Report of the

QUESTIONNAIRE ON THE NEEDS IN THE USE OF AGROBIODIVERSITY INFORMATION

Final version 1.0 published on 11 December 2018

This document is a contribution to the project *Agrotraining - Proofing GBIF use on agrobiodiversity through needs assessment and training*, carried out by GBIF Portugal, GBIF Spain and the College Food Farming and Forestry (F3), of the University of Lisbon. The project was financed by the Capacity Enhancement Support Programme of GBIF (Global Biodiversity Information Facility), project CESP2016-007,

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Aims

This report is the outcome of a pilot project that aimed to understand the main needs from Agrobiodiversity actors and some of their general perceptions regarding information and definitions.

Contact information/disclaimer

This document was elaborated by GBIF Portugal, in collaboration with GBIF Spain and College Food Farming and Forestry (F3). For more information, please contact node@gbif.pt.

Recommended citation:

Branquinho, C., Carmo, M.B., Faria, M.L., Figueira, R., Franco, J.C., Freire, D., Goulão, L., Messina, T., Monteiro, F., Proença, V., Romeiras, M.M., Santos-Reis, M., Sardinha, I.D., Villaverde, C. (2018). Report of the Questionnaire on the needs in the use of agrobiodiversity information. GBIF Portugal, GBIF Spain and College F3: Food, Farming and Forestry of the University of Lisbon, Lisbon, Portugal, 61 pp.

Table of Contents

1. Introduction

Data are the basis for scientific work, for policy elaboration and for decision-making. Therefore, there is broad consensus in the scientific and conservation communities that data should be free and open for access and available in a sustained, persistent and secure way (Moritz et al. 2011). Agrobiodiversity (ABD) information is of main importance worldwide and therefore should be collected, standardized and shared, through open and free access databases. However, until now, such practices remain a challenge and dealing with it may require changes in how agricultural research is conducted, but also on capacity building to engage new actors and foster data observation networks (Proença et al. 2017). “Not only will teams need to be multidisciplinary, as they begin to pursue big data and data-intensive approaches, they will need to find effective ways to share their diverse kinds of data with each other, with other research teams, with members of farming and business communities, and with policy-makers” (Parr, Antognoli, & Sears, 2017).

In this context, the Portuguese Node, together with GBIF Spain and the College Food, Farming and Forestry (F3) of the University of Lisbon, launched the **Questionnaire on the Needs in the use of Agrobiodiversity Information**, under the scope of the project GBIF CESP2016-007 Agrotraining[1]. The questionnaire aimed at uncovering needs of biodiversity information in the domain of ABD and was carried out from the 17th of April to the 15th of September, 2017.

The survey targeted actors with a relationship and/or experience with ABD, including but not exclusively: producers, regulators, members of NGOs, professors, researchers, and other users from related domains. The questionnaire was available online (link), in four languages (Table 1), and had an estimated completion’ time of 10 to 15 minutes (see Annex section of this document). Although initially of global scope, the final focus was directed to communities in Portugal and Spain, in order to

1http://www.gbif.pt/agrotraining

achieve better representativeness. Moreover, questions' elaboration considered their relevance to the preparation of course contents and were used to identify primary needs from stakeholders regarding ABD data use.

Therefore this report is the outcome of a pilot project that aimed to understand the main needs from ABD actors and some of their general perceptions regarding ABD information and definitions.

Table 1. Links to the online survey in the four languages selected (only the English version is available for consultation).

Language	URL
Portuguese	http://www.gbif.pt/questionario
Spanish	http://www.gbif.pt/cuestionario
English	http://www.gbif.pt/questionnaire
French	http://www.gbif.pt/questionnaire_francais

2. Summary of Key Findings

1. Respondents understand the main elements from Agrobiodiversity and attribute a high or very high importance to all of them, specially to support species and species from the ABD system.
2. A high percentage of respondents (ca. 60%) uses ABD databases. The remaining 40% stated not to use it, and among these, ca. 56% do not know databases or don't know how to use it.
3. Respondents aim to acquire from databases: knowledge; occurrence data; professional information; environmental education material; teaching and courses material; data for reports' elaboration to private agro-food companies; and consulting material.
4. About 34% of the respondents still prefer searching engines (*e.g.* Google) and literature for information on ABD, while 26% use databases (international and national).
5. Regulators were the group most interested in citizen science databases.
6. FAOStat and GBIF are among the most used international databases.
7. Respondents also use national databases to conduct their search for ABD data, being Flora-on the main tool for Portugal and Anthos for Spain.
8. The most searched data are: species identification, distribution data, pests, diseases and weed management.
9. The majority of respondents from the "research and teaching group" stated to use databases, representing the group with greater access to information from these sources, followed by "regulators and NGOs".
10. The most important criteria stated, while searching on databases are: scientific name, distribution and traits, which were considered as "Very Important" by all groups of stakeholders.

11. The majority of respondents prefer or would prefer data treated and organized by area of interest.
12. When accessing data, most respondents carry out small details additions (50%).
13. Almost 70% of these changes are not made available, and the 30% that do share alterations, do it in different sources or platforms rather than the original ones.
14. Main reasons for not sharing it back were stated to be: lack of time and of infrastructure (platform).
15. Papers are the main product (36%) deriving from database searches. However, a significant part is used for reports elaboration, through NGO or European Community reports (16%) and Public institutions' reports (23%), becoming an important source of ABD information sharing.
16. Training and capacity building in core institutions from both countries may speed up and facilitate the mobilization of ABD data in the Iberian peninsula, and greater use of available databases by more diverse groups of stakeholders.
17. The researchers' group is the most interactive regarding data searching, providing and sharing, when compared to the other groups.

3. Detailed findings

I. Respondents' profile

After the online release of the survey, 214 people started to answer it. From that total, 78 (36%) quit the survey before concluding it and 135 (64%) finalized and submitted their answers.

Questions 1 to 7, except for Question 4 (country information), were not included in this report as they are personal details (*e.g.* name, surname, email address, etc.) of respondents and therefore were considered of confidential nature. Further on, Question 4 gathered information regarding respondents' country, which disclosed an asymmetric geographic distribution (Fig. 1) and corresponding representativeness, leading to the exclusion of countries with less than 30 respondents. Thus, only Portugal and Spain were included, which summed up to a total of 99 individual questionnaires for analysis.

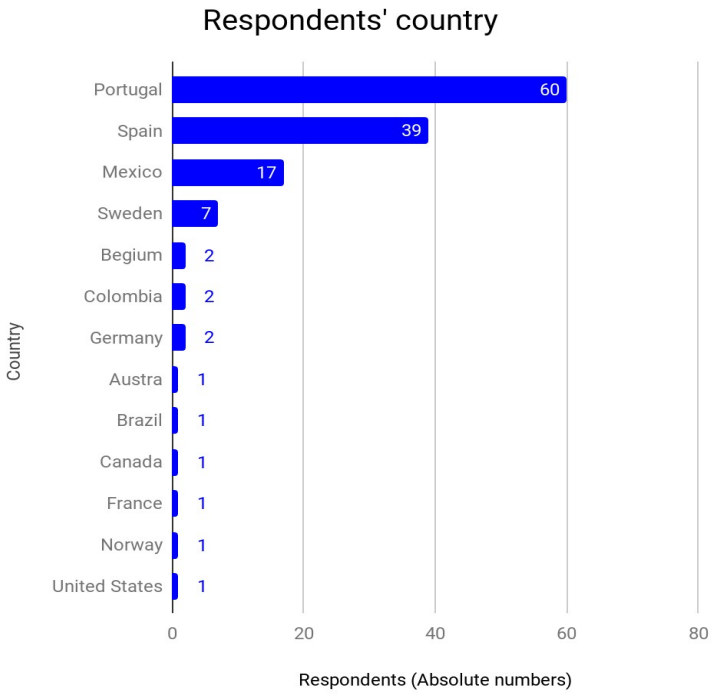

Fig. 1. Number of respondents per country (n=135) (Question 4).

Regarding the professional background (Question 8), respondents were clustered in four main groups, to allow a better analysis of the answers (Fig. 2):

- "Research and Teaching group" - This group comprehends all researchers and high education professors.
- "Regulators and NGOs" - This group includes government officers, staff from local associations, NGOs, international organizations and consultants.
- "Production chain" - This group includes producers and industry employees.
- “Others” - This group comprehends consumers and people that have chosen “other” as a professional background.

