking
CORDIS	CORDIS is the European Commission's source of information about EU-funded research and innovation
DG RTD	Directorate General Research and Innovation
FP7	7th Framework Programme
KCBD	Knowledge Centre for Biodiversity
WP	Work package
T1.1	Task 1.1 Typology of challenges

BACKGROUND: ABOUT THE BIOAGORA PROJECT

BioAgora is a collaborative European project funded by the Horizon Europe programme. It aims to connect research results on biodiversity to the needs of policymaking in a targeted dialogue between scientists, other knowledge holders and policy actors.

Its main outcome will be the development of a Science Service for Biodiversity. This new service will fully support the ecological transition required by the European Green Deal and the European Union's Biodiversity Strategy for 2030.

The BioAgora project was launched in July 2022 for a duration of 5 years. It gathers a Consortium of 22 partners, from 13 European countries, led by SYKE, the Finnish Environment Institute. Partners represent a diversity of actors coming from academia, public authorities, SMEs, and associations.

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EXECUTIVE SUMMARY

This report (D3.2) is a deliverable of the BioAgora project, funded under the European Union's Horizon Europe research and innovation programme under grant agreement No 101059438.

The aim of this document is to detail how Task 3.2 of BioAgora has analysed the relationship between EU research projects and their policy impacts, and to present these findings. To achieve this, Task 3.2 developed a comprehensive database of EU-funded biodiversity-relevant research projects based on the data available on CORDIS. Basic project data was extracted from the available information (e.g. funding amount, duration), policy targets, stated and potential contribution to the EU Biodiversity Strategy for 2020, reported impacts and enabling and hindering factors. Projects were assessed using statistical and content analysis methodologies. This report analysed 183 projects in the period between 2008-2023 using CORDIS data. The projects were funded by either the 7th Framework Programme (FP7) or Horizon 2020.

Our analysis revealed that while 63% of projects reported some type of policy impact, only 15% of projects, however, provided strong evidence for these claims. Instrumental policy impacts, such as influencing policy documents, were found in 22% of projects. Among projects with instrumental impacts, only 9% were supported by strong evidence. Key factors influencing all types of policy impacts included project duration, pre-defined policy intent, and targeted contributions to the EU Biodiversity Strategy for 2020 (BDS2020). Understanding the importance of engagement and availability of knowledge were also relevant determinants for the projects' success in achieving impacts. Statistical analysis additionally highlighted a strong correlation with the number of the project consortium's partners, involvement of knowledge brokers, and the timing of outputs feeding into key new policy cycles when decisionmakers are likely to seek information.

Whilst we acknowledge the limitations of our research, particularly the challenges in demonstrating causality and tracing policy impacts linearly, delayed impact manifestation, and the role of key actors in facilitating policy influence rather than projects, our findings demonstrate that, at present, direct policy uptake from research appears to be lagging in the field of biodiversity. It is thus important to align research calls, research project design and their policy objectives to enhance the policy impact of EU funded research projects. In order to amplify research uptake in policymaking, we recommend incorporating specific policy requirements in relevant research calls, so that projects have a clear policy target to address from the outset. We also suggest supporting projects with extended durations and broad stakeholder engagement, particularly involving knowledge brokers. Furthermore, we encourage policymakers to directly engage with these projects and enable forums to interact with researchers to share their needs and the types of information they require, recognising that evidence-based policymaking is a collaborative effort, not solely the responsibility of researchers.

NON-TECHNICAL SUMMARY

This document is part of the BioAgora project, funded by the EU's Horizon Europe programme. It explains if and how biodiversity relevant EU research projects had policy impacts. A database of 183 EU-funded research projects (between 2008-2023) related to biodiversity (e.g. contributing to the main EU policy on biodiversity, the EU Biodiversity Strategy for 2020) was created. Information from the EU's project database (CORDIS) including details including funding, duration, and policy impacts was collected. When assessing these projects' policy impacts, the results showed that while 63% of the projects claimed to influence policy, only 15%, however, provided strong evidence to support these claims. Only 22% of projects directly fed into policy documents and processes, while only 9% of projects could demonstrate strong evidence for this. While we acknowledge the limitation of our research, particularly the complexity of tracing direct policy impact, these findings indicate that direct policy uptake from research may be lagging in the field of biodiversity. When assessing what could enable these impacts, we found that factors such as project length, clear, pre-defined policy goals, and contributions to the EU Biodiversity Strategy

for 2020 (BDS2020) played an important role. Engagement and availability of knowledge also appeared to play an important role. The analysis found that having more and diverse project partners (e.g. NGOs, think tanks, public bodies) and timing outputs with key policy cycles increased the likelihood of impact. To improve the influence of research on policy, the findings suggest that research calls, project designs, and policy goals should be better aligned. Projects should be given clear policy targets to address from the start. Longer project durations and broader collaboration, especially with knowledge brokers, are recommended. Policymakers should also engage directly with projects to communicate their needs, recognising that evidence-based policymaking is a shared responsibility between researchers and decision-makers.

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1. Introduction

Scientific research is the key to inform evidence-based policies. Yet, there remains a significant gap in ensuring widespread access to and the uptake of research-based knowledge among policymakers across various sectors and decision-making levels concerning biodiversity (Buxton et al., 2020; Rose et al. 2018; Young et al., 2014). To date, there is also limited knowledge about how scientific research and their projects feed into and impact relevant policies, and what enables or hinders this knowledge from being used by policymakers (Posner et al., 2016; Zolyomi et al., 2023). This gap subsequently poses a challenge to effective and evidence-based decision making at local, national, EU, and global levels, and prospective, potentially more policy-relevant research.

The BioAgora project, funded by the Horizon Europe Programme, aims to address this gap by establishing strong connections between research outcomes on biodiversity and decision-making processes through targeted dialogues among scientists, knowledge holders, and policy actors. BioAgora aims to develop a new Science Service for Biodiversity, to support effective coordination and collaboration at the Science-Policy Interface on a European scale.[1] Task 3.2 aims to contribute to the Science Service and its various functions, by partially filling a knowledge gap concerning what impacts EU-funded research is having on biodiversity policy. Task 3.2 created a database of 183 relevant research projects (Annex 1) and used the database to harvest knowledge and synthesise reported policy impacts from projects contributing to the EU Biodiversity Strategy for 2020 (BDS2020)[2]. To capture more nuanced understanding of policy impacts beyond instrumental impacts, we used a typology that categorises policy impact into five main categories (conceptual, instrumental, capacity building, enduring connectivity and behaviour/attitude change), that has been used before in biodiversity-related impact mapping (Edwards and Meagher, 2020). In doing so, we also aimed to explore what enabled or hindered such policy impacts based on existing research findings (Bartlett et al., 2017; Edler et al., 2022; Zolyomi et al., 2023) and BioAgora's Task 1.1's deliverable on challenges that impede the Biodiversity Strategy for 2030 (BDS2030) (Lenti et al., 2023).

Based on the analysis of the 183 FP7 and Horizon Europe-funded biodiversity-relevant projects, we found that 63% of projects reported any policy impact. Of this 63% of projects, most reported conceptual policy impacts that seek to contribute to raising awareness or increase policy knowledge. Only 32% of all projects (irrespective of policy impact type), however, offered some evidence or justification about their claimed policy impact. Only 15% of all projects provided strong evidence to support their policy impact claims. Out of the projects we analysed, 22% declared instrumental policy impacts (influencing policy documents or processes), while only 9% of all projects could underline these instrumental impact claims with strong evidence. Considering what could plausibly influence policy impact, we find associations with allocated time (project duration), initial policy intent as well as planned and targeted contribution to the BDS2020. We could also see relationships between projects that could address the hindering and enabler factors, specifically relating to the availability/flow of knowledge as well as engagement and policy impact. Project duration, the number (and diversity) of partners and timing of project outcomes feeding into key policy cycles additionally played a defining role in projects having policy impact. Findings from our analysis, particularly in relation to enabling and hindering factors aim to support the ongoing implementation of the current strategy.

Whereas we acknowledge the limitations of our research, especially the challenges in demonstrating causality, the linearity of policy impacts and delayed impact manifestation, we believe Task 3.2 can provide some useful lessons learnt. Task 3.2 is among the first to systematically enhance our collective understanding of the policy impacts of EU funded biodiversity relevant research using a more holistic categorisation of policy impacts. In doing so, Task 3.2's findings contribute to better understanding biodiversity-relevant EU research projects' impacts on policy. Additionally, the outcomes of the analysis provide recommendations regarding how EU funded research projects

[1] https://bioagora.eu/about-bioagora/

[2] The EU Biodiversity Strategy for 2020. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52020DC0380

could potentially yield more policy impacts to ultimately support the implementation of the Biodiversity Strategy for 2030 (BDS2030).

In this deliverable, we first provide an overview of the methodology of the research, including the conceptual framework for the database construction, the selection and analysis of the projects, and the data processing. We then discuss our results and provide some key points and recommendations primarily for policy consideration in the field of biodiversity relevant research.

2. Methodology

2.1. Conceptual frame of the database design

There is an increasing demand to comprehend how scientific research influences policy, and how policymaking considers scientific evidence (Edler et al., 2022). As defined by Jones and Cleere (2014), policy impact involves influencing how policymakers act and how policies are made. Policy impacts may also refer to changes in political culture and the processes underpinning policy development. To measure the policy impacts of research, earlier models have primarily focused on the linear relationships between research outputs and impacts (Edler et al., 2022). These approaches, however, have been replaced by more holistic frameworks (e.g., Bozeman and Sarewitz, 2011), as scholars have highlighted that the influence of science unfolds over the long term and may not always be easily identifiable or directly linked to specific projects. Some research impacts are also easier to measure, while others remain difficult to detect or much harder to trace (Muhonen et al., 2020). Accordingly, a more nuanced approach to identify policy impacts is necessary. Wilkinson et al. (2012) proposed a more integrated approach, incorporating stakeholder relationships and exchanges as key elements of policy impact. Nutley et al. (2007) introduced categories of impact—instrumental, conceptual, and capacity building—expanded by Edwards and Meagher (2020) to include enduring connectivity and attitudes towards knowledge exchange, forming a comprehensive framework for assessing policy impacts, which was adopted in relation to biodiversity (Zolyomi et al., 2023). Despite the development of more holistic approaches and their advantages, a strong emphasis on short-term and direct impacts remains (Edler et al., 2022).

In line with understanding the types of impacts, research also explored how science can achieve higher policy impacts, for example, through engaging key stakeholders, driving more evidence-based policy making with a lasting effect resulting in long-term policy change. Nutley et al. (2007) found that impact factors such as salience (timeliness of results to feed into specific policy processes), credibility of research, and legitimacy (the proper process to deliver results) can influence policy impacts. Participation of knowledge brokers, co-creation, early involvement of relevant policy partners, adequate translation of scientific messages for policy audiences are additionally highlighted as factors that can create policy impacts (Edler et al., 2022). Crucially, wide-stakeholder engagement, a focus on policy impacts from the beginning, and compiling policy recommendations from the onset along with adequate time and funding allocations have been specifically emphasised as key impact factors in biodiversity research (Zolyomi et al., 2023; Bartlett et al., 2017, Lenti et al., 2023).

Drawing from the literature on policy impact, we developed our methodology with two main objectives: to comprehensively map various types of impacts and to test whether the impact factors identified in the policy impact literature are indeed linked to the reported impacts. Aligning with the research approach and goals of our task, we created a database to evaluate biodiversity-related research projects based on their general characteristics, and contributions to the BDS2020, while also assessing their policy impacts and potential enabling and hindering factors to identify lessons learnt for policy impact.

2.2. Process of the systematic data collection of research projects

To select the relevant projects for the database, we considered the following criteria. The projects shall 1) be a research project (FP7 or Horizon 2020) 2) have an EU scope (the projects took place in EU Member States or the projects could clearly demonstrate an EU scope through the contribution of specific EU policies), 3) contribute to the EU Biodiversity Strategy 2020 (BDS2020) and 4) be a single project (not umbrella projects or programmes covering multiple projects to avoid double counting of project impacts). To find these projects, Biodiversity Strategy 2020-relevant keywords were selected and used to conduct systemic searches on CORDIS[3] the European Commission's database of EU projects. Here, we selected filters for research projects funded under the FP7 (2007-2013) or Horizon 2020 (2014-2020) programmes due to their timelines, as these were more likely to produce scientific data relevant to the BDS2020. The focus on EU research projects was further justified by their emphasis on EU priorities and likely EU geographical coverage. Additionally, the EU research funding instruments often explicitly require projects to contribute directly to policy and address actual policy needs, making them more likely to incorporate policy aspects and aim for policy impact. These projects also have greater opportunities to directly influence EU policy due to the involvement of key entities and their connection with decision-making processes and actors. Furthermore, the availability of EU research projects in CORDIS provides a central, standardised database that enabled consistent data access and comparison.

To determine whether projects contributed to the BDS2020, specific keyword chains were set up and run on CORDIS as detailed below. The collected projects were then further assessed to confirm their alignment with the above-noted criteria and were processed according to the database categories. This included basic project information (e.g., keywords, duration, funding), contributions to BDS2020 Targets and Actions, intended policy use and impact, actual policy impacts and their evidence, enabling and hindering factors, additional lessons learned, and the Overton Index. The populated data was subsequently analysed using descriptive statistics, statistical regressions, and qualitative content analysis.

2.1.1 Establishing the list of projects by setting the scope and keywords

To understand the impacts of EU research projects on the EU BDS2020, we focused on collecting completed projects on the CORDIS database. The projects were selected from the period 2008-2023 to ensure their overlap with the BDS2020 timeframe (2011-2020), allowing them to potentially contribute to its formulation, implementation, or monitoring. Considering the average length of research projects being 3-4 years, projects in the database commenced from 2008 onwards, ensuring they could be completed in time to contribute to the strategy. Only projects that started within the strategy's timeframe and were completed by 2023 were included. Importantly, we

[3] https://cordis.europa.eu/search/en

applied this timeframe as our assessment was based primarily on the final reporting of the projects, which are only produced at the end of the project period. It is important to note that final reports per se may not have always been available. In some cases, CORDIS only displayed periodic reports, which then were used as a basis for our analysis (also see under section 2.5 detailing limitations of the research).

To ensure relevance with the BDS2020, specific keywords were selected in line with the BDS2020's Targets and Actions (European Commission, 2011)[4]. We identified 14 specific keywords/keywords chains in our initial searches that align with the BDS2020 Targets and Actions as follows:

- "Biodiversity Strategy 2020"
- "Natura 2000" OR "Birds Directive" OR "Habitats Directive" OR "Birds and Habitats Directives" or "Nature Directives"
- “Restoration”
- "No net loss"
- "Green infrastructure"
- "Ecosystem service*"
- "Rural development" AND biodiversity
- “CAP AND biodiversity”
- "Agricultural genetic diversity"
- "Forest biodiversity"
- "Sustainable use" OR sustainable AND fisheries OR "fish stocks"
- "Invasive alien species"
- "Global biodiversity"
- "Genetic resources" and "fair AND equitable sharing of benefits"

These keywords were tested and refined to ensure they covered all relevant projects as effectively as possible even if projects did not explicitly claim to make contributions to the BDS2020 or did not specifically apply the BDS2020 language on policy targets and actions. The accordingly forged keywords strings were used for each target of the BDS2020 are the following:

- Target 1: Biodiversity OR nature AND “Biodiversity strategy 2020” OR “Natura 2000” OR “Birds Directive” OR “Habitats Directive” OR “Nature directive*” OR "protected area*" OR "protected species*" OR habitat*
- Target 2: Biodiversity OR nature AND “Biodiversity Strategy 2020” OR Ecosystem* OR "ecosystem service*" OR restor* OR “green infrastructure” OR “no net loss” OR “biodiversity loss”
- Target 3: Biodiversity OR nature AND “Biodiversity strategy 2020” OR “agriculture” OR “rural development” OR “Common Agricultural Policy” OR “agricultural genetic diversity” OR forest* OR “forest biodiversity” OR “forest holder*”
- Target 4: Biodiversity OR nature AND “Biodiversity strategy 2020” OR “fish” OR “fish stock*” OR “fish species” OR "fish habitat*" OR "fish ecosystem*"
- Target 5: Biodiversity OR nature AND “Biodiversity strategy 2020” OR “invasive alien species” OR “invasive species” OR “Plant and Animal Health Regimes”
- Target 6: “Biodiversity strategy 2020” AND “global biodiversity” OR “biodiversity proof” OR “genetic resource*” OR “fair and equitable sharing” OR “trade policy”.