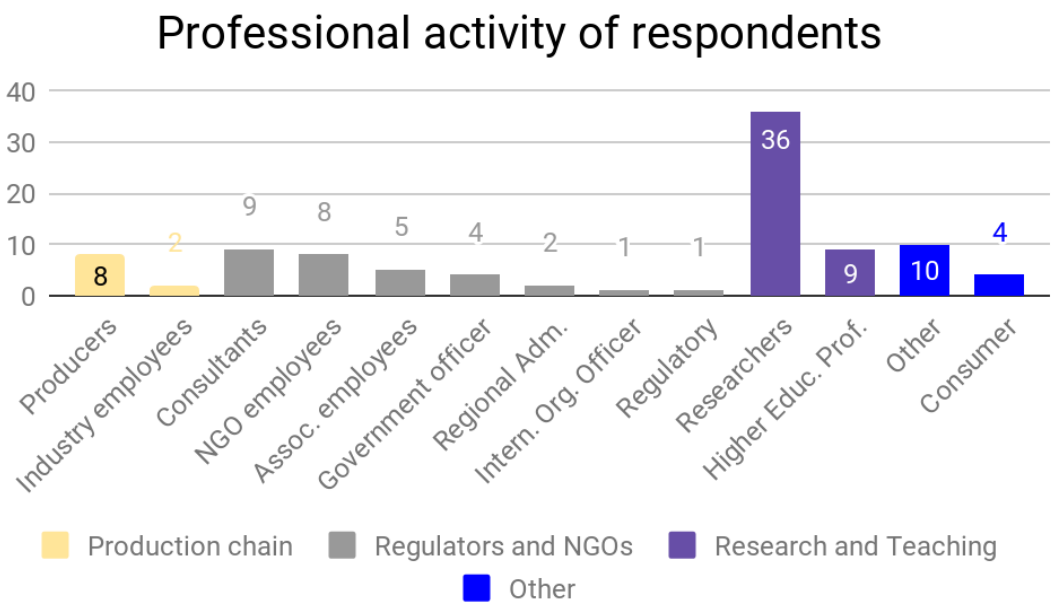

Fig. 2. Respondents’ professional activity (one choice, 99 respondents) (Question 8).

From the 99 respondents, the majority (n=45) belongs to research or to higher education teaching fields (Fig. 2), which are in most cases, closely related areas and accounted for almost half of the participants (45,9%) (Fig.3). Therefore results presented in this report may be more representative to this professional background.

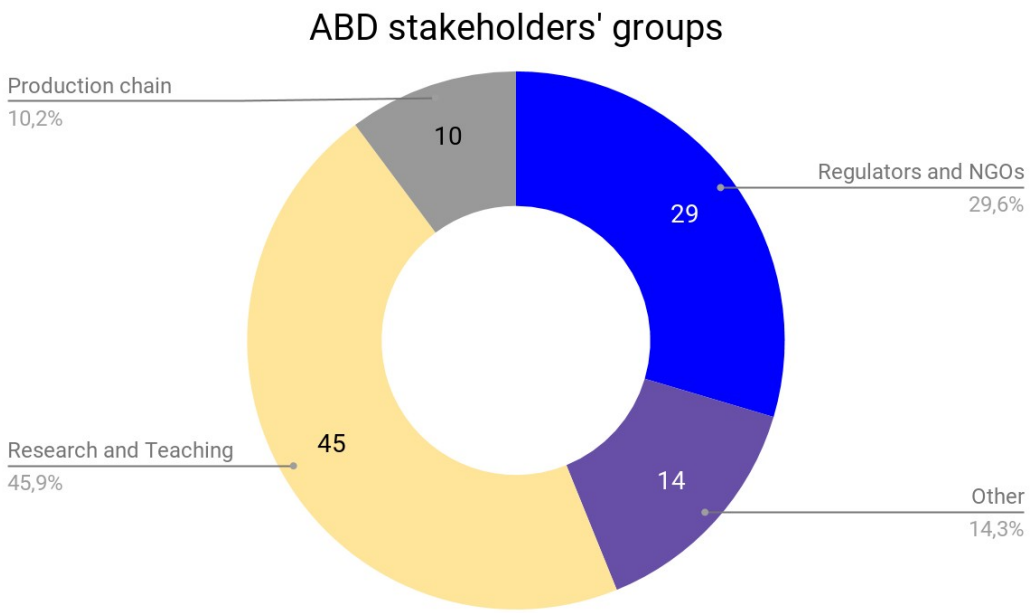

Fig. 3. Percentage of respondents aggregated in each professional activity group (n=99) (Question 8).

In respect to the areas of knowledge (Question 9) of the selected respondents (n=99) (Table 2), from a total 264 responses, 211 were related to natural sciences (80%), from which Agronomy, Biodiversity and Nature Conservation gathered 32% (85) of all responses.

Table 2. Main areas of expertise (up to three choices, 99 respondents) (Question 9).

Expertise areas			
Agriculture Systems	13	Genetics/Evolution	6
Agroforestry	12	Invertebrates/Microbiology Genetic Resources	6
Agronomy	**34**	Landscape/Land Planning	14
Animals Genetic Resources	3	Legislation/Public Policies	5
Anthropology/Sociology	0	Marketing	3
Aquatic/Fishing Genetic Resources	0	Natural Resources Management	11
Biodiversity	**31**	**Nature Conservation**	**20**
Bioindustry	1	Nutrition/Health	5
Biotechnology	4	Other	10
Botany	11	Pests/Diseases/Weeds Management	9
Economy	8	Plant Genetic Resources	6
Ecosystems Services	17	Press/Media/Communication	5
Education/Training	9	Soil Science	5
Entomology/Pollination	4	Zoology	8
Ethnobiology/Ethnobotany	4	**Total responses**	**264**

II. Perceptions about components of Agrobiodiversity and their relative importance

In order to better understand respondents perceptions regarding Agrobiodiversity, the definition by FAO[2,3] was presented to them, as follows:

> "Agrobiodiversity (ABD) is the variety and variability of animals, plants and microorganisms that are used directly or indirectly for food and agriculture, including crops, livestock, forestry and fisheries. It comprises the diversity of genetic resources (varieties, breeds) and species used for food, fodder, fibre, fuel and pharmaceuticals. It also includes the diversity of non-harvested species that support production (soil micro-organisms, predators, pollinators), and those in the wider environment that support agroecosystems (agricultural, pastoral, forest and aquatic) as well as the diversity of the agroecosystems".

This definition details three main elements from Agrobiodiversity, that are summarized on Table 3.

2 FAO. 1999. Agricultural Biodiversity, Multifunctional Character of Agriculture and Land Conference, Background Paper 1. Maastricht, Netherlands. September 1999.
3 FAO. 2005. Building on Gender, Agrobiodiversity and Local Knowledge. http://www.fao.org/3/a-y5956e.pdf

Table 3. Definition highlights for the main components of agrobiodiversity.

Main components of agrobiodiversity
Species used for food production or agriculture.
Support species (i.e., species that provided direct services to agroecosystems, but not harvested).
Other **species present in the agroecosystems** (i.e. biological diversity in the ecosystem).

When asked if they would prefer another definition (Question 11), 96% (95 of 99) said “No”. However, they suggested additional components that were considered important to be included in this definition, such as crop wild relatives and its relationships to other species or varieties; cultural components and traditional ecological/field knowledge.

Moreover, respondents were asked to attribute an importance level (Question 10) to the components (Table 4).

Table 4. Respondents answers (one choice per component), per component (Question 10).

ABD components	Not applicable	Less relevant	Relevant	Very relevant
Species used	3	11	31	**54**
Support species	1	16	20	**62**
Species in the agro-ecosystem	2	5	29	**63**
	Total respondents: 99			

For that, they had to select from the options: “Very important”, “Important”, “Less important” or “Not applicable” (Fig. 4), and attribute it to each component. Responses showed an overall “high or very high” importance level attributed to all elements (Fig. 4), from all groups of stakeholders, which could represent that respondents’ perceive biological diversity as highly valuable, which may be linked to more sustainable and diversified cultivation preferences, from the majority. Also, some of the comments highlighted the importance “to have production systems that respect human rights”, “needs” and that “values biological diversity”.

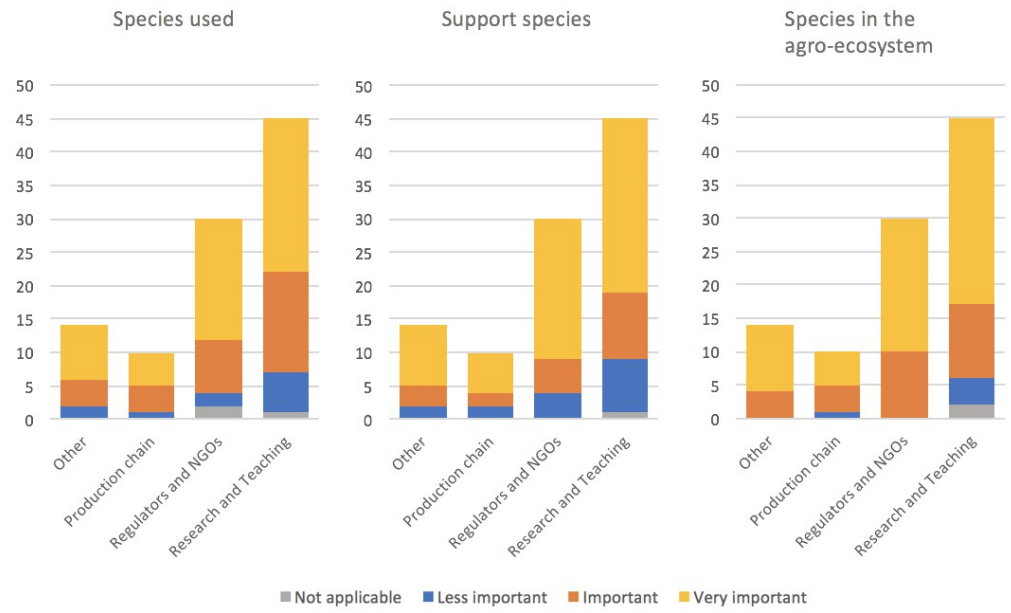

Fig. 4. Relevance classification of the three major components, per respondents' field of activity (Question 10).

In the groups' analysis, the majority of "producers" found all components as very relevant (Fig. 5), with a higher number for "species used" and "support species".

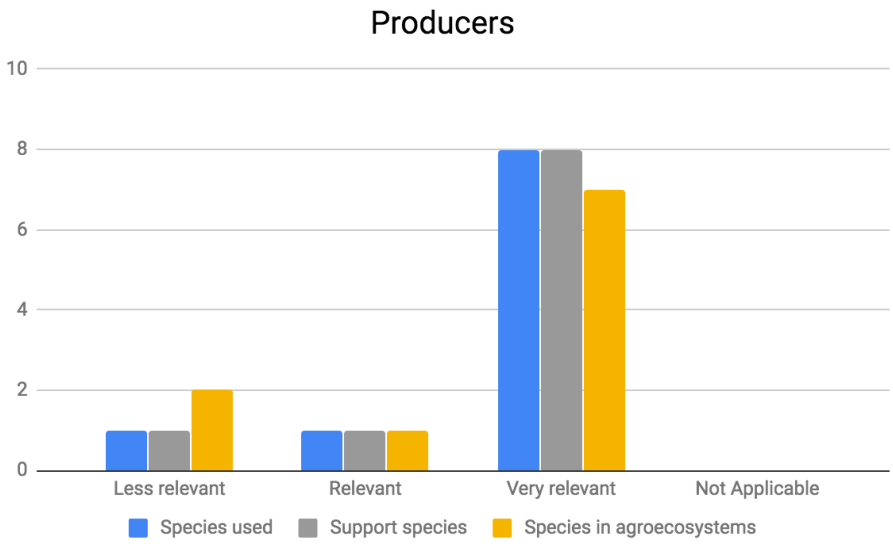

Fig. 5. Producers group' relevance classification of the three major components (Question 10).

"Regulators and NGOs" group had the majority atributting a "very relevant" level to all components, but "species used" was also indicated as "relevant" (Fig. 6). The group with "researchers and professors" (Fig. 7) gave the highest level of importance to "species in the agrosystem", followed by "species used" and "support species".

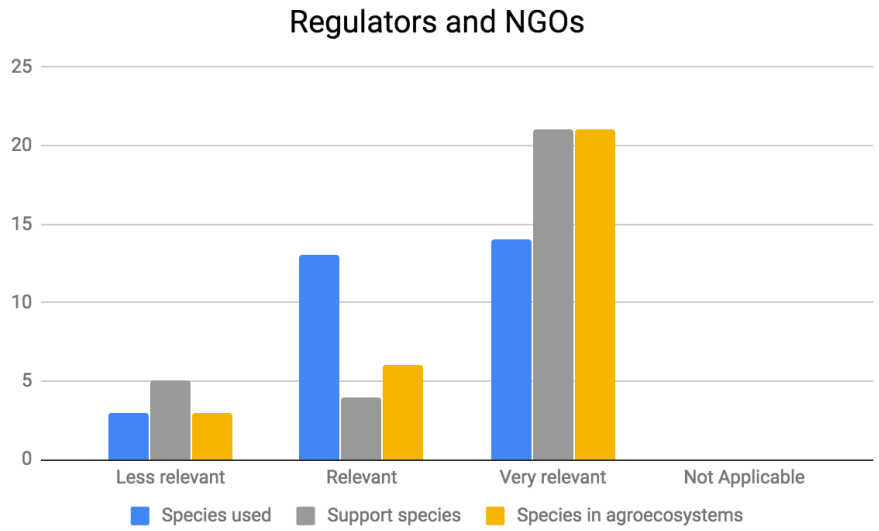

Fig. 6. Regulators and NGOs group' relevance classification of the three major components (Question 10).

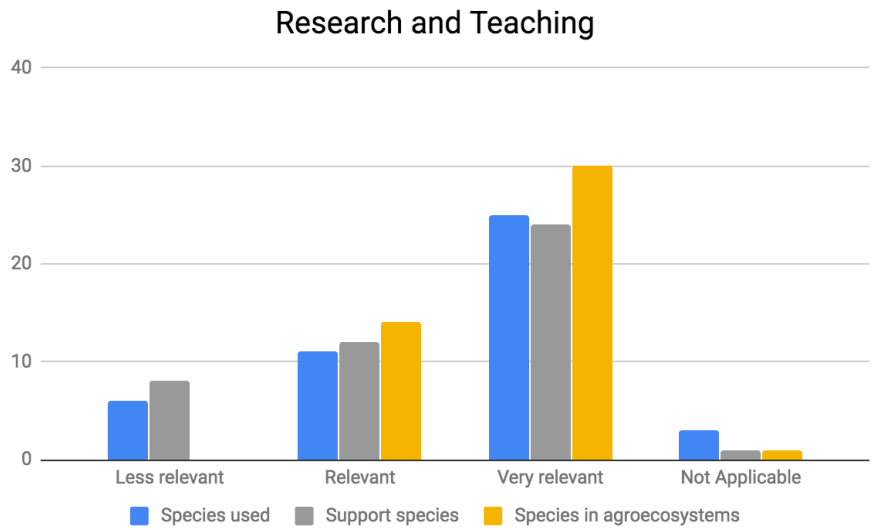

Fig. 7. Research and Teaching group' relevance classification of the three major components (Question 10).

The “other” group (Fig. 8) indicated “support species” as the most relevant, and also had a high number of responses as relevant to “species in the agrosystem”.

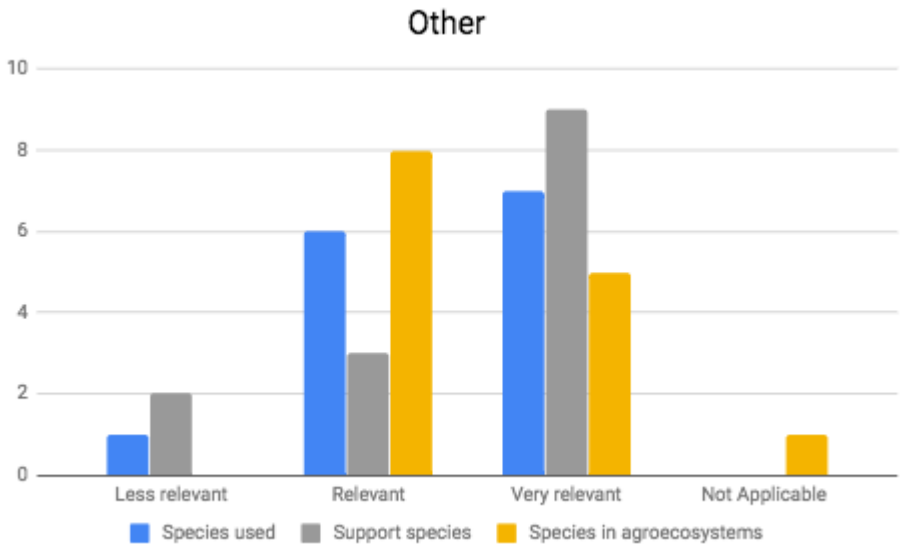

Fig. 8. Other group’ relevance classification of the three major components (Question 10).