Systematic searches were conducted on CORDIS between February-July 2023 using filters (FP7 and Horizon 2020 covering the 2008-2023 period) and the keywords noted above. Selected projects identified by the searches were

[4] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52011DC0244

collected in a separate Excel file to be further assessed (and potentially to be excluded) based on the four key criteria during data processing.

2.2 Processing data of the selected projects

Based on the key literature, a database in an Excel spreadsheet on BioAgora's joint SharePoint site was created and shared with the consortium. After several rounds of iteration among the participating experts and consultation with BioAgora partners, the main categories and subcategories of the database (further details can be found on each main category and their subcategories below) were crafted to enable systemic harvesting of knowledge from the project reports. For each project, the summary report or the information under the "reporting" tab on CORDIS was assessed first to fill in the relevant categories. For additional details, further tabs on CORDIS (such as "fact sheet" or "results") were consulted. It is important to outline that the analysis strictly focused on the information found on CORDIS, and no further assumptions were made e.g. based on additional expert knowledge, reports or websites.

The database categories included subcategories on general information of the project, contribution to the BDS2020 and other policies, policy impact (including enabling and hindering factors), linkage with T1.1 typology of challenges, and the Overton index. The type of data mined was dependent on the database cell requirements within the categories/subcategories and could contain pre-defined selection (e.g. Yes/No), quantitative data (numbers) or text. Detailed information about the categories, an explanation of how the cell was filled out and pre-existing categories of the cell (if relevant) were also provided on the first tab of the Excel sheet named Readme. Below, each of the main categories and their subcategories are detailed.

2.2.1. Project information

Project information collected in the database included the acronym of the project, the full name of the project, project duration, the main aim/short description of the project, keywords in CORDIS, the CORDIS link of the website/summary report (the summary/synthesis report) that was used for the analysis, the number of partners involved in the consortium as well as the involvement of knowledge broker (Yes/No) or public bodies (Yes/No), amount of EU contribution (EUR), total project budget (EUR) and the type of research funding (FP7 or Horizon Europe or their relevant sub-funding under the Marie Curie programme).

2.2.2. Contributions to Biodiversity Strategy for 2020

The relevance of the projects to BDS2020 was recorded and categorised into potential contributions and stated contributions to the targets and actions of BDS2020. We note the contribution as potential (P) when it aligned with the actions and targets of the strategy, but was not noted in the project specifically, and stated (S) when the contributions in the targets and actions were explicitly noted in the project documents. The targets and actions were entered using each action's/target's specific codes in the database. For guidance, relevant targets, pillars and actions could be found on a separate sheet of the database with the tab called "BDS2020&2030".

2.2.3. Policy context

In the "Final results likely feeding into the new BDS or EU programming policy cycles" column (Yes/No), we were interested to see if the project's final outputs were produced in time for the preparation of the BDS2030 (2017-2020) or the EU programming cycles (2012-2014; 2017-2020). Notably, the latter period was extended to four years to accommodate the overlap with BDS2030 preparations. Information regarding the policies and regulations that the project claimed to contribute to, as reported in CORDIS, included relevant global, EU, national, regional, or local biodiversity policies listed in the reports. For example, entries included the Water Framework Directive, the Common Agricultural Policy etc. as well as global and local policies.

2.2.4. Policy impact

Columns here focused on policy impact aspects of the projects and were sub-categorised into the following:

- The "intended use of the project" described what the project was originally set to achieve with their outcomes. It outlined what intended policy use the project was dedicated to.
- The "intended policy impact of the project" succinctly described the desired effects and changes that were expected to occur within the policy domain as a result of the project or foreseen by the project documents. Here, we were specifically interested in any policy instrument the project aimed to impact on.
- The "actual policy impact" sub-category highlighted what changed - the tangible policy impacts that have occurred as per the project reporting.
- "Type of (policy) impacts" were categorised according to Edwards and Meagher's (2020) impact classification. The impact classification used a typology with five categories to differentiate between the types of impact reported: instrumental change, conceptual change, capacity-building, enduring connectivity, and cultural/attitude change. We considered projects impacts:
    - an instrumental change (I) if amendments/changes to regulations were reported, relevant decisions, implementations, and actions or new formulations of such were produced and directly fed into policy;
    - conceptual change relevant impacts (C) if the project resulted in increased awareness and knowledge among decision makers;
    - capacity-building (CB) if projects resulted in increased skills and expertise;
    - enduring connectivity (EC) when changes occurred led to established networks, relationships, and connections;
    - cultural/attitude changes (CA) if clear implications in attitude and behaviour change were reported, including changes in how knowledge is produced for policymaking.
- "Description of evidence" described the evidence provided in the reporting e.g. about how the policy impact was achieved (e.g. the policy brief was disseminated to a certain audience or the workshops involved specific policy stakeholders), and on what basis the strength of the evidence was chosen (see below).
- "Strength of evidence" was established based on the "Description of evidence", and it included information on whether the evidence was strong, ambiguous, weak or unknown. The strength of the evidence depended on the information provided by the project reporting. The evidence was regarded:
    - strong if the policy impact was clearly highlighted with distinct information (e.g., the project generated a tool that was discussed with particular policymakers and subsequently was applied in implementing a specific regulation).
    - Ambiguous if references to policy considerations were made but it was unclear how impacts were achieved, despite being highlighted.
    - Weak or unknown if the impact was noted but with limited or no evidence (Zolyomi et al., 2023).

2.2.5. Enabling and hindering factors and lessons learnt

Enabling factors and hindering factors described what likely influenced a policy impact to occur (why/how or why not change happened and what factors or processes enabled or hindered these impacts) according to the project reports. The lessons learnt collected information on what worked, what could (or should) be done differently, and what could (or should) be done in the future to reach a better impact. In practice, however, the lessons learned category largely overlapped with the enabling and hindering factors and were considered altogether during the analysis.

2.2.6. Cross-validation with Task 1.1 specific enablers and barriers

BioAgora's Task 1.1 analysed and found eight typologies of challenges[5] that potentially limit the implementation of the BDS2030 (which we believe to be applicable to our task given the context). This typology included:

- availability of knowledge
- funding
- horizontal policy coherence
- management effectiveness
- vertical policy implementation
- systematic spatial planning
- engagement
- current political and economic structures.

Projects that identified the aforementioned challenges had this data captured in T3.2's database as enabling and hindering factors. During data collection and assessment, we identified additional categories highlighted in the reports, which were then added to the existing T1.1's typology, including:

- political willingness/priorities/values,
- public support,
- project duration,
- trust and transparency,
- governance.

Additionally, the availability of knowledge category was further extended to three sub-categories based on the project reports:

- availability of knowledge,
- type of information/knowledge and
- flow of information/knowledge

2.2.7. Overton Index

The so-called Overton index was calculated to ensure cross-validation of the policy impact results, using Overton[6], a web-based tool, which identifies and tracks mentions of academic documents. In this study, the Overton index was calculated as a quantitative measure of a project's visibility and engagement within policy-related discourse. This index was derived by aggregating the number of mentions each project received across various policy documents accessible through Overton. These documents, as defined by Overton, are primarily written for policymakers and published by policy-focused sources like government reports, parliamentary records, policy briefs, and publications by think tanks or intergovernmental organisations (IGOs), all of which are fully indexed in Overton's database[7]. The methodology involved defining specific search parameters tailored to each EU project—project acronym and title—to ensure that search results are specific to the project. The data collected included the frequency of mentions and the sources of documents - government, think tanks and intergovernmental organisations - in which the projects were mentioned. For this study, the Overton Index primarily relied on simply counting the number of times a project was mentioned, offering a straightforward and reproducible approach. The

[5] https://zenodo.org/record/7685651#.Y_9RRx_MK5d
[6] https://app.overton.io
[7] https://help.overton.io/article/whats-your-definition-of-a-policy-document/

relationship between the Overton Index and the policy impact of projects was assessed by comparing the index scores against documented policy impacts, which were categorised qualitatively.

2.2.8. Demonstration cases relevance

To provide relevance to BioAgora's demonstration cases, we categorised projects accordingly into the following themes based on each project's thematic focus, keywords and objectives: nature-based solutions (NbS), freshwater, marine, pollination, multifunctional landscapes, transformative change, and monitoring and scenarios. For example, with the NbS case, we considered projects that contributed or related to nature-based solutions, including for instance, greening urban, peri-urban, green infrastructure, and urban ecosystems. We selected the freshwater case if the project was centred around topics or keywords relating to e.g. the Water Framework Directive, water use/abstraction and river restoration, for example. Similarly, this also applied to the marine case with related keywords. The multifunctional landscape case considered projects that cover land degradation neutrality, coherent network of natural areas, agricultural landscapes, and sustainable landscapes. We also considered projects including spatiotemporal indicators, land-use change, scenarios for monitoring and scenarios case. No projects were deemed relevant for the transformative change demonstration case as projects did not note specifically transformative change or had distinct focus e.g. on values change, leverage points, systematic changes, behaviour or attitude change.

2.3. Review process

The database was constructed through several iterative phases, both within UNEP-WCMC that was leading this deliverable, and in collaboration with the consortium. During an online workshop of Work Package 3 (WP3) - state of knowledge the initial frame of the database was presented at the end of 2022. This was followed with further discussion in online and in-person BioAgora meetings. The initial database framework was also presented to Directorate General Research and Innovation (DG RTD) and the Knowledge Centre for Biodiversity (KCBD) to request input.

During data collection, several internal reviews were conducted to validate and standardise data interpretation and category application, particularly for the qualitative policy impact sections, given the subjectivity of some categories. These reviews occurred both during the data collection process and after its completion. Additional formatting and content checks were performed and cross-checked with participating researchers.

2.4. Data analysis

After thorough revision and cross-checking of the database, the data was analysed using descriptive statistics, logistic regression (binary, ordinal and multinomial) and rank-biserial correlation using IBM SPSS Statistics 29.0.2.0 (see table 1). Additionally, qualitative content analysis was conducted using MAXQDA. To ensure robustness and triangulation of our findings, we applied the Overton Index and qualitative insights from MAXQDA to contextualise and corroborate our results.

For the general quantitative analysis defining percentage and descriptive statistics filtering and sum commands in Excel were applied. Data was summarised according to the main variables in each category. For the SPSS application, the data considered as nominal outcomes and predictors were first coded, assigning values of 0 or 1 depending on whether the given category was met (Yes value) or not (No value).

Table 1: Summary of statistical analyses used in this study

Model	Model type	Response (/dependent/outcome) variable	Predictor (/independent) variables
1	Binary logistic regression	**Policy impact** (dichotomous: Yes = 1, No = 0)	**13 variables**: • Contributions to BDS 2020 • Involvement of knowledge brokers • Involvement of policy bodies • Policy intention • Timing of results • Availability of knowledge • Engagement • Horizontal policy coherence • Current political and economic structures • Vertical policy implementation • Project duration • Number of project partners Systematic spatial planning
2	Binary logistic regression	**Instrumental change** (dichotomous: Yes = 1, No = 0)	**13 variables**: As in model 1
3	Binary logistic regression	**Policy impact** (dichotomous: Yes = 1, No = 0)	**6 variables**: Each of the six targets of the BDS 2020 (see Table 2)
4	Ordinal logistic regression	**Number of policy impact types** (ordinal: 1-5)	**9 variables:** • Funding source (FP7/H2020) • Contributions to BDS2020 (Stated/potential) • Involvement of knowledge brokers • Public bodies' involvement • Policy intentions • Project duration • Number of project partners • Timing of results • Total EU contributions
5	Multinomial Logistic Regression	**Strength of evidence**	**5 variables:**

		(nominal: Strong = 0, Ambiguous = 1, Weak/No Evidence = 2)	• Engagement • Availability of knowledge • Policy intention • Timing of results • Project duration Number of project partners
6	Non-parametric Rank-biserial Correlation	**Overton Index** (ranked)	**1 variable each for the analyses:** • Policy impact • Strong evidence of policy impact

2.4.1. Logistic regression analysis

Binary logistic regression analyses were conducted to examine the relationship between 1) projects with policy impacts and relevant predictor variables; 2) instrumental change and the various predictors and 3) policy impacts and the six targets of the Biodiversity Strategy 2020. The outcome variables, (policy impact and instrumental change), were coded as a binary outcome indicating whether a project had policy impacts (yes/no) or instrumental change (yes/no). We used binary logistic regression because the outcome variables—policy impact and instrumental change—are dichotomous, meaning they have two possible outcomes (i.e., whether a project had policy impacts or not). Logistic regression is specifically designed to model such binary outcomes and estimate the probability of an event occurring (policy impact or instrumental change) based on a set of predictor variables (Laerd Statistics, 2017).

Before conducting the logistic regression, a univariate analysis of variance (ANOVA) was performed for each predictor variable to identify those with a significant relationship to the dependent variable. An unconventional cutoff for statistical significance was applied ($p < 0.01$) to ensure that only the most robust predictors were included in the final model and to mitigate the risk of overfitting. The following significant predictors that met the $p<0.01$ threshold included, contributions to BDS 2020, funding source (FP7 or Horizon 2020), number of project partners, involvement of policy bodies, involvement of knowledge brokers, T1.1 enabling and hindering factors, policy intentions, project's final results likely feeding into new BDS or EU programming policy cycles (timing of results) and project duration. They were entered into a logistic regression model to estimate their effects on the likelihood of influencing the outcome variables. The model fit was assessed using the -2 Log Likelihood, Cox & Snell R-squared, and Nagelkerke R-squared values to evaluate the explanatory power of the model. The significance of the overall model was tested using the Omnibus Tests of Model Coefficients. Individual predictors were assessed using Wald tests.

Model performance was further evaluated using the Hosmer and Lemeshow goodness-of-fit test to check for the adequacy of model fit to the data. The classification accuracy of the model was examined using a classification table, which provided the overall percentage of correct predictions for both the "policy impact" and "no policy impact" categories for this case. Residual analysis was conducted to identify any potential outliers or influential data points, with cases flagged based on standardised residuals. For all the analyses, statistical significance was determined at p< 0and reported with corresponding odds ratios (Exp(B)) for interpretation of effect sizes.

2.4.2. Ordinal logistic regression analysis

An ordinal logistic regression analysis was performed to investigate the factors influencing projects with multiple types of policy impacts, categorised from 0 to 5, where 0 represents no impact and 5 represents the presence of all five types of policy impacts. Ordinal logistic regression was chosen because it is suitable for predicting outcomes with ordered categories, even when the distances between categories are not equal (Laerd Statistics, 2015).

The analysis included both nominal and continuous predictor variables, such as funding source (FP7 or Horizon 2020), contributions to BDS2020, involvement of knowledge brokers (e.g., EU agencies, NGOs), public bodies' involvement (excluding research and policy institutions), policy intention, project duration (in years), number of project partners, likelihood of results feeding into future EU policy cycles, and total EU contributions. The model's assumptions, including proportional odds, were tested using the test of parallel lines, and goodness-of-fit was evaluated using Pearson and deviance chi-square tests. Model fit was assessed through a comparison of the null and final models, and pseudo-R-squared values (McFadden 1974; Cox and Snell 1989; Nagelkerke 1991) were reported to indicate the model's explanatory power. This approach allowed for the identification of significant predictors that explain variations in the number of policy impact type experienced by different projects. Statistical significance was determined at $p < 0.05$, and all analyses were conducted using a logit link function.

2.4.3. Multinomial logistic regression analysis

A multinomial logistic regression was conducted to examine the predictors of strong impact indicators. This model was chosen because the outcome variable, strength of evidence, is categorical with four levels: strong (0), ambiguous (1), weak/unknown (2), and no evidence (3), with "no evidence" serving as the reference category. Dummy variables were created for the three levels of evidence (strong, ambiguous, weak/unknown) to model the likelihood of each outcome relative to no evidence. Predictor variables included engagement, availability of knowledge, policy intention, number of partners involved, project duration, and Final results likely feeding into the new BDS or EU programming policy cycles (timing of results). The model fit was assessed using likelihood ratio tests, comparing reduced models to the full model, and the goodness-of-fit was evaluated using Pearson's chi-square and deviance statistics. Pseudo-R-squared measures (McFadden, 1974; Cox and Snell, 1989; Nagelkerke, 1991) were calculated to assess the explained variance. Variables with p-values less than .05 ($P<0.05$) were considered statistically significant, and odds ratios were used to interpret the direction and strength of associations. The final model provided insights into which factors increased the likelihood of stronger or weaker evidence of policy impact.