III. Agrobiodiversity data use and search

Respondents use of ABD databases (Question 13) is not general and when acquired about it, almost 60% (59 from 99 respondents) answered positively to the question (Fig. 9).

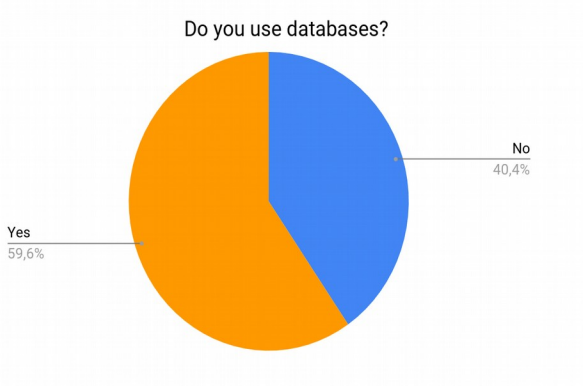

Fig. 9. Percentage of respondents that use ABD databases (Yes/No question, 99 respondents) (Question 13).

However database use comes mainly by respondents from the "research and teaching group" (=45), which showed that 70% use databases, representing the group with greater access to information from systems. The "regulators and NGOs" responses showed that 56% of people in this group also use databases for data acquirement. The "production chain" included producers and industry workers from the agricultural sector and showed a proportional use, where five stated to use and five stated not to use it (Fig.10).

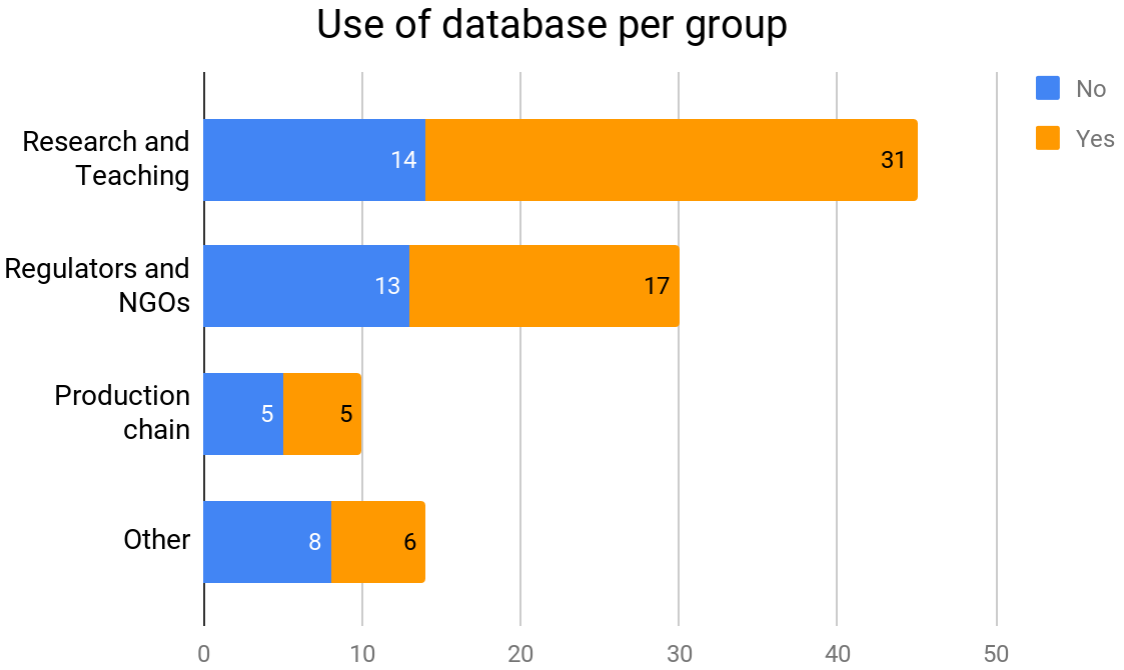

Fig. 10. Use of databases per group (yes/no question, n=99) (Question 13).

Furthermore, respondents had the option to state their reasons for not using ABD databases (Question 14) (Fig. 11), which resulted in 32 answers, that were analysed and placed in five main groups:

1. Databases are not satisfactory;
2. They don’t have the time to access it;

3. They use other resources such as papers or web search engines (e.g. google);

4. They don't need or don’t find it relevant to their work;

5. They don't know databases/how to use it.

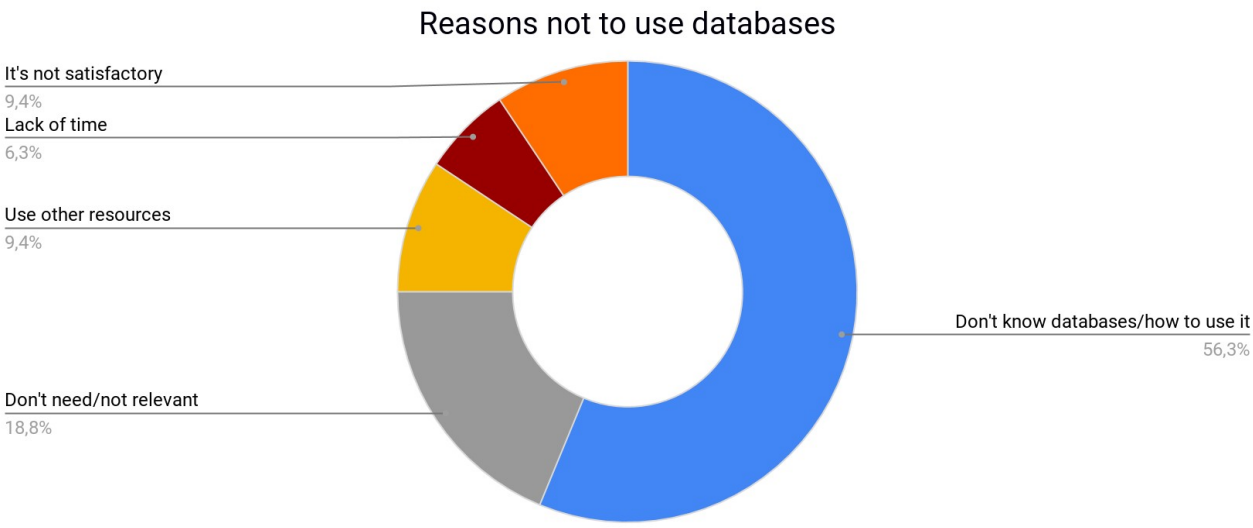

Fig. 11. Percentage of main reasons given by respondents (n=32 answers) (Question 14).

In that case, more than half have stated not to know any ABD databases or how to use it. Moreover, 20% of answers (n=6) stated not to need or to find it irrelevant, in which cases they may not find what they are looking for, as some stated that “current bases are not ABD specific”.

When looking at the reasons (Fig. 12) given by respondents, from a group perspective, the majority of respondents (n=18/32), from all groups that don’t use it, affirmed that they don’t know it or don’t know how to use it.

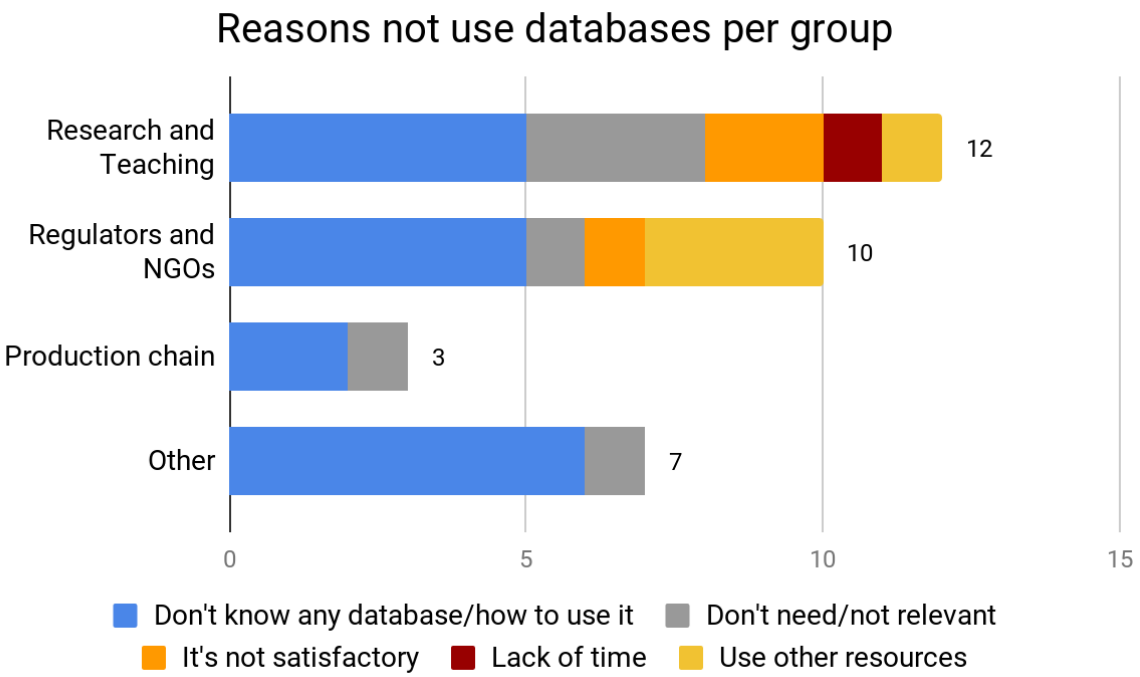

Fig. 12. Reasons not to use databases, per group of respondents (n=32 answers) (Question 14).