2.4.4. Content analysis

To assess the qualitative aspects of the data, a content analysis approach was applied. This involved mining relevant text extracts from project reports, specifically those that highlighted enabling or hindering factors and lessons learned in the context of policy impacts. The extracted data were then systematically coded according to the typology developed in T1.1, which categorises hinderers, enablers and lessons learned of policy implementation concentrating on the BDS2030. The coding process utilised qualitative content analysis (using consistent coding according to pre-defined categories as per T1.1) to ensure consistency and depth of interpretation.

Additionally, the software MAXQDA was employed to assist in the analysis, providing advanced tools for visualising and interpreting the frequency and patterns of words. This was particularly useful for categories that did not have simple binary (Yes/No) responses or numerical values. Through MAXQDA, word clouds and frequency tables, a more comprehensive understanding of the qualitative data was enabled. This approach ensured that nuances in the text were captured, highlighting recurring themes, stakeholder perspectives, and contextual factors influencing policy impacts. These steps were taken to maximise the accuracy and reliability of the qualitative insights derived from the project reports.

2.4.5. Non-parametric rank-biserial correlation

To assess the relationship between the Overton Index, a continuous variable, and our findings of 1) policy impact, and 2) policy impact with strong evidence, both dichotomous variables, a non-parametric rank-biserial correlation were employed respectively. The rank-biserial correlation is an appropriate method for examining associations

between a continuous variable and a dichotomous variable when the assumptions of normality (when data are unevenly spread out) and homoscedasticity (even variability in data points) are violated. Given the presence of outliers in the Overton Index and the non-normal distribution of the data, this test was deemed suitable for the analysis. That is, this test does not require a normal distribution and is less affected by extreme values (outliers), making it suitable for our data.

Prior to conducting the analysis, the Overton Index—a continuous variable—was transformed into ranks (sorted orders) to account for the non-normal distribution (uneven distribution). The policy impact and policy impact with strong evidence variables were used as the grouping variables for each test. The rank transformation of the Overton Index allowed for the assessment of correlations in a manner that is robust to outliers and does not assume linearity.

The rank-biserial correlations were computed by performing a Mann-Whitney U test, which assesses whether the distribution of the ranked Overton Index differed significantly between the two groups (policy impact vs. no policy impact; and strong evidence vs. no strong evidence respectively). The rank-biserial correlation coefficient was derived from the Mann-Whitney U statistic.

The significance level was set at p-values less than .05 ($p < 0.05$). Pearson's correlation was calculated between the ranked Overton Index and the dichotomous policy impact and strong evidence variables respectively for comparison purposes.

2.5. Limitations of the methodology

Whereas the T3.2 database may serve as an indicator of the impacts research projects have produced and what could potentially enable policy impacts, we understand its limitations. Firstly, we could not exclude the possibility that projects potentially contributing to the BDS2020 were not covered by our search strings as they may have used different keywords, and therefore, were filtered out by CORDIS. Additionally, we understand the complexity of attempting to measure policy impacts, which limits our ability to capture them. Impacts may manifest long after the project's conclusion, potentially beyond the scope of the project's final report. It is also somewhat optimistic to anticipate clear causality, with policy impacts to be delivered in a linear way based on one single project. We also recognise that it may be actors, rather than projects, that may facilitate these impacts. Accordingly, reports directly linked with projects may not fully capture such impacts. Furthermore, it is also possible that some impacts may not necessarily be captured in a research report either because it was not expected to be reported or was not deemed relevant at that point. We might have also overlooked some elements simply because they were not noted strictly in a policy impact context. Importantly, we were additionally unable to evaluate the quality of the impact and to what extent it delivered further impacts unless it was specifically reported. We also did not collect data on additional elements that play a role in influencing policy, including the organisational, environmental and additional societal factors (e.g. specific champions, organisational openness or the actual policy focus on biodiversity due to an external event), which are nevertheless key defining factors in policy impacts. On a technical note, CORDIS sometimes publishes periodic reports instead of final reports, which may result in incomplete coverage of the impacts.

To contrast these plausible limitations, we tested our keywords and consulted with key actors about our database and project selections. We also used a more nuanced understanding and categorisation of policy impact to attempt to capture the broader, more complex implications that extend beyond conventional approaches that focus on instrumental impacts. We also aimed to validate our results with an external tool, the Overton Index that serves as a means of verification of our findings. We acknowledge that while the model demonstrated strong explanatory power, some trends, such as the contributions to BDS2020 approaching significance, suggest that further validation with larger datasets is warranted, although that is beyond the scope of T3.2.

Despite its limitations, T3.2's methodology and analysis offer valuable insights into how research projects contribute to making policy impacts. T3.2 is also important for enhancing our understanding on why certain impacts possibly occurred and how these enabling and hindering factors can be encouraged and discouraged in future calls, tailoring research projects to be more relevant for biodiversity policy formulation, implementation and evaluation.

3. Results

3.1. Main characteristics of the assessed projects

The initial search on CORDIS yielded a total of 14,018 projects, with the majority (n=4,776) related to Target 3 of the BDS 2020. These projects were then further refined using Horizon 2020 and FP7 filters, along with our specific criteria (see section 2.2). Following this pre-selection, 226 projects were shortlisted for processing. During the processing of these projects, according to our categories, the final number of projects included in our analysis was reduced to 183 that fully met our 4-step criteria.

The titles and keywords of these projects already provide some indication of the projects' focus. The most common words in the project titles contained ecosystem (n=40), European (n=28), management (n=25), biodiversity (n=24) and service (n=18) (in association with ecosystem services, but also providing services e.g., in monitoring) (Fig.1). Other common words included sustainable, forest, marine, (climate) change, water and species. Considering projects' keywords in CORDIS, a similar tendency can be observed (it is important to note however that not all projects featured keywords on their CORDIS site - keywords were captured in the case of 151 projects). Ecosystem was the most frequently used keyword (n=47), followed by biodiversity (n=38), marine (n=27), (climate) change, (n=21), fish (n=21), management (n=21) and urban (n=20). Other frequent keywords included fishery, sustainable, conservation, forest, water and farm.

Figure 1: Word cloud of the most common words used in the title of the assessed project

Considering policy impact factors, we extracted information considering project length, number of partners involved, and participation of knowledge brokers and public institutions. On average, projects lasted about 3.5 years, with the majority running for either three years (33%) or four years (29%). About 20% of projects had a duration of approximately two years, while 14% extended to five years. A small portion of projects (around 3%) were either shorter than one year or nearly six years in length (Fig. 2).

Regarding the number of partners involved, projects on average had 15 partners. It is important to note that Marie Curie Actions (FP7) or Marie Sklodowksa-Curie Actions (Horizon 2020) often involved only one partner. When we eliminate projects funded by the latter programme, the average partner number increases to 19 (Fig. 3).

Regarding participation, knowledge brokers —such as national scientific institutes that have direct connections with national or international decision-making bodies, NGOs and think tanks working at the science-policy interface and specific institutions such as the Joint Research Centre— participated in 65% of the projects. Public bodies, including ministries and local authorities, were involved in 35% of the projects. Please note that in some cases knowledge brokers and public bodies may overlap; for example, in the case of the Joint Research Centre (Fig. 3).

In terms of funding, the EU provided a total of 653.6 million EUR across all 183 projects, averaging 3.57 million EUR per project for consortium funding. Including co-funding contributions from partners, the total project budget was 785 million EUR, with an average of 4.3 million EUR per project. Individual project budgets ranged from a minimum of 15,000 EUR to a maximum of 17 million EUR (Fig. 3).

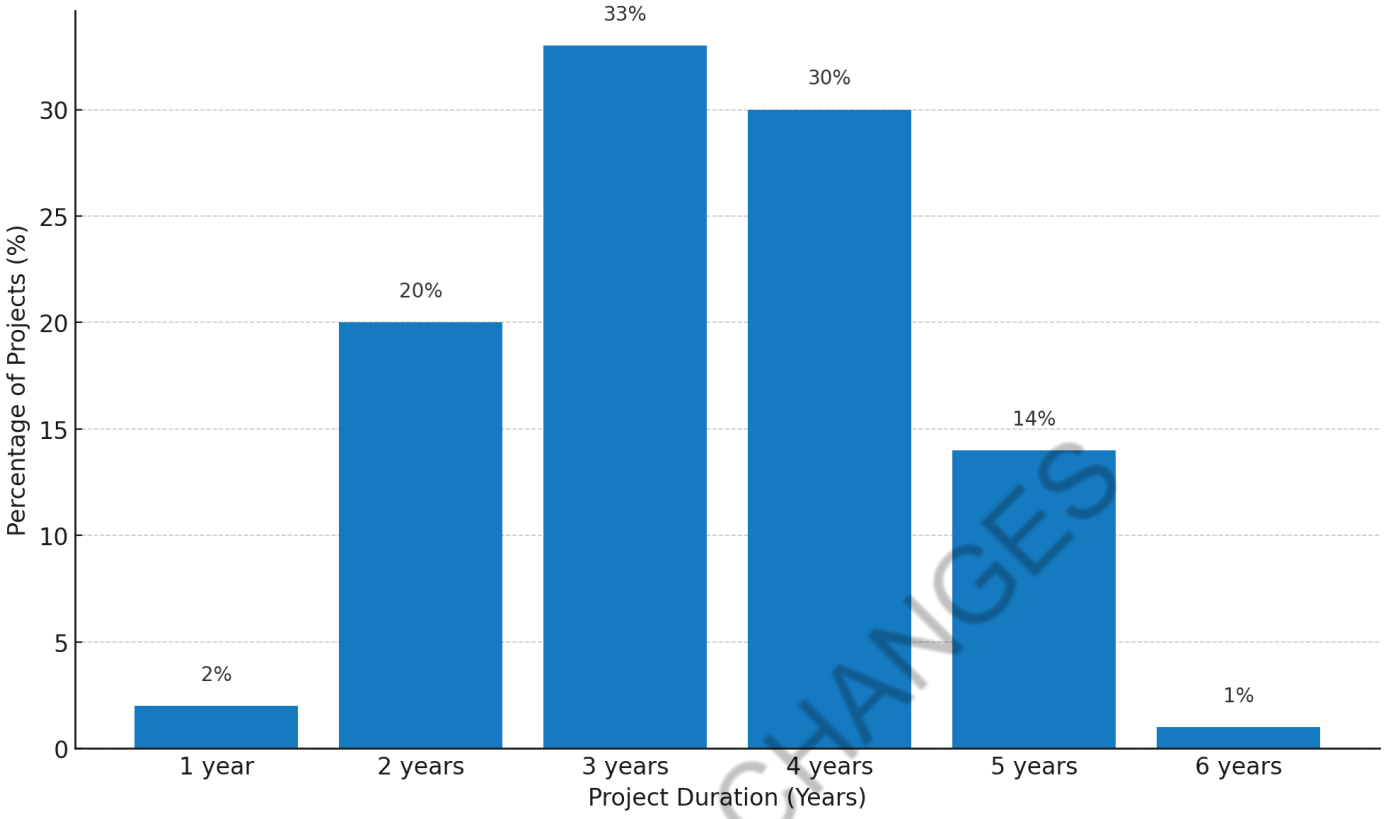

Figure 2: Project distribution according to duration

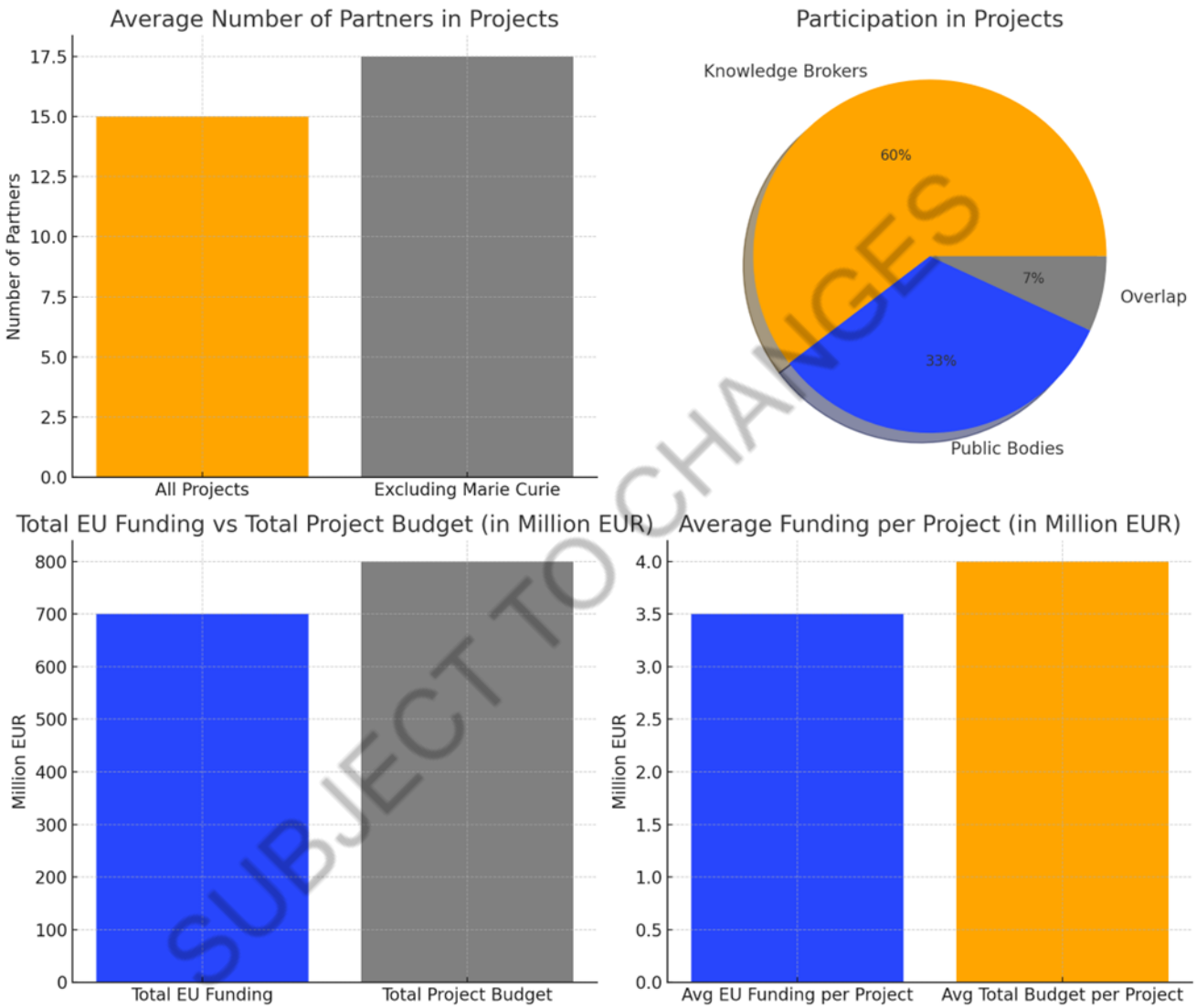

Figure 3: Number of partners and total and average budgets of the 183 assessed projects

Considering different funding programme distribution, the FP7 programme covered 65% of the projects, while 35% was funded by Horizon 2020. Out of the total number of projects 25% were Marie Curie Actions (15% of all projects in the FP7, and 10% in the Horizon 2020 programme) (Fig. 4).