Moreover, respondents were asked to select their principal sources of information (Question 18) when looking for ABD data (Fig. 13), showing that 34% (135 answers from 393) still use searching engines and literature for information as their main source, while 26% use databases (international and national). Moreover, 11% of answers attributed personal contacts, that may include specialists' individual databases as an option.

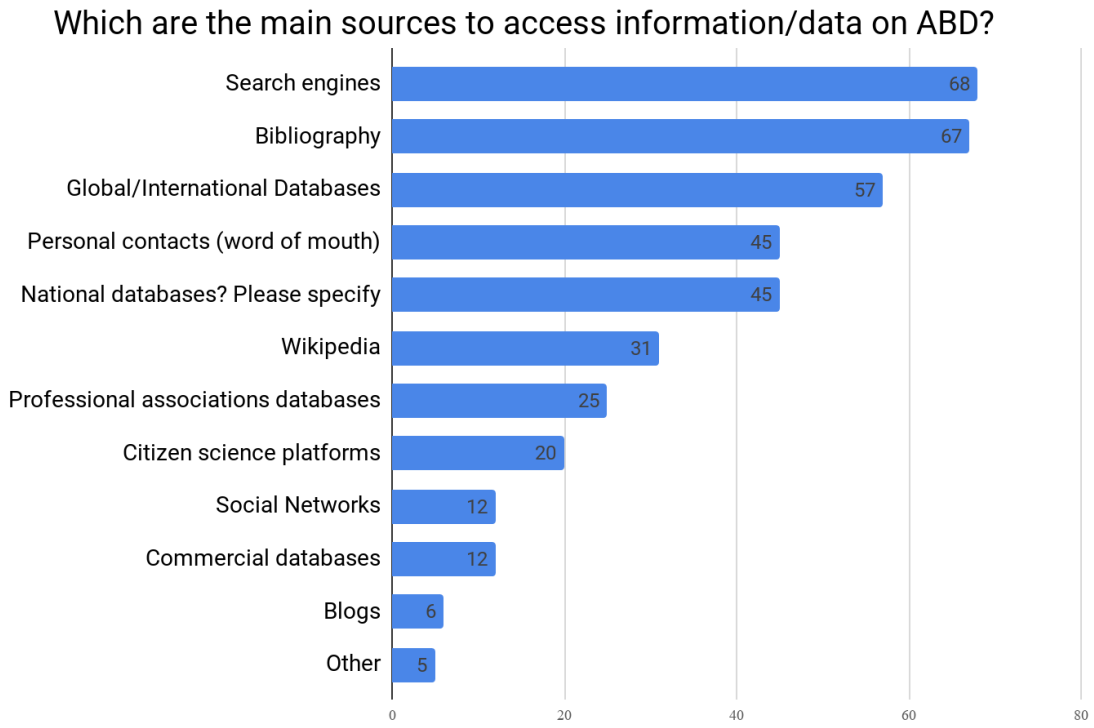

Fig. 13. Respondents main source of information for ABD data (multiple choice question: 393 responses in total; 99 individuals responding) (Question 18).

When looking individually at each group, results are similar to the general analysis (Fig.13) and showed that all groups mainly acquire information through searching engines and bibliography. One possibility for this outcome is that they probably chose searching engines to indicate scientific papers and reports search, for ABD information. Next, they selected international and national databases and personal contacts as other sources for data.

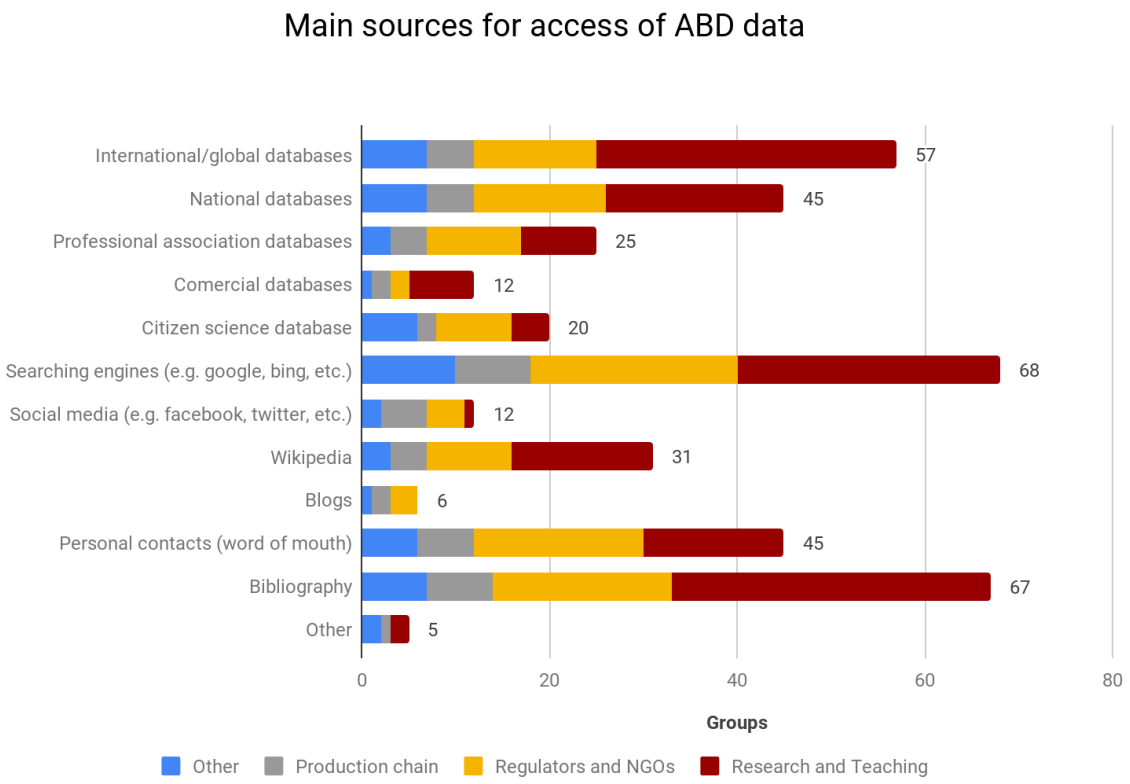

Fig. 14. Stakeholders' groups main source of information for ABD data (393 responses in total) (Question 18).

Regarding information on ABD (Fig. 15) (Question 12), within their own field of expertise, respondents have selected as their main objectives for searching for data: species identification; distribution data, pests, diseases and weed management; followed by searches on components related to biodiversity indicators, production, landscape management and practices.

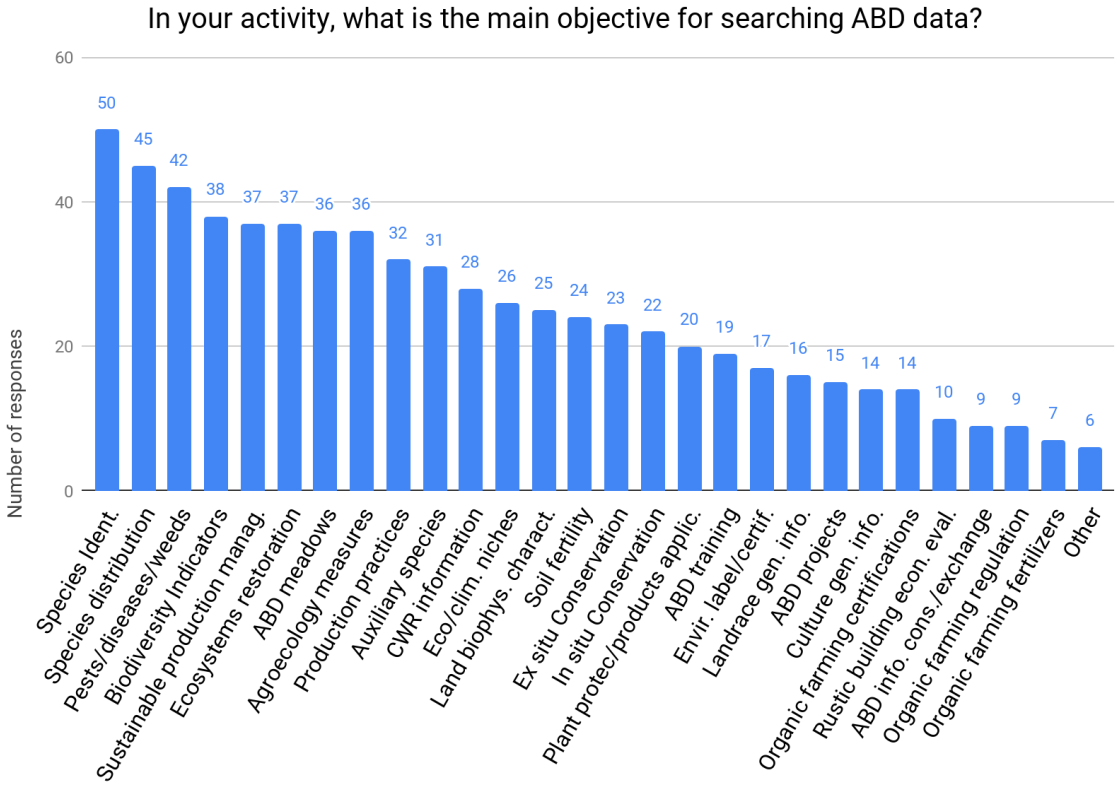

Fig. 15. Main objectives for searching data by respondents (multiple choices allowed) (Question 12).

Also, from additional information (not listed for selection) respondents usually search or would like to have access to, they highlighted: food information on the context of improving dietary habits; information for education purposes; and transparency related to genetically modified organisms (GMO). Moreover, they stated that would benefit from data on ecosystems' valuation, policies' improvement, as well as crop wild relatives (CWR) studies.

When enquired about the type of data they use from databases and its frequency (Question 15), there was a total of 1,292 responses, with an average of 14 answers per respondent. From which, respondents answered to regularly use: environment data, species occurrence, climate, ecology and checklists (Fig. 16). Over the "Never" category, most selected options were: Geology, Physiology,

Satellite Image and Anthropology. Further on, users stated in open answer fields, that they “use data on protected species” and about “economic value”, on a regular basis. Moreover, results per group of stakeholders are available in figures 17 to 20.

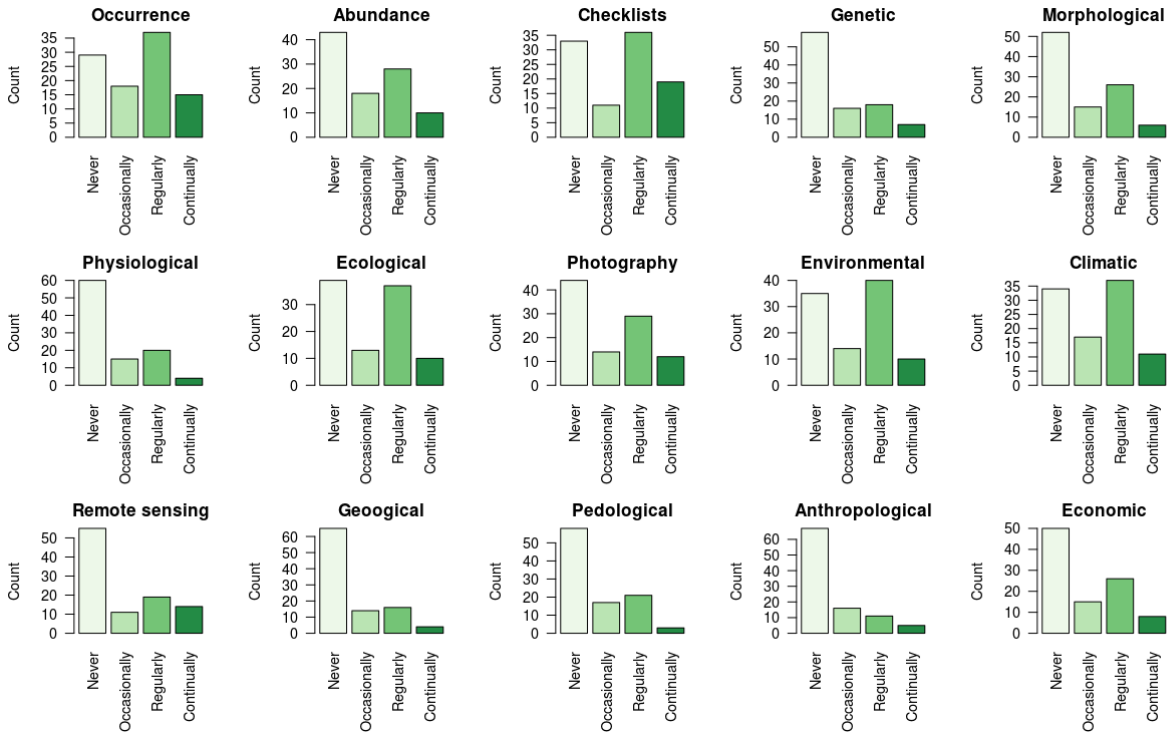

Fig. 16. Frequency of data usage per typology (Categories: Never, Occasionally, Regularly and Continuously) (Question 15).

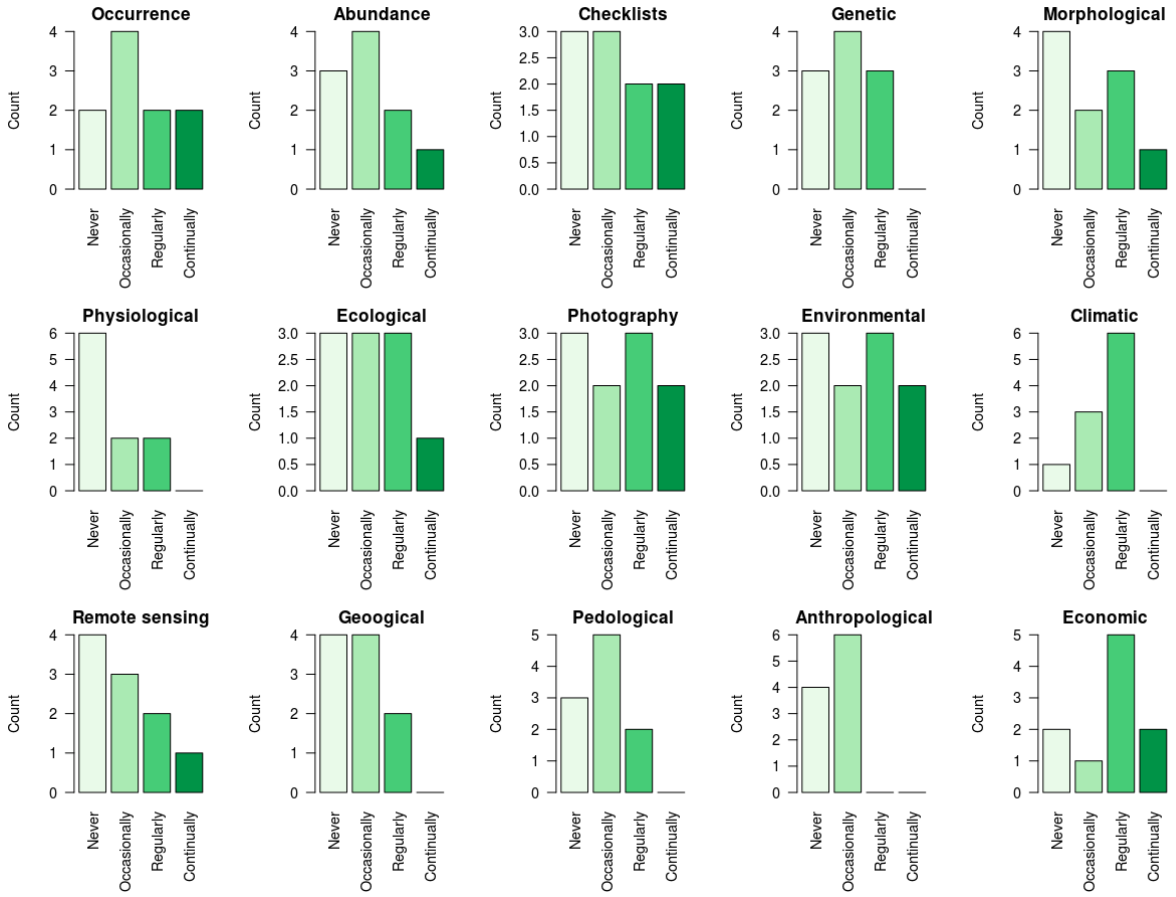

Fig. 17. Producers frequency of data usage per typology (Categories: Never, Occasionally, Regularly and Continuously) (Question 15).