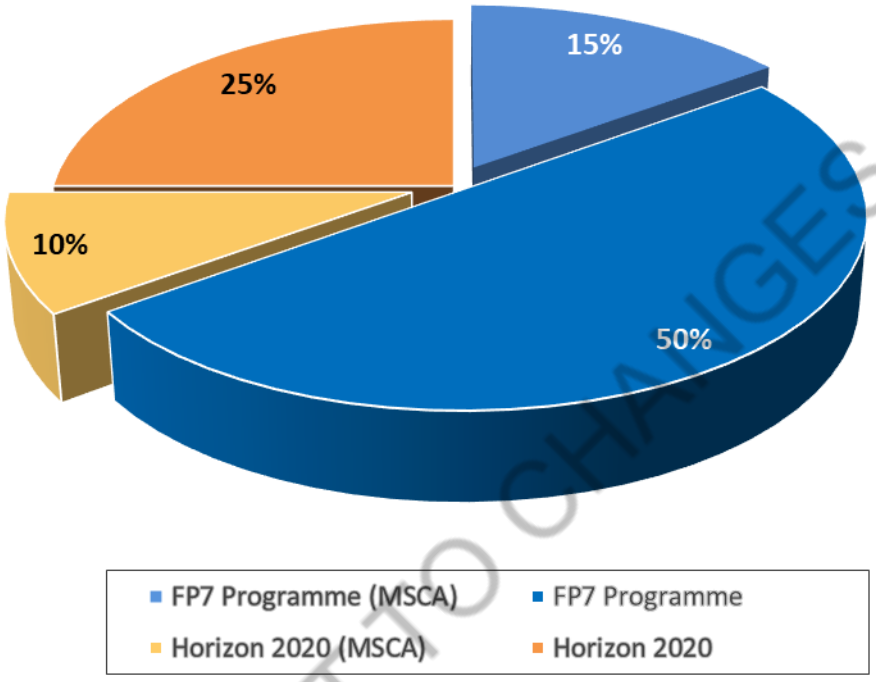

Figure 4. Project distribution according to funding programmes

3.2. Projects' Contributions to the BDS 2020 Targets and Actions

The analysis highlights an uneven distribution of projects focusing on different targets and goals. For example, Target 2 of the Strategy, "Maintaining and restoring ecosystems and their services" was the most addressed among the targets. Ninety-nine projects had a focus on this target, out of which 84 covered Action 5 "Improve knowledge of ecosystems and their services in the EU", 35 centred around Action 6, "Set priorities to restore and promote the use of green infrastructure", while 13 focused on Action 7 "Ensure no net loss of biodiversity and ecosystem services" (exclusively or in combinations with other actions). The second most frequent target was Target 4, "Ensuring sustainable use of fisheries resources", which was addressed by 43 projects. Here, Action 13, "Improve the management of fished stocks" was considered to be tackled by 36 projects, while Action 14, "Eliminate adverse impacts on fish stocks, species, habitats and ecosystems" was addressed by 42 projects (in 35 projects, both of these relevant targets were engaged with). The third most frequent Target 1 was the focus of 42 projects, where Action 1, "Complete the establishment of the Natura 2000 network and ensure good management" was in the centre by 38, Action 2, "Ensure adequate financing of Natura 2000 sites" by 14, Action 3, "Increase stakeholder awareness and involvement and improve enforcement" by 19, while Action 4, "Improve and streamline monitoring

and reporting" was addressed by 22 projects. Thirty-eight projects dealt with Target 3, the fourth most frequent target on ensuring the sustainability of agriculture and forestry. Here, 16 projects were considered tackling Action 8, "Enhance direct payments for environmental public goods in the EU Common Agricultural Policy", while Action 9, "Better target Rural Development to biodiversity conservation" was addressed by 22 projects. Eight projects were deemed to be engaged with Action 10, "Conserve Europe's agricultural genetic diversity", while Action 11, "Encourage Forest holders to protect and enhance forest biodiversity" was in the attention of 14 projects. Action 12, "Integrate biodiversity measures in forest management plans" was targeted by 15 projects.

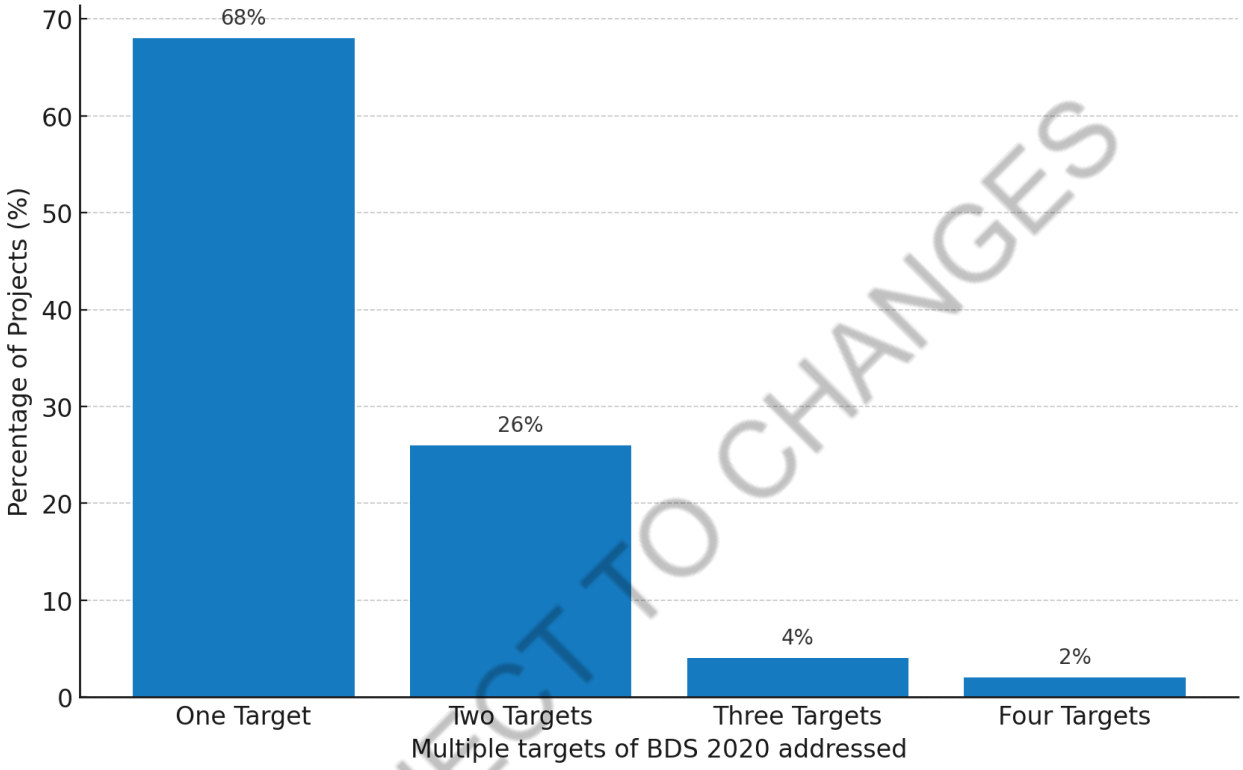

Figure 5: Distribution of projects according to multiple targets addressed (including projects with both stated and potential contributions to the BDS2020)

Importantly, out of the total number of projects, only 18% (n=33) specifically stated contribution to one or more of the BDS2020 Targets, while the remaining 82% projects were presumed to contribute to the BDS2020 by addressing either one or more of the Targets based on their focus and objectives. Most of the projects (68%) were considered to engage with one BDS2020 target. Twenty-six percent of the projects had stated or potential contribution to two targets, whereas 4% focused on three, and 2% on four targets (Fig. 5).

The fifth most frequent target was Target 6, "Help averting global biodiversity loss" was considered to be tackled by 18 projects. Eleven projects covered Action 17, "Reduce indirect drivers of biodiversity loss", 7 projects Action 18 "Mobilise additional resources for global biodiversity conservation", 3 tackled Action 19, "'Biodiversity proof' EU development cooperation", while 8 projects Action 20, "Regulate access to genetic resources and the fair and equitable sharing of benefits arising from their use". Target 5, "Combat Invasive Alien Species" was in the attention of 18 projects engaging with the topic. Its relevant Action 15, "Strengthen the EU Plant and Animal Health Regimes" was addressed by 15, while Action 16, "Establish a dedicated instrument on Invasive Alien Species" by 13 projects

(Table 2). As noted above, it was often considered that projects had multiple targets addressed. Most frequently, Targets 1 and 2 occurred together (n=26), while Targets 2 and 4 (n=12) and Targets 2 and 3 (n=10) were also relatively common pairs (Fig. 5).

Table 2: Overview of the targets and actions of the Biodiversity Strategy 2020[8]

Targets	Actions	No. of projects addressing a specific action
1: Fully implement the birds and habitats directives	1: Complete the establishment of the Natura 2000	38
	2: Ensure adequate financing of Natura 2020 sites	14
	3: Increase stakeholder awareness and involvement and improve enforcement	19
	4: Improve and streamline monitoring and reporting	22
2: Maintaining and restoring ecosystems and their services	5: Improve knowledge of ecosystems and their services in the EU	84
	6: Set priorities to restore and promote the use of green infrastructure	35
	7: Ensure no net loss of biodiversity and ecosystem services	13
3: Increase the contribution of agriculture and forestry to maintaining and enhancing biodiversity	8: Enhance direct payments for environmental public goods in the EU Common Agricultural Policy	16
	9: Better target Rural Development to biodiversity conservation	22
	10: Conserve Europe's agricultural genetic diversity	8
	11: Encourage forest holders to protect and enhance forest biodiversity	14
	12: Integrate biodiversity measures in forest management plans	15
4: Ensure the sustainable use of fisheries resources	13: Improve the management of fished stocks	36
	14: Eliminate adverse impacts on fish stocks, species, habitats and ecosystems	42

[8] There are overlaps from the BDS 2020 actions addressed by projects.

5: Combat invasive alien species	15: Strengthen the EU Plant and Animal Health Regimes	15
	16: Establish a dedicated instrument on Invasive Alien Species	13
6: Help avert global biodiversity loss	17: Reduce indirect drivers of biodiversity loss	11
	18: Mobilise additional resources for global biodiversity conservation	7
	19: 'Biodiversity proof' EU development cooperation	3
	20: Regulate access to genetic resources and the fair and equitable sharing of benefits arising from their use	8

Of the 18% (n=33) of projects that specifically stated contribution to the BDS2020, a similar tendency can be observed regarding the BDS2020 Targets: 28 of these projects aimed at addressing Target 2, 16 Target 1, 2 Target 3, 4 Target 4, 3 and 3 Target 5 and 6, respectively. One BDS2020 target was the focus of 16 projects with the majority being Target 2. In the case of 12 projects, two targets were in focus, in four projects 3, and in one case 4 targets were simultaneously aimed to be tackled (Fig. 6).

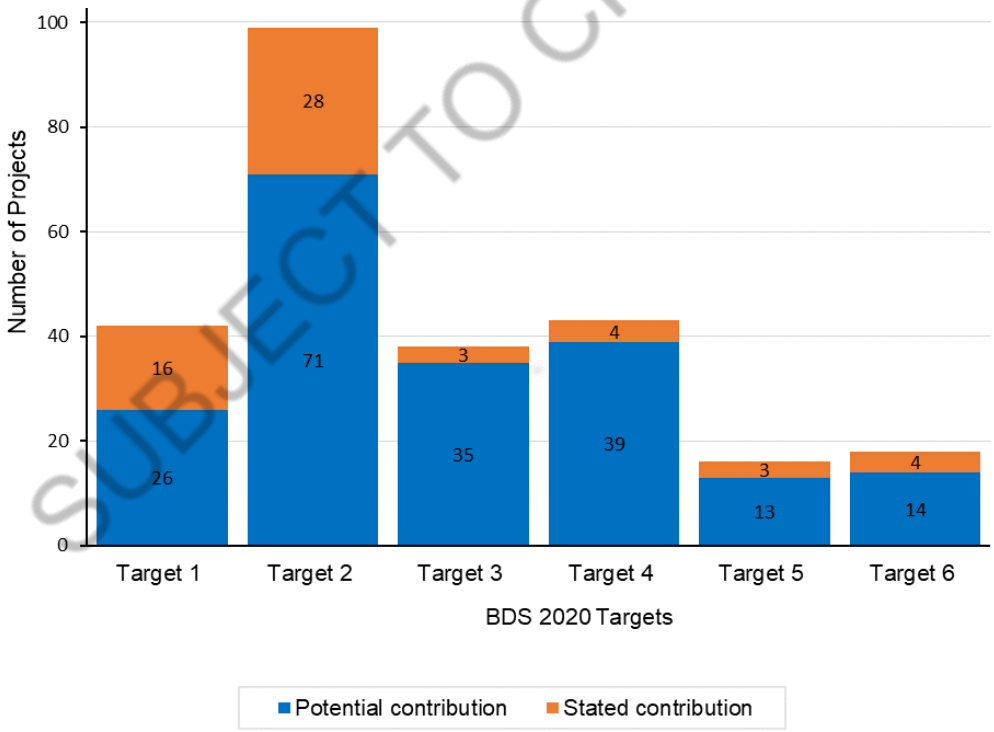

Figure 6. Distribution of potential and stated contributions across projects with different targets[9]

[9] Due to overlaps derived from the multiple targets addressed by projects, number of projects are larger than the overall sum.

3.3. Project alignment with policy cycles and project contributions to additional policies

When looking into the timing of the final project outputs to feed into key policy cycles, including the BDS2030 formulation or the EU 7-year programming cycles, we found that 48% of the projects had suitable timing to feed into these cycles as they were completed in the relevant timeframe where policymakers may more actively consult scientific input.

While analysing the projects' contribution to the BDS2020, we also assessed whether other EU policies and directives were scrutinised. Seventy-eight percent of the projects noted one or more additional policies or directives. Most projects noted the Habitats Directive (n=42) (but less so the Birds Directive (n=15), while the mention of the Convention on Biological Diversity was equally significant (n=22). Regarding relevant sectoral policies, the Common Agricultural Policy (n=36), key marine policies (n=55), the Water Framework Directive (n=27), the Common Fisheries Policy (n=24) and the EU Forest Strategies (n=7) were noted most frequently. Other sectoral policies such as climate adaptation, energy, floods, nitrates, etc. were less prominently targeted, while social and health policies were almost entirely missing (Table 3). An overview of the key additional policies reported by projects is provided below, with the full range of all additional related policies set out in Annex 2.

Table 3: Frequency of additional related policies noted by the analysed projects.

Ranking based on the number of projects policies were noted	Policies (as noted in the projects' documents)	Frequency (no. of projects listing the policy)
1.	Habitats Directive	42
2.	Common Agricultural Policy (CAP)	36
3.	Marine Strategy Framework Directive (MSFD)	32
4.	Water Framework Directive (WFD)	27
5.	CBD (Strategic Plan/CBD Strategic Plan for 2011-2020)	22
6.	Common Fisheries Policy (CFP)	24
7.	Birds Directive	15
8.	Sustainable Development Goals	12
9.	Green Infrastructure Strategy	8
10.	European Maritime Policy (Marine Spatial Planning (MSP)	8
11.	Floods and Drought Directives	7

12.	EU Forest Strategy (2020, 2030)	7
13.	EU Green Deal	5
14.	EU Blue Growth strategy	5
15.	Aichi Biodiversity Targets	4
16.	Strategic urban planning (Urban planning, Urban policy, Urban policy and planning)	4
17.	Forest Action Plan	4
18.	Integrated Maritime Policy for the European Union	3
19.	EU Plant Health Directive	2
20.	European Groundwater Directive	2

3.4. Policy impacts

In this chapter, we summarise the results of the intended policy use and intended policy impact of projects. We outline the types of policy impacts achieved and evaluate their strength—categorised as strong, ambiguous, or weak—based on the evidence provided in the project reports (Table 4).

Table 4: Overview of policy impacts reported in the projects

Projects with intended policy use/impacts	Projects with reported impact	Projects with multiple types of impact (two or more)	Projects with claimed impact and strong/ambiguous evidence
69%	63%	63%	31%
Projects highlighting enablers and hinderers to policy impact	**Projects with claimed instrumental impacts**	**Projects with claimed instrumental impact and strong evidence**	**Projects with all five types of impacts**
30%	22%	9%	1%

The percentage reflects the proportion of the total 183 assessed projects.

3.4.1. Intended policy use and policy impact

We assessed whether the project reports indicated a clearly defined policy use for the projects or specified a clear policy impact in the project's objectives. Fifty-four percent of the projects considered the intended policy use of their results (e.g. provide new knowledge or guidance for policymaking). Fifty-two percent had more specific policy impact targeted at the start of their project (e.g. support EU Member States implementing the Nature Directives or integrate nature-based solutions to city planning). A total of 127 (69%) projects considered either intended policy use and/or had a specific policy impact from the outset.

3.4.2. Projects with reported impacts

Out of the assessed 183 projects, 115 (63%) reported some type of policy impacts instrumental (I) - resulting directly in policy change or new policies; conceptual (CC) - increased policy knowledge; enduring connectivity (EC) - enhanced networks or connections of policymakers; cultural/attitude change (CA) - improved ways of policymaking through attitude change towards using or creating knowledge; and capacity building (CB)). Of the 115 projects, all reported contributing to raising awareness or increasing policy-relevant knowledge (conceptual change) representing 63% of the total projects assessed. Forty projects (22%) influenced policy documents or processes contributing to instrumental change. Similarly, 40 projects (22%) strengthened policy networks or relationships leading to enduring connectivity). Thirty-one projects (17%) impacted policy capacities (capacity building change). Lastly, eight projects (4%) led to changes in attitudes or ways of policymaking (cultural/attitude change) (Fig. 7).

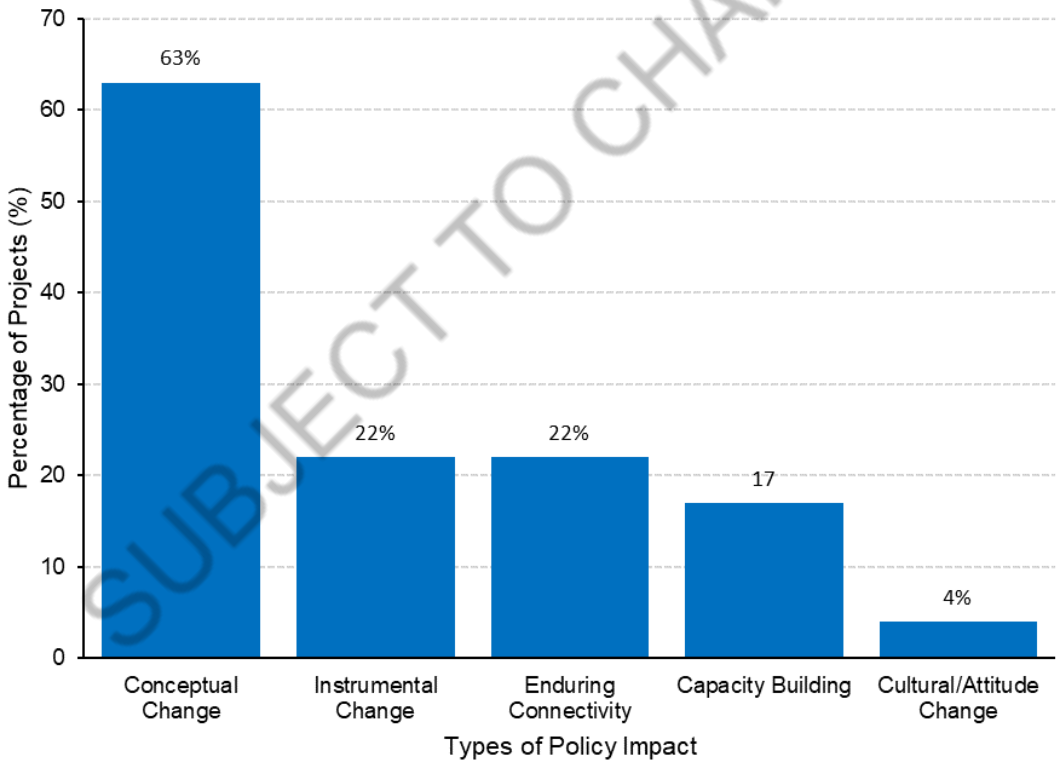

Figure 7: Distribution of policy impact types across projects[10]

[10] Please note that since many projects contribute to more than one type of policy impact, the percentages in the chart reflect the total frequency of impacts and may exceed the number of projects.

Among the projects with reported impacts, 39 (34%) were categorised as having only conceptual change. Other impact types were rarely reported as standalone outcomes, as impact types were often combined, occurring together in 42% of the projects. A total of 50 projects (43%) reported two different types of impacts, while 11 projects (10%) demonstrated three types of impacts simultaneously.

In 13 projects (11%), four types of impacts were identified. Of these, only one project excluded instrumental change but included the other four types in various combinations. In the remaining cases, instrumental and conceptual changes co-occurred with enduring connectivity and capacity-building impacts (9 projects), enduring connectivity and cultural/attitude change (2 projects), and cultural/attitude change with capacity building in one instance. Only two projects (2%) demonstrated all five types of impacts (Figure 8).

Regarding the strength of the evidence, only 28 out of the 115 projects claiming impacts (15% of all projects) provided sufficient detail to qualify any of their reported impacts as strong. Of these, 17 projects (9%) claimed strong instrumental impacts. Conversely, evidence from 57 projects was deemed weak or unknown, while 30 projects provided ambiguous evidence of impact.

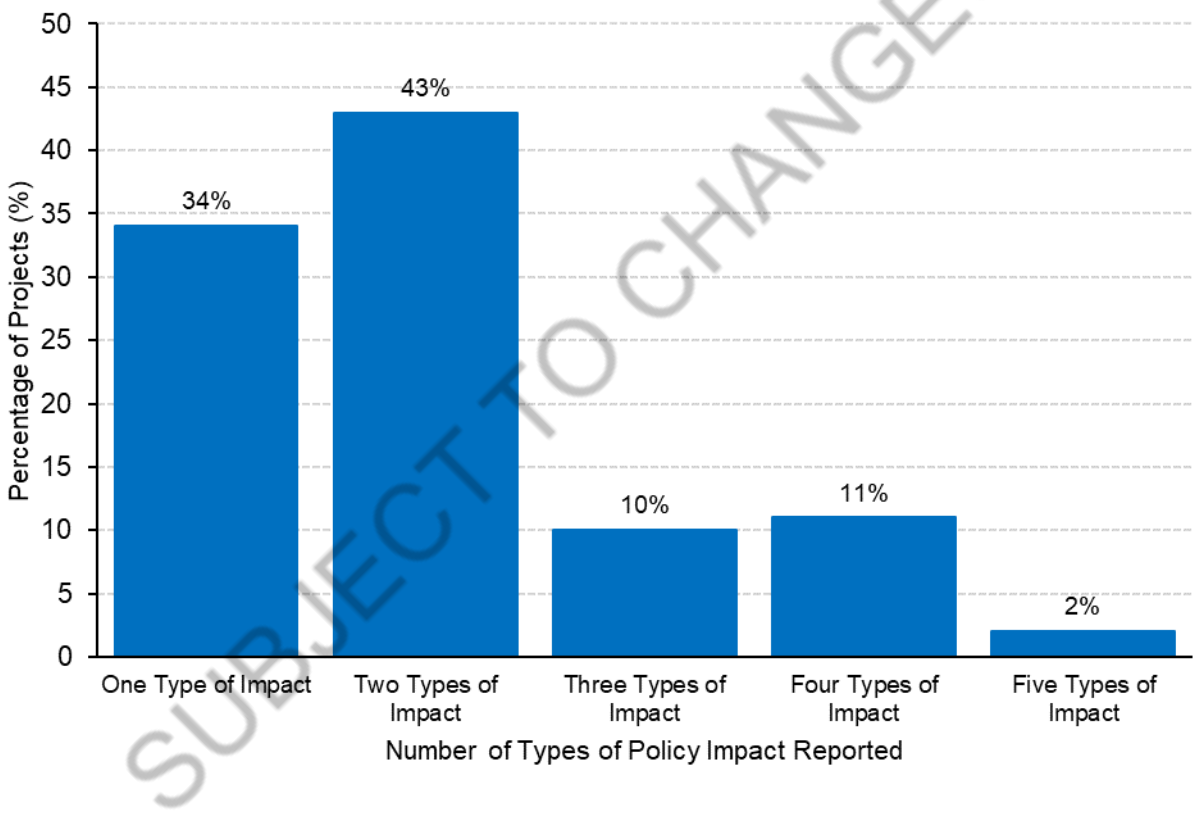

Figure 8: policy impact types occurring jointly within projects[11]

Several trends emerge regarding the main characteristics of the 115 projects with reported policy impacts. The average duration of these projects was 3.5 years, with most of the funding sourced from the FP7 programme (68%) (We speculate the reason of the higher impact under the FP7 funding stream was because of the timeframe, and because there may have been specific calls that required specific policy impacts).

[11] Please note that since many projects contribute to more than one type of policy impact, the percentages in the chart reflect the total frequency of impacts and may exceed the number of projects.

Among the 101 projects that listed keywords, the most common terms were related to ecosystem services or various ecosystems (29%), biodiversity (19%), marine (18%), management (15%), and climate change or urban topics (14% each). Less frequent keywords included fishery (11%), conservation, forest, sustainable, water, and agriculture (9% each).

Of the 33 projects explicitly stating contribution to specific Biodiversity Strategy 2020 (BDS2020) targets, 29 (89%) were included within this group reporting policy impacts. Contributions to BDS2020 were distributed as follows: 56% targeted Target 2, 27% addressed Target 1, 24% focused on Target 4, 20% on Target 3, 9% on Target 6, and 6% on Target 5.

A significant proportion (92%) of the projects with reported policy impacts claimed to address one or more policies beyond the BDS2020. Of these, 77% focused on multiple policies, while 23% concentrated on one additional regulation. The most prominent policies included the Habitats and/or Birds Directives (29%), marine-related policies such as the Marine Strategy Framework Directive (26%), the Common Agricultural Policy (25%), and the Common Fisheries Policy (20%). Climate change policies, including the EU Climate Change Act and the EU Adaptation Strategy, were addressed by 18%, and water-related policies, particularly the Water Framework Directive, by 16%.
At the global level, the Convention on Biological Diversity (18%) and the Millennium Development Goals or Sustainable Development Goals (11%) were the most frequently noted policies. Projects also targeted sectoral policies beyond the environmental realm, with 25% addressing areas such as spatial planning (marine or urban), transport, energy, and waste. Social and health policies were less frequently mentioned, appearing in only 7% of cases.

In terms of policy scales, 82% of projects focused on EU-level policies, 25% addressed global policies, 14% engaged with national or local policies, and 6% targeted regional policies (percentages exceed 100% due to overlap in focus). Of the 106 projects addressing additional policies, 81% defined either intended policy use or specific policy impacts.

Among the projects with reported policy impacts, 31% identified enabling factors, and 6.5% highlighted hindering factors. Notably, all projects that identified enabling factors and all but one that reported hindering factors were included in the subset of projects reporting impacts. Key enablers and barriers included stakeholder engagement, highlighted by 51 projects (44%), and the availability of knowledge, such as the type or flow of information, noted by 44 projects (38%). Less frequently mentioned factors included horizontal policy coherence (17 projects, 15%), current political and economic structures and governance (11 projects, 10%), and funding availability (8 projects, 7%).

3.4.3. Projects with policy impacts providing strong or ambiguous evidence

When examining projects with strong or ambiguous evidence for their claims (n=58, representing 31% of all projects), a clear trend emerges. These projects have an average duration of 3.8 years, with the majority funded under FP7 (74%). The project keywords (n=56) reflect a strong emphasis on ecosystems and their services (19 projects), followed by biodiversity (10), fisheries (9), urban (9), and marine topics (8). In terms of contributions to the BDS 2020, most projects addressed Target 2 (58%), with significant engagement also seen in Target 1 (28%) and Target 4 (28%). Furthermore, 69% of these projects focused on a single target, 21% addressed two targets, and 10% engaged with three or more targets.

A large majority (93%) of projects with strong or ambiguous evidence for reported impacts (n=54) also addressed additional policies beyond BDS 2020. These policies were predominantly at the EU level (81%), followed by local and national (22%) and global levels (15%). The most frequently cited policies included the Common Agricultural Policy (17 projects, 29%), the Habitats and Birds Directives (16 projects, 27%), the Common Fisheries Policy (13

projects, 22%), and water (9 projects, 16%) and marine policies (8 projects, 14%). While 24% of these projects referenced only one policy, most engaged with multiple regulations. Notably, only 8 projects (11%) listed no intended policy use or policy impact from the outset.

In terms of impacts, 53% of the projects demonstrated some level of instrumental change, while an equal proportion (53%) included capacity building and connectivity-enabling components. Cultural or attitude change impacts were reported in 13% of the projects (7 cases). For 47% of the projects (27 cases), impacts were reported in pairs, often combining conceptual and instrumental changes. In 12% of cases (7 projects), three types of impacts were described together, while in 17% (10 projects), four types of impacts were noted. Notably, two projects (3%) reported five types of impacts simultaneously.

Approximately 32% of the projects did not document enablers, barriers, or lessons learned. Among those that did, 60% (34 projects) highlighted engagement, and 54% (30 projects) identified the availability of knowledge as a key factor, either as an enabler or a barrier.

3.4.4. Projects reporting more types of impacts with ambiguous or strong evidence

For projects demonstrating more types of impacts and providing either ambiguous or strong evidence (n=44; 24%), a similar trend emerges. On average, these projects are longer in duration than the overall sample, with an average length of 3.8 years. Seventy-two percent have a clear focus on one target (either stated or presumed). Most of these projects are centred on Target 2 (60%), with fewer focusing on Target 1 and Target 4 (26% each). Only two projects did not specify intended policy use or impact. Notably, lessons learned, enablers, and hinderers were disclosed for all but 10 projects.

When examining projects claiming three or more impacts with ambiguous or strong evidence (n=19; 10%), this trend becomes even more pronounced. The majority of these projects focus on urban planning (36%), ecosystem services and biodiversity (26%), and marine and fisheries (26%). With the exception of two projects, all are aligned with a single target, predominantly Target 2 (68%), often focusing on Actions 5 and 6. All but one project reported intended policy use or impact. Furthermore, enablers, hinderers, and lessons learned were described in all but four projects. Availability of knowledge was highlighted as a key enabler or hinderer in 58% of the projects, while engagement was emphasised in 74%.

3.4.5. Projects with instrumental policy impacts and strong evidence

Some distinct trends can be described considering the main characteristics of those projects with instrumental policy impacts and strong evidence (n=17 – 9%). Six of these projects (35%) centred around fisheries, five around urban and spatial development (one also including food aspect), three concentrated on ecosystem services and biodiversity. One project each (0,5%) focused on coastal lagoons, pollination and offshore wind farming on marine areas. Most of the projects were FP7 funded (75%) with an average duration of four years. Only 20% of the projects stated specific contributions to the BDS2020, while almost all of them (94%) refer to particular policies besides the BDS2020, which includes urban planning (29%), the Marine Strategy Framework Directive (29%), the Common Fisheries Policy and aquaculture policies (29%), while e.g. the Habitats and/or Birds Directives (18%) are less noted. Considering the BDS2020 Targets, similarly to the previous trends, these projects were mostly rendered to Target 2 (70%) and Target 4 (35%) with the majority of the projects (82%) engaged with one target.

Nearly all projects (94%) identified either the intended policy use or a specific policy impact they wanted to achieve, and the majority (82%) described particular enabling and hindering factors. Among these, 85% emphasised

engagement, and 78% cited the availability of knowledge as key enablers or barriers to achieving policy impact. Horizontal policy coherence was also noted as an influencing factor by 28% of these projects.

3.5. Enabling, hindering factors and lessons learnt

Considering enablers and hindering factors, 56 projects (30% of all projects) reported enabling factors on policy impacts, while only 12 (6%) disclosed hindering factors. As noted above, the projects discussing enablers and hinderers are in the group that also reported policy impacts (with the exception of one project). Apart from one project in this group, those that listed enablers all had policy impacts. Considering specific lessons learnt, 18 projects elaborated these in terms of policy – however, due to the significant overlaps with enablers and hinderers, this information was also used as enabler and hinderers and was coded according to the BioAgora Task 1.1's typology on barriers and enablers.

Using T1.1's enablers and barriers, we found that most projects claimed engagement as a key element of achieving policy impact (50 – 27%), while the availability of knowledge was similarly crucial (44 – 24%). Horizontal policy coherence (17), funding (9), current political and economic structures (8), vertical policy implementation (6), management effectiveness (4), and systemic spatial planning (4) were also noted (Fig. 9).