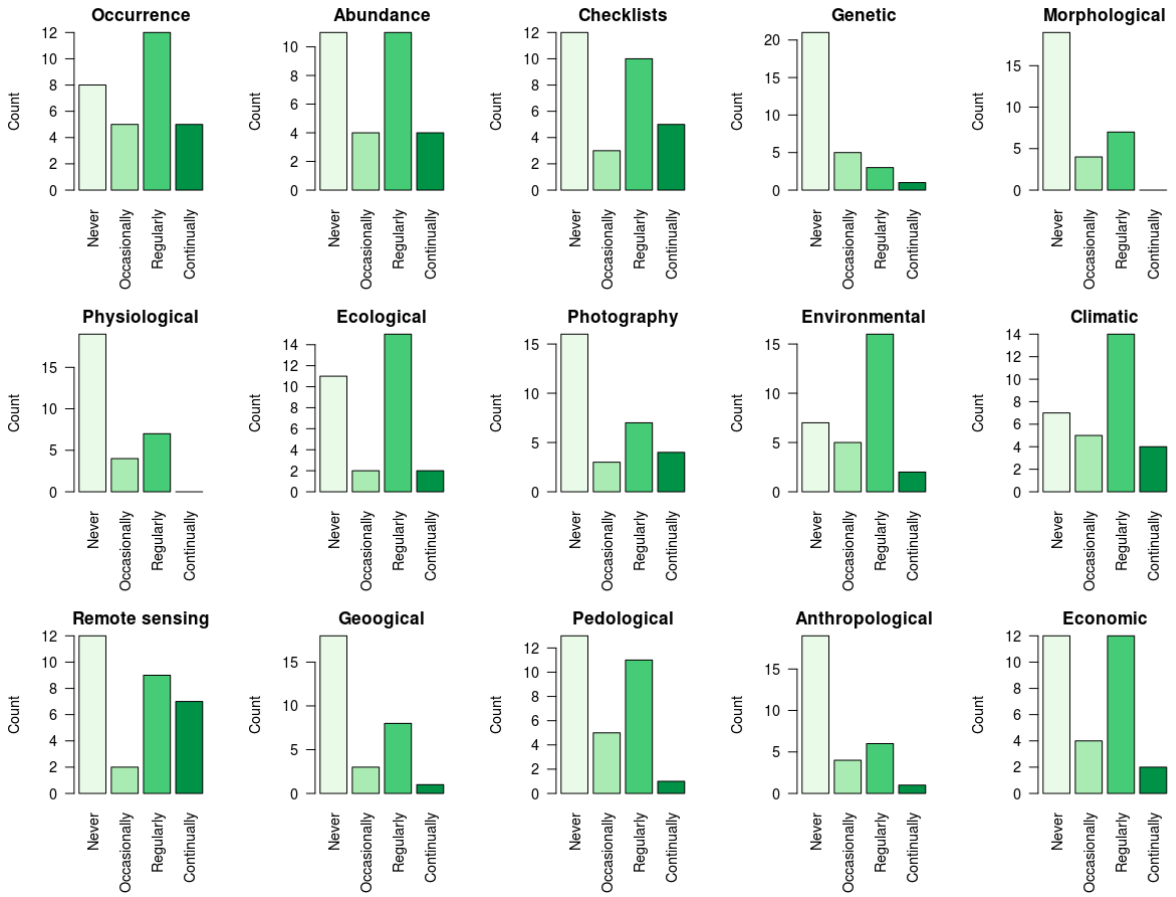

Fig. 18. Regulators frequency of data usage per typology (Categories: Never, Occasionally, Regularly and Continuously) (Question 15).

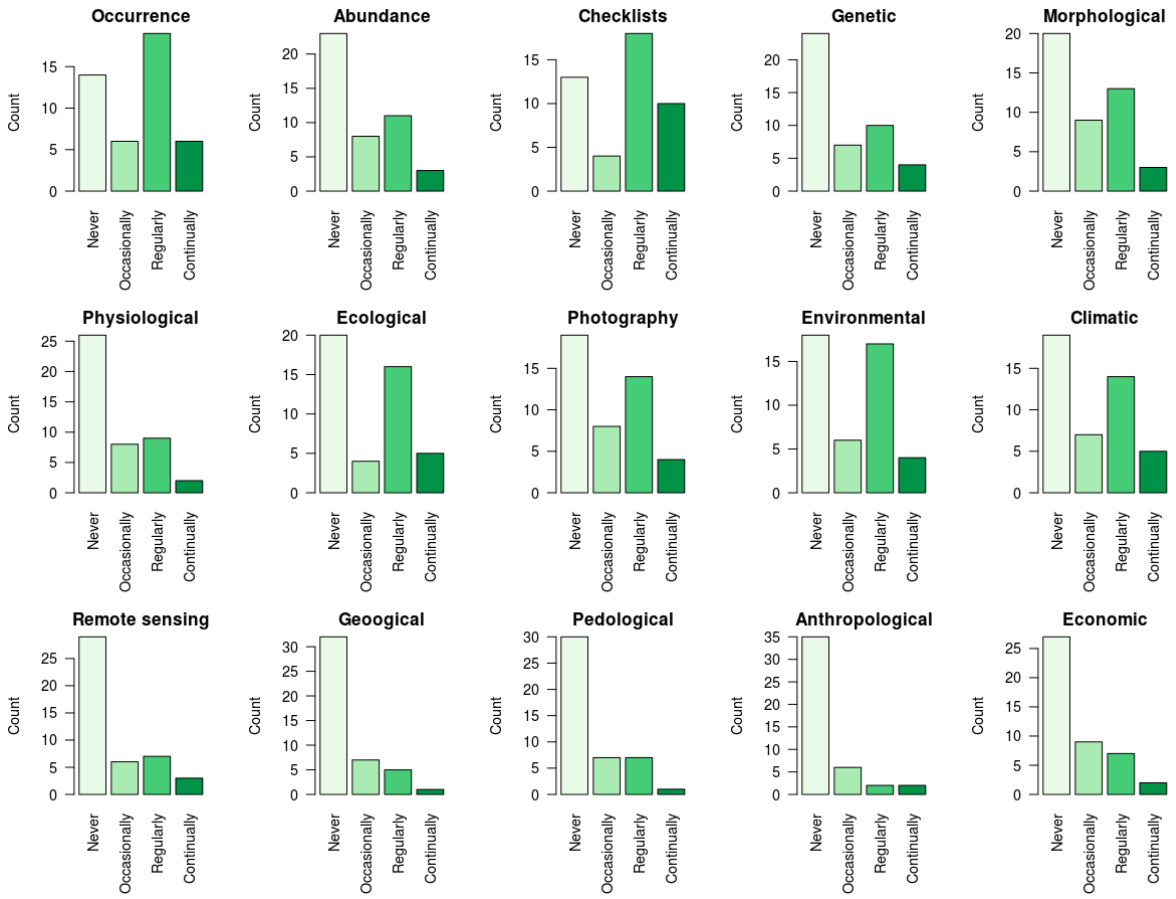

Fig. 19. Researchers frequency of data usage per typology (Categories: Never, Occasionally, Regularly and Continuously) (Question 15).