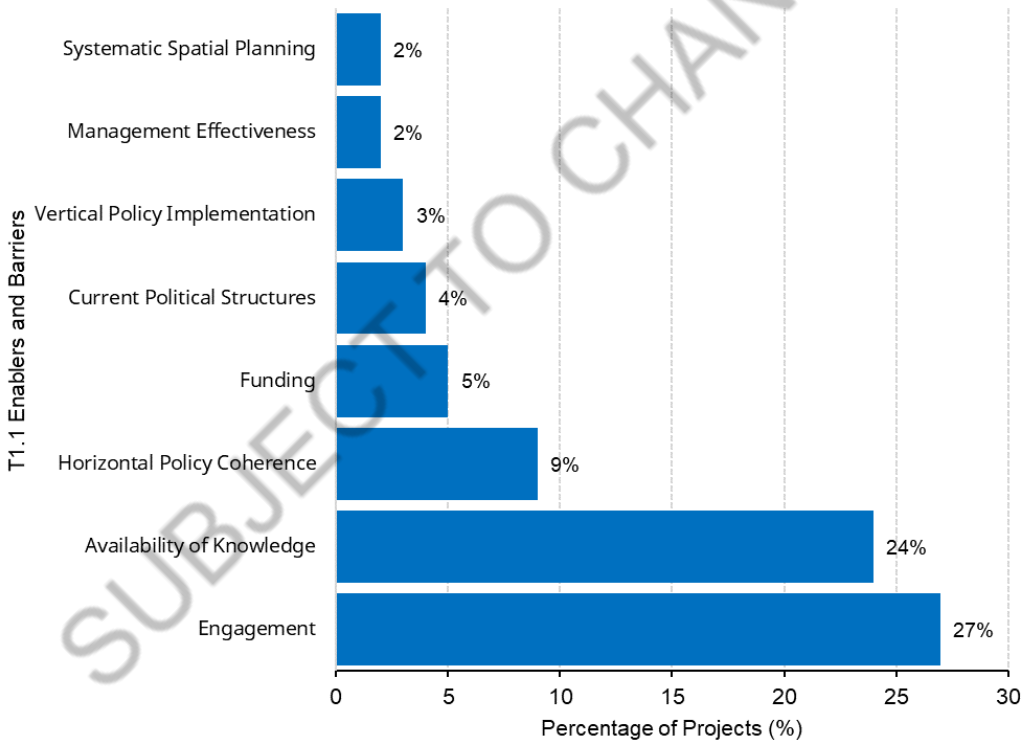

Figure 9: Barriers and enablers according to BioAgora's Task 1.1' typology in projects

Based on analysing the content of the project reports, we also extended T1.1's typology on barriers and enablers as elaborated above. Each element of the typology can be considered as either an enabler or a barrier. We found a distinction between the availability of information, the type of information and knowledge, and the flow of information within the availability of knowledge (i.e., not only whether the knowledge was available, but also in what format and how it was disseminated or shared, and from whom to whom). The importance of the "Type of information" was highlighted in 18 projects (10% of all projects), whereas the "Flow of information" was mentioned in 11 projects (6%). Although the T1.1's category covers existing political and economic structures, some projects

made specific note of additional elements, based on which we separately added the following categories: "Political willingness/current values and priorities" (noted in 4 cases) and "Governance" - specifically how systems and policies are governed (noted in 6 cases), "Trust and transparency" was separately highlighted in two projects, "Public support" and the importance of "project duration" were underlined in 1-1 project (respectively).

3.6. Overton Index validation

A total of 108 projects (94%) out of 115 projects with recorded policy impacts were mentioned in Overton, a web-based tool that tracks policy impact, while only 7 were not mentioned at all, suggesting there is a strong relationship between policy impact and visibility in Overton. Some of the projects with recorded policy impact and high Overton index include NATURVATION (110), ESMERALDA (212), CONNECTING Nature (71), NAIAD (70), WISER (114) and HUNT (72). Out of the 68 projects with no recorded policy impact, 37 were still mentioned in the Overton database. Notably, 13 of these projects had significant Overton mentions, each surpassing 10 mentions. The standout projects include MADE with 92 mentions, followed by AMBER (31), UNALAB (32), Nature4Cities and QUESSA (28 each), EUCLID (20), IMPRESS (18), RESTORE (17), 4F CROP and CLAIM (15 each), PRESERVATION and DIOMFISH (14 each), and SLOPE (12). These projects, despite their lack of reported policy impact, demonstrated high visibility and influence in public discourse and research.

3.6.1. Correlation between projects with policy impact and Overton index

A non-parametric analysis was conducted to examine the relationship between the Overton Index and policy impact. The Mann-Whitney U test, which forms the basis for the calculation of the rank-biserial correlation coefficient, revealed a significant positive association between policy impact and the rank of the Overton Index (U = 1912.00, Z = -5.801, p < .001). The rank-biserial correlation coefficient (r_{rb}=0.430) indicates that projects with policy impacts tend to have higher Overton Index scores. These findings demonstrate a strong and statistically significant relationship between policy impact and the Overton Index (Table 5).

Table 5: Rank-biserial correlation Analysis of Overton Index on Policy Impact

Variables	N	U statistic	Z-score	$r_{rank\text{-}biserial}$	p-value
Policy impacts and Overton index	183	1912.00	-5.801	.430	**<.001***

Note. N=total sample size; U= Mann-Whitney U statistics; r=rank-biserial correlation; Z-score=standard test statistic output; * P is significant at <0.05 level

3.6.2. Correlation between projects with strong evidence of policy impact and Overton Index

A nonparametric rank-biserial correlation was conducted to examine the relationship between the Overton Index and strong evidence of policy impact. The rank-biserial correlation (r_{rb} = 0.220, p = 0.003) indicated a significant positive association, suggesting that projects with strong evidence of policy impact tended to have higher Overton Index values. Since the rank-biserial correlation is derived from the Mann-Whitney U test, the results are consistent

with and supported by the Mann-Whitney U test, which showed a statistically significant difference in Overton Index ranks between projects with and without strong evidence of policy impact (U = 1562.50, p = 0.003) (Table 6).

Table 6: Rank-biserial correlation Analysis of Overton Index on Strong Evidence

Variables	N	U statistic	Z-score	$r_{rank\text{-}biserial}$	p-value
Strong evidence and Overton index	183	1562.50	-2.968	.220	**.003***

Note. N=total sample size; U= Mann-Whitney U statistics; r=rank-biserial correlation; Z-score=standard test statistic output; * P is significant at <0.05 level

3.7. Correlation within the data

3.7.1. Relationship between policy impacts and various predictors

A logistic regression analysis was conducted to assess the impact of various predictor variables on the likelihood of projects achieving policy impacts. The model included several predictor variables including: project duration, contributions to BDS 2020, availability of knowledge, horizontal policy coherence, engagement, current political and economic structures, number of partners involved in the consortium, knowledge brokers, involvement of public bodies and policy institutions, likelihood of final results feeding into new BDS or EU programming policy cycles, policy intention, systematic spatial planning, and vertical policy implementation.

The linearity of the continuous variables with respect to the logit of the dependent variable was assessed via the Box-Tidwell (1962) procedure. A Bonferroni correction was applied using all sixteen terms in the model resulting in statistical significance being accepted when $p < .00312$ (Tabachnick & Fidell, 2014). Based on this assessment, all continuous independent variables were found to be linearly related to the logit of the outcome variable. The logistic regression model was statistically significant, $\chi^2(13) = 119.919$, $p < .001$. While the logistic regression model demonstrated strong explanatory power (Nagelkerke $R^2 = 62.4\%$) and identified statistically significant predictors, the relatively small sample size may limit the generalisability of these findings and the ability to detect additional significant predictors.

The results indicated that the number of partners involved in the consortium was a significant predictor of policy impact (p =.031). This suggests that for each additional partner in the consortium, the odds of achieving a policy impact increase by 8.2%. Additionally, the likelihood of final results feeding into new BDS or EU programming policy cycles (timing of results) was a significant predictor (p = 0.017). This indicates that projects whose final results are likely to contribute to new policy cycles are approximately 2.88 times more likely to have a policy impact compared to those without such contributions. While contributions to BDS2020 approached statistical significance (p = 0.057) suggesting a likelihood to influence policy impact, it did not meet the conventional, $\alpha = 0.05$ threshold.

Overall, the logistic regression model highlighted the number of consortium partners and the alignment of project results with policy cycles (timing of results) as key factors in achieving policy impacts. Table 7 below provides a comprehensive overview of the regression coefficients.

Table 7: Logistic regression predicting the likelihood of projects with policy impacts from the following predictor variables

	B	S.E	Wald	df	Sig.	Exp(B)	95% CI for EXP(B) LL	UL
Project duration	.014	.264	.003	1	.959	1.014	.605	1.700
Contributions to BDS 2020	1.364	.716	3.626	1	.057**	3.913	.961	15.933
Availability of knowledge	18.381	5087.255	.000	1	.997	96129225.410	.000	.
Horizontal policy coherence	-.333	12793.035	.000	1	1.000	.717	.000	
Engagement	18.908	5077.390	.000	1	.997	162741968.043	.000	.
Current political and economic structures	1.923	21648.744	.000	1	1.000	6.838	.000	.
Number of partners involved in the consortium	.079	.037	4.667	1	**.031***	1.082	1.007	1.163
Knowledge brokers involvement	.741	.576	1.653	1	.199	2.098	.678	6.493
Public bodies involvement	.033	.618	.003	1	.957	1.034	.308	3.472
Timing of results	1.058	.442	5.719	1	**.017***	2.880	1.210	6.851
Policy intention	.278	.472	.346	1	.557	1.320	.523	3.331
Systematic spatial planning	3.296	96276.510	.000	1	1.000	27.017	.000	.
Vertical policy implementation	-4.140	98751.971	.000	1	1.000	.016	.000	.

Note. Model = "Enter" method in SPSS Statistics; B = unstandardised regression coefficient; CI = confidence interval; LL = lower limit; UL = upper limit; SE B = standard error of the coefficient;; df= degree of freedom; Sig. =*significant at P<0.05 level, **P=0.05

3.7.2. Relationship between instrumental change and various predictors

A logistic regression analysis was conducted to examine the factors predicting instrumental change. The model included 13 predictors, and results are presented as odds ratios (Exp(B)) with corresponding 95% confidence intervals and p-values (Table 8). The analysis revealed that the availability of knowledge was a statistically significant predictor of instrumental change (p = 0.012). Specifically, when knowledge was available, the odds of instrumental change occurring were 5.13 times higher, 95% CI [1.427, 18.444]. The number of partners involved in the consortium was also a statistically significant predictor (p = 0.024). For each additional partner, the odds of instrumental change increased by 1.058, 95% CI [1.007, 1.111]. Policy intention approached statistical significance (p = 0.064), suggesting that a clear policy intention might be related to instrumental change. The odds of instrumental change occurring increased by a factor of 8.1 when policy intentions were present, 95% CI [0.883, 74.262].

Other variables, including funding source, contributions to BDS2020, final results feeding into policy cycles, horizontal policy coherence, project duration, current political and economic structures, engagement, vertical policy implementation and systematic spatial planning, were not significant predictors of instrumental change ($p > 0.05$).

The findings suggest that the availability of knowledge and the number of partners involved in the consortium significantly increase the likelihood of instrumental change. Policy intention, while not statistically significant, showed a trend suggesting it may also play a role in such changes. It should be noted that this analysis was conducted on a relatively small sample size. While the results provide valuable insights into the predictors of instrumental change, the limited sample size may influence the precision of the estimates and the ability to detect smaller effects. Future research with larger datasets is recommended to validate and extend these findings.

Table 8: Logistic regression predicting the likelihood of projects with instrumental change from the following predictor variables

							95% C1 for Exp(B)	
	B	S.E	Wald	df	Sig.	Exp(B)	LL	UL
Funding source	.786	.607	1.673	1	.196	2.194	.667	7.216
Project duration	.214	.271	.626	1	.429	1.239	.729	2.107
Contributions to BDS 2020	-.189	.611	.095	1	.757	.828	.250	2.740
Availability of knowledge	1.635	.653	6.273	1	**.012***	5.130	1.427	18.444
Policy intention	2.092	1.131	3.424	1	.064	8.100	.883	74.262
Timing of the results	-.671	.508	1.747	1	.186	.511	.189	1.382
Number of partners involved in the consortium	.056	.025	5.085	1	**.024***	1.058	1.007	1.111
Horizontal policy coherence	.396	.874	.205	1	.651	1.485	.268	8.233
Funding	-2.823	1.533	3.391	1	.066	.059	.003	1.199
Current political and economic structures	1.655	1.384	1.429	1	.232	5.234	.347	78.935
Engagement	-.185	.649	.082	1	.775	.831	.233	2.963
Vertical policy implementation	1.082	2.046	.280	1	.597	2.952	.054	162.720

Systematic spatial planning	23.058	14584.161	.000	1	.999	10327981425.966	.000	.
Constant	-5.779	1.450	15.884	1	<.001	.003		

Note. Model = "Enter" method in SPSS Statistics; B = unstandardized regression coefficient; Exp(B) = Odds ratio; CI = confidence interval; LL = lower limit; UL = upper limit; SE B = standard error of the coefficient; df= degree of freedom; Sig. =*significant at P<0.05 level

3.7.3. Relationship between policy impact and the six targets of the BDS2020

A logistic regression was performed to assess the relationship between policy impacts and the six targets of the Biodiversity Strategy 2020. The model examined the likelihood of projects achieving policy impacts as a result of their contributions to each target. The results are presented as odds ratios (Exp(B)) with corresponding 95% confidence intervals and p-values.

Contributions to target 1 (fully implement the birds and habitat directives) of the BDS 2020 significantly increased the likelihood of achieving policy impact (p= 0.023). Projects that contributed to Target 1 were 2.621 times more likely to achieve policy impact. This indicates a strong positive association between contributions to BDS 2020 target 1 and projects resulting in policy impact. Although the odd ratios (2.013, 95% CI [0.798, 5.074]) of Target 3 (increase the contribution of agriculture and forestry to maintaining and enhancing biodiversity) showed a positive relationship with policy impact, it is not statistically significant (p = .138). Contributions to Targets 2, 3, 4, 5, and 6 did not significantly influence the likelihood of achieving policy impact (Table 9).

Table 9: Logistic regression analysis of policy impact by Biodiversity Strategy (BDS 2020) targets

							95% C.1 for Exp (B)	
	B	S.E	Wald	Df	Sig.	Exp (B)	LL	UL
Target 1	.964	.425	5.143	1	**.023***	2.621	1.140	6.029
Target 2	.363	.389	.870	1	.351	1.437	.671	3.079
Target 3	.700	.472	2.199	1	.138	2.013	.798	5.074
Target 4	.481	.444	1.170	1	.279	1.617	.677	3.865
Target 5	-.531	.593	.802	1	.371	.588	.184	1.880
Target 6	-.546	.542	1.016	1	.313	.579	.200	1.675
Constant	-.018	.413	.002	1	.965	.982		

Note. Model = "Enter" method in SPSS Statistics; B = unstandardized regression coefficient; CI = confidence interval; LL = lower limit; UL = upper limit; S.E = standard error of the coefficient; DF= degree of freedom; Sig. =*significant at P<0.05 level

3.7.4. Relationship between the strength of evidence and several predictors

A multinomial logistic regression was performed to determine the predictors of strong evidence on policy impact (Table 10). The reference category for the analysis was "no policy impact (no evidence)". Results indicated that the availability of knowledge was a significant predictor across all levels of evidence. For instance, compared to no policy impact, the availability of knowledge was strongly associated with higher odds of strong evidence of policy impact (Exp(B) = 103,164,209.06, p < .001) and weak evidence (Exp(B) = 752,877,780.44, p < .001). Engagement was also a significant predictor of strong evidence compared to no policy impact (Exp(B) = 14.58, p = .021), but this effect was not significant when comparing weak evidence to no impact (Exp(B) = 6.75, p = .086).

The number of partners showed a small but significant positive effect on the likelihood of both strong evidence (Exp(B) = 1.065, p = .037) and weak evidence (Exp(B) = 1.063, p = .013) compared to no policy impact. Additionally, policy intention had a marginally significant effect in predicting strong evidence (Exp(B) = 4.787, p = .058) but was not a significant predictor for ambiguous or weak evidence.

Overall, the availability of knowledge, engagement and number of partners were the most influential factors in predicting stronger evidence of policy impact, particularly in distinguishing projects with strong evidence from those with no impact.

Table 10: A multinomial logistic regression of the strength of evidence of policy impact

Strength of evidence		B	S.E	Wald	df	Sig.	Exp(B)	95% CI for Exp(B) LL	UL
0	Intercept	-5.007	1.280	15.314	1	<.001			
	Engagement	2.680	1.157	5.365	1	**.021***	14.579	1.510	140.758
	Availability of knowledge	18.452	.611	912.424	1	**<.001***	103164209.064	31157647.287	341580798.248
	Policy intention	1.566	.826	3.590	1	**.058****	4.787	.948	24.186
	Timing of results	.575	.537	1.148	1	.284	1.777	.621	5.088
	Project duration	.339	.318	1.136	1	.287	1.403	.753	2.615

	Number of partners	.063	.030	4.347	1	**.037***	1.065	1.004	1.129
1	Intercept	-4.495	1.271	12.495	1	<.001			
	Engagement	1.994	1.192	2.797	1	.094	7.346	.710	76.041
	Availability of knowledge	19.594	.647	916.737	1	**<.001***	323190164.291	90910795.665	1148949159.785
	Policy intention	.236	.686	.118	1	.731	1.266	.330	4.854
	Timing of results	.601	.567	1.123	1	.289	1.824	.600	5.540
	Project duration	.168	.336	.252	1	.616	1.183	.613	2.286
	Number of partners	.113	.030	13.798	1	**<.001***	1.120	1.055	1.189
2	Intercept	-2.118	.832	6.483	1	.011			
	Engagement	1.909	1.113	2.943	1	.086	6.746	.762	59.737
	Availability of knowledge	18.137	.000	.	1	.	752877780.439	75287780.439	75287780.439
	Policy intention	.530	.457	1.347	1	.246	1.700	.694	4.162
	Timing of results	.794	.418	3.604	1	.058**	2.212	.975	5.021
	Project duration	.046	.251	.033	1	.855	1.047	.640	1.712
	Number of partners	.061	.024	6.205	1	**.013***	1.063	1.013	1.115

Note. a. The reference category is: 3=no policy impact (no evidence); 0 = strong evidence; 1 = ambiguous evidence; 2 = weak/unknown; CI= Confidence interval; LL = Lower limit; UP = Upper limit; SE = standard error of the coefficient; B = unstandardized regression coefficient; df= degree of freedom; *P< .05 at significant level; **P at the borderline of statistical significance

3.7.5. Relationship between projects with more than one type of policy impact and several predictors

The ordinal regression analysis examined the factors determining the cumulative odds of projects having more than one type of policy impact. The assumption of proportional odds, which posits that the relationship between the independent variables and the cumulative odds of being below versus above any given threshold is consistent across thresholds, was met. This was confirmed by a full likelihood ratio test comparing the proportional odds model to a model with varying location parameters, $\chi^2(36) = 24.678$, $p = 0.923$. The model demonstrated good fit to the observed data, as indicated by the Pearson goodness-of-fit test, $\chi^2(896) = 863.071$, $p = 0.780$, and the deviance goodness-of-fit test, $\chi^2(896) = 445.487$, $p = 1.00$. The final model significantly improved upon the intercept-only model, $\chi^2(4) = 88.608$, $p < 0.001$. Several predictors were statistically significant in determining the cumulative odds of projects achieving higher levels of policy impact. Projects that explicitly stated contributions to the Biodiversity Strategy 2020 (BDS 2020) significantly reduced the cumulative odds of having fewer policy impacts (Wald $\chi^2(1) = 6.776$, $p = .009$). Specifically, for a one-unit increase in this predictor, the cumulative odds of being below versus above any given threshold of policy impacts decreased by 62.7% (Exp(B) = 0.373). This reflects a shift in cumulative odds rather than a direct change in the likelihood of achieving specific impact types.

The involvement of knowledge brokers, such as EU agencies, NGOs, and think tanks, also emerged as a significant predictor (Wald $\chi^2(1) = 4.010$, $p = 0.045$). Projects without knowledge broker involvement had 0.457 times lower cumulative odds of achieving higher levels of policy impact (Exp(B) = 0.457). Timing of results was another key factor (Wald $\chi^2(1) = 4.143$, $p = 0.042$), where projects whose final results were unlikely to influence new BDS (2030) or EU programming policy cycles were associated with a 54.8% reduction in the cumulative odds of achieving higher policy impacts (Exp(B) = 0.548).

Policy intention further influenced outcomes (Wald $\chi^2(1) = 6.358$, $p = 0.012$), with projects lacking explicit policy intentions being 0.392 times less likely to achieve multiple policy impact types (Exp(B) = 0.392). Finally, the number of partners involved in the consortium was a robust predictor (Wald $\chi^2(1) = 13.602$, $p < 0.001$). Each additional partner increased the cumulative odds of achieving higher policy impacts by 9.8% (Exp(B) = 1.098).

Conversely, other factors, such as the funding source (FP7 or Horizon 2020) and the involvement of public bodies, did not significantly predict the cumulative odds of achieving higher policy impacts ($p > 0.05$).

It is worth noting that the analysis was based on a sample size of 183 projects. While this sample size provides valuable insights into the relationships between predictor variables and policy impacts, the findings should be interpreted within the context of the study's focus and the scope of available data. Future research could build on this work by examining larger datasets to further validate these results.

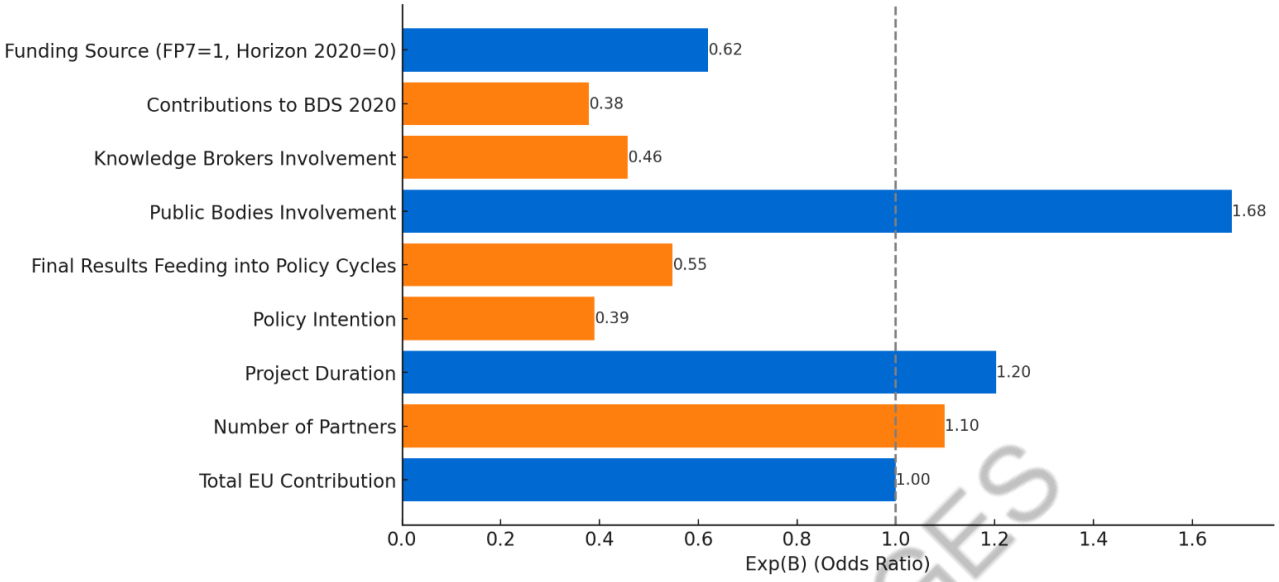

Figure 10: Odds ratios of predictors in ordinal regression analysis of policy factor types[12]

4. Discussion

4.1. Research projects contributing to the BDS2020

Using a set of criteria, we analysed the policy impacts of 183 EU research projects from 2008 to 2023 under the FP7 and Horizon 2020 funding programmes. Of these, 150 projects (82%) potentially contributed to the BDS2020, while 33 (18%) explicitly stated so. Based on the general project characteristics, we found that the most common themes in project titles and keywords included ecosystems, biodiversity, management, and marine conservation, indicating a somewhat expected focus on ecosystem services and sustainable resource management. There was a distinct emphasis on topics related to Target 2, with the marine theme and fishery conservation being the most significant specific biome/sector covered by the projects, followed by topics related to Target 1. Agriculture-related projects were less dominant.

The average project duration was 3.5 years, with consortium sizes averaging 15 partners (rising to 19 when excluding Marie Curie Actions that often included only one partner). Knowledge brokers participated in 70% of projects, while public bodies were involved in 38% (these categories sometimes overlapped in functions). Total EU funding amounted to 653.6 million EUR, with FP7 covering 65% of the projects and Horizon 2020 funding 35%. The limited coverage of Horizon 2020 can be explained with our assessment's timeframe. We only assessed completed projects, while many Horizon 2020 projects were still ongoing after 2023.

In terms of their direct contribution to the BDS2020, the most frequently addressed topics were related to Target 2, focusing on ecosystem services, restoration, and green infrastructure (54%), followed by Target 4 on fisheries (23%), and projects relevant to Target 1, the Nature Directives (23%). This does not only indicate certain priorities

[12] The chart shows the relative strength and direction of each predictor's influence on the likelihood of having more than one type of policy impact. Predictors with odds above 1 indicate a positive association with higher categories of policy impact types. Statistically significant predictors are highlighted in orange and not-statistically significant in blue.

and focal areas among the projects but within the relevant research project calls as well. The majority of the projects had a clear-cut target focus, whereas some projects often addressed multiple targets simultaneously, with Targets 1 and 2 being the most common pairing. This may suggest that either the call texts encouraged these synergies, or that the successful projects recognised the interconnectedness of these targets and incorporated measures to address them collectively. Targets 1 and 2, in particular, show a clear synergy by linking the Nature Directives with ecosystem services, restoration, and green infrastructure—connections that may not be particularly challenging to establish. However, other linkages, such as those with agriculture targets, were less prominently addressed despite a clear connection.

Forty-eight percent of the projects had outputs timed to align with key policy cycles, such as the BDS2030 formulation and the EU 7-year programming cycles, allowing policymakers to consult relevant scientific input – which is also probably attributed to the relevant calls' specifications. This overlap of policy cycles and project outcomes was not necessarily planned as projects only happened to address a relevant call; yet still providing an opportunity to achieve more significant policy impacts. In addition to contributing to the BDS2020 (either explicitly or potentially), many projects also acknowledged other policies, most notably the Nature Directives, the Convention on Biological Diversity, and sectoral policies like the Common Agricultural Policy, marine policies, the Water Framework Directive, the Common Fisheries Policy, and the EU Forest Strategies. This multi-focal approach also partially overlaps with the focus on multiple targets and the recognition of synergies, as well as the growing mainstreaming needs of biodiversity into various sectoral policies.

4.2. Understanding research projects' contributions to policy

Of the total projects assessed, 69% either considered intended policy use or had a specific policy impact target from the outset, suggesting that the majority of the projects understood the importance of policy and how their results should contribute to it. Whether this intent or planned impact was aimed at fulfilling predefined criteria in response to the call text or was actively engaged with, could not be assessed based on the available information. However, considering that 27% of the projects did not report on any type of policy implication and only 31% of projects actually delivered impacts within their scope, while providing strong evidence, we can deduce that policy impact was not likely to be the driving force behind the research. This may also be explained by the fact that some projects were not called upon to contribute to policy; instead, research calls requested delivery of "only" research. Another plausible explanation is that the research calls were undertaken by researchers who may not have been familiar with policy actors and processes, resulting in the policy element not being prioritised, even if their findings were relevant. Alternatively, it is possible that such impacts were not reported because they were simply not requested by the funder. In fact, the growing pressure from research to provide direct contributions to evidence-based policy has only recently been articulated with a gradually growing, stronger emphasis (Edler et al., 2022). In the biodiversity realm, this is evident through the enhanced funding for science-policy interfaces, such as EKLIPSE and BioAgora, and more recent research calls (e.g. under Horizon Europe and Biodiversa+), explicitly requiring funded projects to channel their outputs directly into policy. Simultaneously, policy documents (e.g. the Kunming-Montreal Global Biodiversity Framework or the EU Biodiversity Strategy for 2030) increasingly emphasise the need for evidence-based policymaking, calling for scientific inputs. In parallel, the European biodiversity governance framework is being set up with the lead of the Knowledge Centre for Biodiversity and the contribution of the Science Service to aid closing the gap between science and policy. This kind of bridging activity to connect policymakers and researchers to understand needs is seemingly crucial considering the limited rate of claimed and evidenced policy impacts detected among the assessed projects.

Whereas 63% of the projects reported some type of policy impact, these were largely related to conceptual change, which were in many cases limited to dissemination activities (e.g. disseminating policy brief to the policy audience). Now, if the impacts were not further detailed in the reports, we could not verify whether the audience was, in fact, engaged with the information or if any follow-up activities took place beyond the project's scope. However, specific policy audiences (e.g. concrete DGs, ministries, or individuals) were rarely identified in the reporting, potentially revealing that dissemination measures were not precisely targeted (Nutley et al., 2007, Young et al., 2014). In most cases, the evidence provided in case of the conceptual impact (and in general) was weak or ambiguous regarding the extent to which these dissemination and exploitation activities were effectively carried out. Other impact types, such as enduring connectivity (e.g., engaging various stakeholders through involvement) or instrumental changes that contribute to policy documents or processes, were evident in only one-fifth of the projects. Capacity building was present in approximately 16% of the projects. Attitude or behaviour changes, such as adopting new approaches to integrating knowledge for policy (e.g., involving new stakeholders in decision making), were observed in 4% of the cases. However, the latter is particularly challenging to report, as it is seldom a direct outcome of the project and often manifests beyond the project's duration as a cumulative or indirect result. These outcomes suggest limited policy scope and policy impact tracking of the projects beyond dissemination of results. In turn, the relatively low number among the projects with detected policy impacts with clear evidence (16%) also indicates that the knowledge generated by these projects was likely not utilised for policy purposes and did not foreseeably reach a policy audience (at least within the project's timeframe) even if knowledge might have been relevant.

On a more positive note, when projects reported impacts, these impacts often occurred in combination (66% of those reporting), indicating that projects frequently integrated multiple elements for broader outcomes. Projects commonly reported combinations of impact types, suggesting that their strategy for policy influence was often multifaceted. For example, 44% out of those that reported impacts described achieving two types of impact simultaneously, with conceptual change frequently paired with another, such as instrumental change or capacity building. Ten percent reported three impact types in parallel, typically combining conceptual change with enduring connectivity and capacity building. Notably, 11% of projects with claimed impacts demonstrated four types of impacts, highlighting a comprehensive approach to influencing policy through multiple channels. Only two projects managed to demonstrate all five types of impacts, showing that such breadth is rare and likely requires a highly integrated and strategically planned approach from the outset. Whereas there were projects that delivered for policy implications, their strategic approach to address policy from various perspectives was limited. This is even more obvious when we consider how projects reported on impacts offering evident proof. Among the projects claiming policy impacts, only 16% of all projects provided detailed evidence strong enough to support their claims. This again raises the question to what extent policy played a central role in both the projects and the funding calls, and what were the expectations from the projects to report on policy implications.

Ninety-two percent of projects with reported impacts demonstrated higher policy literacy compared to those without, as they addressed additional biodiversity and sectoral policies. This may be because the original policy targets of these projects were aligned with other biodiversity or sectoral policies rather than the BDS2020, only having a potential and not intentional contribution to the strategy. Nevertheless, it is possible that projects with reported impacts possessed a deeper understanding and a more strategic approach of policy, targeting multiple policies while considering their interconnections in terms of biodiversity. When examining the focus of these policies, it is evident that they primarily align with policies directly relevant to BDS2020, such as the Nature Directives (which may have been their original focus). Only 25% of the projects that referenced additional policies included sectoral ones like the Common Agricultural Policy, EU marine policies, or spatial planning. This suggests a limited mainstreaming and cross-sectoral approach, which may stem from the original call specifications as well as the projects' narrower policy focus. Additionally, social and health policies were mentioned in very few cases, indicating a lack of a holistic focus and limited consideration of social aspects within the policy frameworks. Despite these limitations, the influence of EU-level research funding and international consortium collaborations is evident, as most projects targeted EU-level policies.

4.3. Enablers and hinderers of policy impacts

An analysis of the different clusters of projects with multiple impacts and strong evidence revealed that duration was a significant factor. Projects that demonstrated strong evidence of instrumental impacts were generally longer than the typical length, with an average duration of four years. Potentially, longer projects may have had more time to effectively plan and implement policy-relevant measures, including higher levels of engagement, and accordingly, more targeted dissemination of results. Additionally, a stated contribution to the BDS2020, coupled with a clear and deliberate policy intent, was a strong predictor of policy influence among the projects with reported impacts. This finding aligns with the expectation that setting specific policy targets from the outset increases the likelihood of achieving them, as clear goals provide a framework for effective planning and implementation. This additionally corresponds to the observation that a focused approach on a single target, which implies a specific policy area, was associated with greater impact possibility. Notably, projects tackling Target 1 showed a significant correlation with policy impact, likely due to the long-established policy framework and processes under the Nature Directives. The long-existing Birds and Habitats Directives and related processes have likely fostered a deeper understanding and built well-established stakeholder networks focused on the implementation and monitoring of these policies. This foundation could have enabled a more targeted policy approach and facilitated clearer connections between research projects and policy outcomes. In contrast, the other targets such as Target 2 entailing green infrastructure or restoration were less correlated with policy impact, perhaps as there was no dedicated regulation within the given timeframe and required integration with other sectoral policies, such as spatial planning, to fully deliver on biodiversity.

Projects that identified and elaborated on enabling, hindering or lessons learnt (even the latter was considered as enabler or hinderer as they covered the same key challenges) policy factors demonstrated a comprehensive understanding of the requirements for greater policy integration. Specifically, engaging a variety of actors, including knowledge brokers, public institutions, and policymakers, was advantageous for influencing policy directly. Furthermore, projects that comprehensively addressed challenges in knowledge availability—such as the flow, accessibility, and types of information—were more successful in achieving policy impact. Projects with multiple impact types often focused on urban planning, suggesting that impacts might be more attainable at a local level. Engaging local policymakers, understanding their needs, and providing tailored research input may have been more feasible, as local authorities are generally more approachable and open to integrating such input into policies. In examining projects with institutional impact and strong evidence we can detect that those managed to achieve a higher impact that had a marine or urban focus, rather than having direct contribution to the BDS2020. These projects typically focused on a single target and demonstrated a thorough understanding of key enablers and barriers, which supported their effectiveness.

Additionally, the size of the consortium and the alignment of project outcomes with policy cycles emerged as significant predictors of policy impact. This highlights the importance of engagement, particularly the involvement of knowledge brokers, who can leverage their expertise and networks to directly channel research into policy. The timing of project results was also crucial for policy uptake, as new policy developments often seek evidence to establish credibility and inform decision-making.

5. Recommendations to policymakers and researchers

Based on the assessment of 183 EU research projects under the FP7 and Horizon 2020 funding programmes from 2008 to 2023, a number of conclusions and recommendations can be drawn to enhance the policy impact of future research projects.

Projects with explicit policy targets and contributions to the BDS2020 were significantly more successful in achieving impactful outcomes. A clear focus on well-established policy frameworks, such as the Nature Directives, provided a strategic advantage along with a single target focus. This focused approach, particularly when projects target a single, clearly defined policy area, increased the likelihood of effective policy integration and impact.

Consortium size and the involvement of diverse stakeholders, particularly knowledge brokers and public bodies, were significant predictors of policy success. Larger consortia with expertise and networks to engage with policy actors effectively facilitated greater policy influence.

Additionally, the alignment of project timelines with policy cycles played a crucial role. Projects that timed their outputs to coincide with policy developments or review cycles were more likely to achieve uptake, as policymakers often seek credible evidence during these periods.

The length of the projects also influenced their success in achieving a policy impact. Projects with longer durations (around four years or more) tended to be more effective in planning, implementing policy-relevant measures, and engaging with stakeholders. This allowed for deeper, more targeted dissemination of results, which increased their impact potential.

A noticeable limitation was the lack of cross-sectoral integration. Although many projects addressed biodiversity policies, fewer focused on sectoral policies like agriculture or marine frameworks. This indicates an opportunity for future projects to adopt a more integrated approach, aligning biodiversity research with other relevant policy areas to support biodiversity mainstreaming. The limited inclusion of social and health policies suggests a gap in adopting holistic approaches that integrate biodiversity with societal well-being and health outcomes.

However, while many projects claimed policy impacts, only a small percentage (16%) provided strong evidence to support these claims. This raises questions about the extent to which policy objectives were central to the projects and highlights the need for improved mechanisms to track and report policy impacts. On the other hand, it is important to note that our assessment focused solely on policy impacts from the perspective of the research projects. We reviewed these impacts based on the project reports, and therefore, our reflections on enablers and barriers are limited to the researchers' viewpoints. We did not have the means to evaluate how policymakers perceived the projects, the extent to which these projects were considered relevant from their perspective, or what factors enabled those that successfully influenced policy. This represents a significant limitation of the study.

While there is increasing pressure on researchers to meet policymakers' needs, establish contacts, and influence policy, the same expectations may not be reciprocated from the policymakers' side. Researchers often encounter challenges in accessing relevant policymakers and effectively communicating their findings, even when these are summarised and simplified into more digestible formats than research reports or articles (e.g. policy briefs). For evidence-based policymaking to be effective, efforts must be made from both sides. Adequate platforms and opportunities need to be developed to facilitate meaningful dialogue and collaboration between researchers and policymakers, ensuring that scientific evidence is translated into actionable policy. To aid more effective cooperation between science and policymaking and to enable more policy-targeted research projects we **recommend the following measures:**

1. **Future research projects should exhibit key characteristics of policy-impactful research**

- Projects demonstrating strong evidence and multiple types of impacts generally had longer durations (average 3.8 years), higher funding levels, and clear policy intentions. Funding calls should have project criteria that prefer longer durations with higher levels of funding with a multifaceted approach to policy impact.

2. **Future research projects should be required to have a clear intent for policy impacts**
   - The intent should specify what policy impacts the research aims to achieve and how, using specific measurable targets in the funding call and award criteria.
3. **Funders should have differentiated funding streams**
   - Projects that are expected to have policy impacts should have a separate funding stream to projects where policy impact is not considered the goal of the project (as it sometimes should not e.g. the life sciences)
4. **Future research projects should be explicitly aware of and respond to key policies, strategies and directives**
   - There is a plethora of policy needs outlined in the policies, strategies and directives produced by the European Commission. Researchers should be aware of the policy context they are working within, explicitly situate their research within it, and actively respond to outlined policy needs. Where this is not the case, researchers should actively include and consult partners that have the relevant expertise.
   - Funders should be aware that researchers appear to reference some frameworks, directives, strategies and targets more frequently than others. Funders should specifically produce calls that respond to a variety of specific policy needs.
   - Funders should also target specific calls towards key sectors (and policies) beyond biodiversity, for example, agriculture and marine spatial planning, to integrate biodiversity into these sectors.
5. **Funders should fund horizon scanning and research prioritisation activities to identify key topics to guide future funding calls**
   - Funding specific projects entailing research prioritisation horizon scanning with active and targeted consultations with stakeholders and policy will enable funders to then produce funding calls that respond to current and emerging policy needs. Funding streams could be targeted towards achieving particular goals in line with key sectors, strategies, policies and directives. Research prioritisation activities would also enable researchers to actively respond to pre-identified policy needs, which would assist in developing intentions for policy impacts and how to achieve them.
   - Funding horizon-scanning activities should be a parallel activity that will enable funders to plan emerging policy and research needs instead of responding to them through research prioritisation. Horizon scanning could align with seven-year programming cycles to ensure and allow the findings from horizon scanning to feed into programming.
6. **Future funding cycles should strategically align with EU programming cycles**
   - Research tends to be more impactful when it can feed into these cycles. Funding cycles should aim to align with the programming cycles so that research can actively contribute to programming when policy actors may more actively consult scientific input.
   - Policymakers should also more actively reach out to researchers to provide more input into specific programming calls.
7. **Future research calls should identify specific policy needs led by policy actors and consider what research outcome may be appropriate to support these policy needs**
   - To ensure research effectively responds to policy needs, policymakers should be more actively engaged to contribute directly to research programming. Funders should identify not only what types of knowledge research should produce but also outline the specific policy need the research is contributing to and in what format e.g. report, dataset, tool, etc. This would facilitate clarity for researchers regarding how to formulate their intent to create policy impact and ensure the result is useful for the policy need.

8. **Institutionalised mechanisms to support the science-policy interface should be created between researchers and policymakers to support the development of policy-impactful research**
   - Institutionalised mechanisms between policy actors and researchers are essential for reciprocal relationships to produce impactful research.
   - Policy actors need to communicate the policy context and needs to researchers. Researchers can develop proposals on this basis that respond to these policy needs.
9. **Funding calls should require more diverse consortia and strongly promote the active participation of knowledge brokers and policy actors**
   - Diverse consortia including policy actors should aim to achieve buy-in from the very beginning in terms of developing a reciprocal relationship with direct access between policy actors and researchers to develop research products that can be appropriately disseminated and where potentially integrated into policy.
10. **Researchers should be required to report detailed outcomes and specify engagement with policy audiences in a systematic way**
    - Improved reporting standards would help bridge the gap between the policy intent of research projects and their actual impact, ensuring that the knowledge produced is effectively utilised within the EU policy landscape.
    - It would also be useful for projects to report on the enabling and hindering factors to explain if and why research projects are successful in achieving their policy intent. A repository of lessons learned should be developed based on this reporting to give practical insights for researchers but to also identify systemic or structural barriers that may be impeding policy-impactful research from occurring.
11. **As part of research funding, researchers should be required to undergo a training course focusing on policy-making**
    - There is a need for researchers to better understand the policy context they are operating within. A training course could offer capacity building and provide an overview of key issues for policymaking, context-specific information about the European Commission and guidance on policy impact and research.
12. **As part of research funding, policymakers should be required to undergo a training course focusing on understanding how research is undertaken**
    - There is a need for policymakers to better understand the research environment in which funded research projects are operating within. A training course could offer capacity building and provide an overview of key issues regarding the research process. Twinning actions for researchers and policymakers could link the two groups to build a common understanding.

6. Next Steps

Next steps will be considered as part of the second periodic reporting.

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Annexes

ANNEX 1

The project database for the BioAgora consortium can be accessed using the following DOI and has been published on Zenodo: 10.5281/zenodo.15370886

ANNEX 2

Table A1. Additional related policies reported by projects in their summary reports (the names provided below align with how the projects officially referred to the policies)

No.	Related Policies	Frequency
1.	EU Habitats Directive	42
2.	Common Agricultural Policy (CAP)	36
3.	Marine Strategy Framework Directive (MSFD)	32
4.	Water Framework Directive (WFD)	27
5.	Common Fisheries Policy (CFP)	24
6.	CBD (Strategic Plan, CBD Strategic Plan for 2011-2020)	22
7.	Birds Directive	15
8.	Sustainable Development Goals	12
9.	European Maritime Policy (Marine Spatial Planning (MSP)	8
10.	Green Infrastructure Strategy	8
11.	EU Forest Strategy (2020, 2030)	7
12.	Floods and Drought Directives	7
13.	EU Blue Growth strategy	5
14.	EU Green Deal	5
15.	Aichi Biodiversity Targets	4

16.	Strategic urban planning (Urban planning, Urban policy, Urban policy and planning)	4
17.	Forest Action Plan	4
18.	Biodiversity Strategy (2020 & 2030)	3
19.	EU Bioeconomy Strategy	3
20.	Integrated Maritime Policy for the European Union	3
21.	Ramsar Strategic Plan (Ramsar Convention)	3
22.	Soil Thematic Strategy	3
23.	EU Timber Regulation (certification schemas (FSC, PEFC))	3
24.	EU Directive on the promotion of the use of energy from renewable sources (Energy Directive)	3
25.	Blueprint to Safeguard Europe's Water Resources	2
26.	Climate Adaptation Plans (CAPs)	2
27.	Pest Control Directive	2
28.	EU Global and Conservation policies	2
29.	EU Plant Health Directive	2
30.	European Landscape Convention	2
31.	(Local) spatial planning	2
32.	European groundwater directives	2
33.	Paris Agreement	2
34.	EU rural development policy (rural development programs)	2
35.	Farm-to-Fork Strategy	2
36.	Waste Framework Directive	2
37.	River Basin Management Plans	2
38.	Directive 2009/128/EC on sustainable use of pesticides	2

39.	Atlantic Strategy and Action Plan	2
40.	Europe 2020 Strategy	2
41.	Animal Health Strategy for the EU	1
42.	Brazilian PES law	1
43.	City Climate Change Adaptation Strategy	1
44.	Climate action and Adaptation plan	1
45.	Climate Change Act	1
46.	Directive 2000/29/EC	1
47.	Directives for freshwater management	1
48.	Directive 2013/30 on Safety of Offshore Oil and Gas Operations	1
49.	EU Adaptation Strategy	1
50.	EU Regulation 1143/2014 on Invasive Alien Species	1
51.	EU Aquaculture Strategy	1
52.	European Strategy for Sustainable Development	1
53.	Forest Europe & MCPFE resolutions	1
54.	IMO Convention on ballast water management	1
55.	International Treaty on Plant Genetic Resources for Food and Agriculture	1
56.	Local Urban Regeneration Policy	1
57.	Natura capital accounting	1
58.	No Net Loss Initiative	1
59.	United Nations Millennium Development Goals (MDGs)	1
60.	2030 Agenda for Sustainable Development	1
61.	7th Environmental Action Programme	1

62.	Environment and Health Action Plan (2004-2010)	1
63.	Environmental Impact Assessment (EIA) policy	1
64.	EU Atlantic Action Plan	1
65.	EU directives EC 2002/56 and EC 66/402 on food safety	1
66.	EU energy policy	1
67.	EU policy agenda on Sustainable European Cities	1
68.	EU Soil Directive	1
69.	EU 2020 Strategy	1
70.	Europe 2020 Flagship Initiatives	1
71.	Germany's national biodiversity strategy	1
72.	European water policy	1
73.	Lisbon Strategy	1
74.	Local policy levels in regional food chains	1
75.	Macedonian National Heat-Health Action Plan	1
76.	River Basin Management	1
77.	New Renewable Directive (2009/28/EC)	1
78.	Sustainable land use planning	1
79.	The Nagoya Protocol	1
80.	UK's Marine and Coastal Access Act	1
81.	Urban Food Policy or Strategy	1
82.	Bern Convention of the Council of Europe	1
83.	Sustainable Management of Natural and Environmental Resources	1
84.	EU Development Policy	1
85.	UNFCCC	1

86.	TEN-T (Trans-European Network – Transport)	1
87.	Shellfish Waters Directive	1
88.	Restoration Agenda (“developing a Blue Agenda”)	1
89.	River Restoration Plans	1
90.	Strategic Environmental Assessment (SEA) policy	1
91.	Nitrates Directive	1
92.	Kunming-Montreal Global Biodiversity Framework	1
93.	Germany’s national sustainability strategy	1
94.	EU territorial cohesion strategy	1
95.	EU regulations on industrial chemicals (REACH)	1
96.	European environmental and spatial/physical development policies	1
97.	European Ocean Literacy	1
98.	Environmental Policy Integration (EPI)	1
99.	Integrated Coastal Zone Management (ICZM) recommendation	1
100.	Kyoto and Montreal protocols	1
101.	Procurement policy	1
102.	Thematic strategies on air pollution	1
103.	White Paper of Adaptation to Climate Change	1
104.	Environmental Technologies Action Plan (ETAP)	1
105.	Biodiversity Action Plan	1
106.	Biomass Action Plan	1
107.	Biocidal products (BPR)	1
108.	Bathing Water Directive	1

109.	Convention on Combating Desertification	1
110.	Convention on Migratory Species CMS	1
111.	Landfill Directive	1