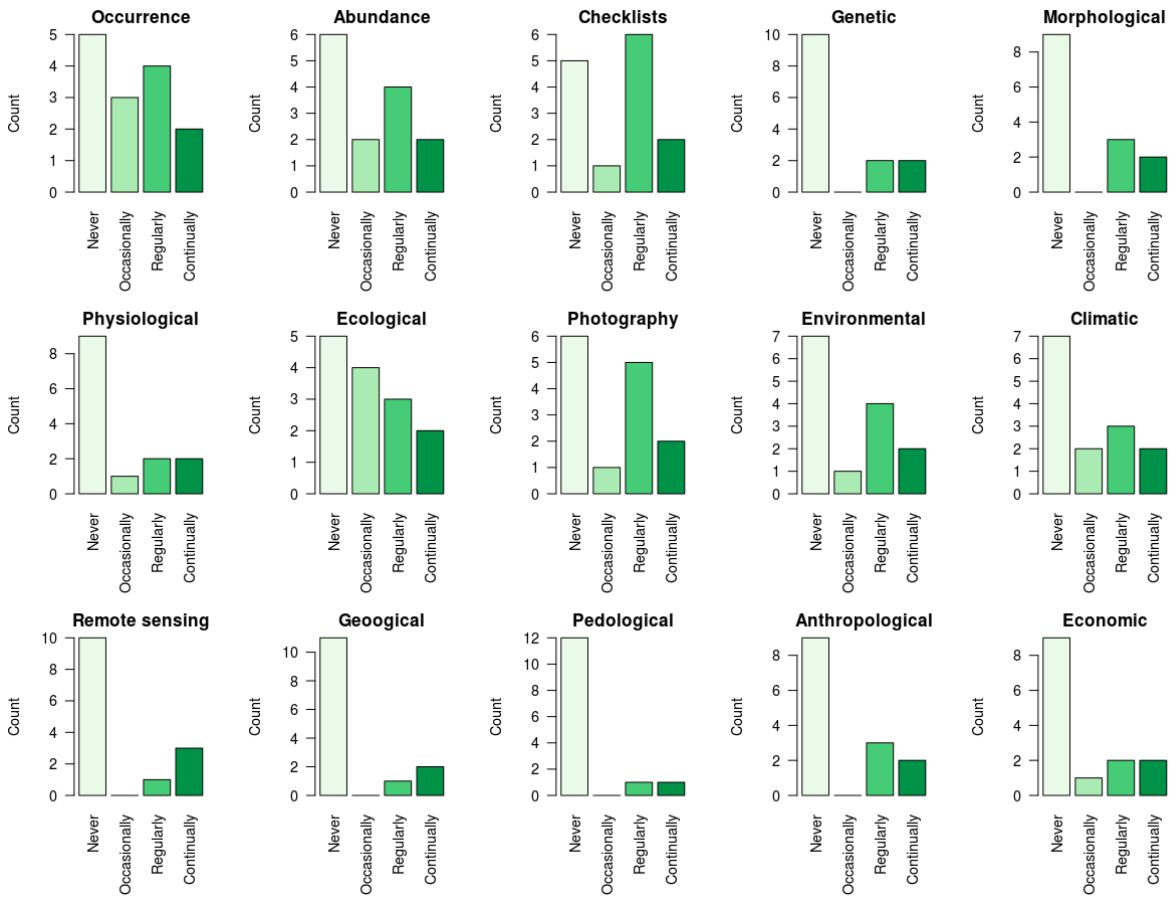

Fig. 20. Others frequency of data usage per typology (Categories: Never, Occasionally, Regularly and Continuously) (Question 15).

Upon data accessed, they were asked about how they combine data (Fig.16) with information sources about species occurrence/abundance (Fig. 21) (Question 16). Results show that apart from ecological, environmental and climatic sources, which are among the main combinations indicated, users also combine abundance/occurrence data with photos and remote sense material (Fig. 21).

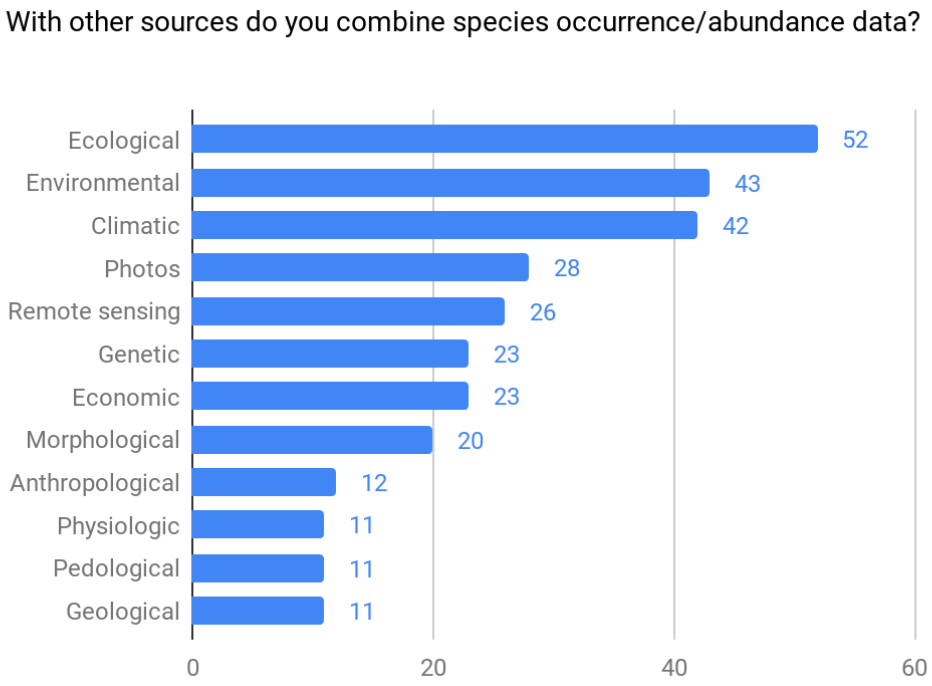

Fig. 21. Sources that users combine with information from species abundance/ occurrence (81 respondents) (Question 16) .

When researching data about ABD, respondents were asked to attribute the importance they give to searching criteria (Question 17). In that regard, the most important criterion, classified as “Very Important” by the highest number of responses was the scientific name; followed by the geographic delimitation, place (e.g. country) and traits (Fig. 22). Therefore, the main *modus operandi* for searches seems to be carried out at species/specimen level (name, locality, functions), which could be a trend among stakeholders or it could be reflecting how biodiversity and ABD databases are structured.

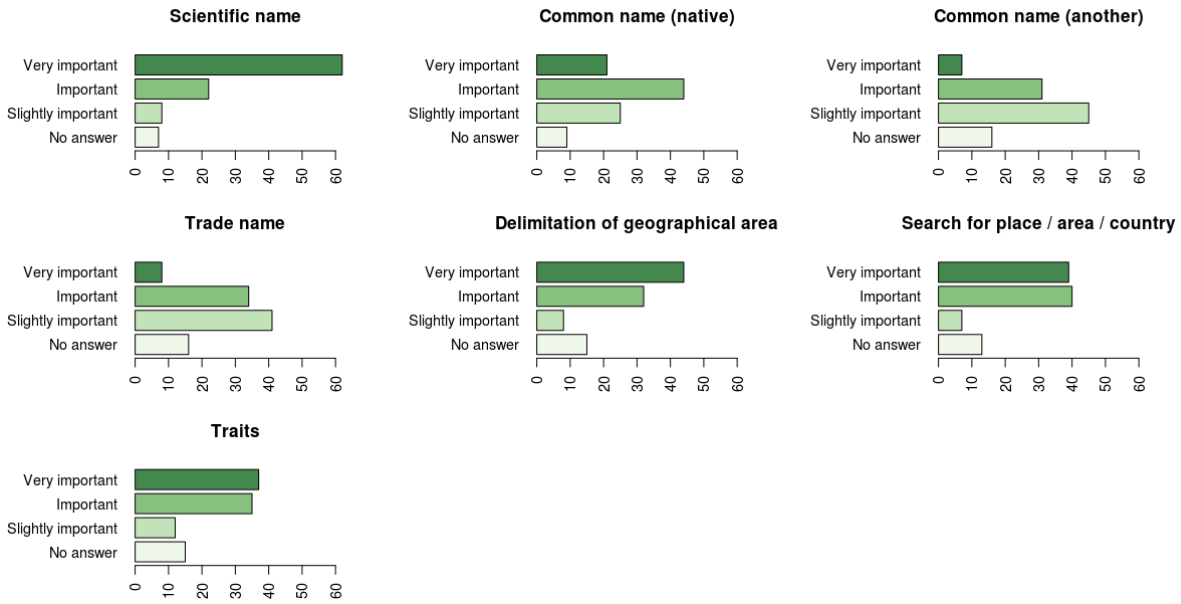

Fig. 22. Respondents searching criteria level of importance (Levels= No answer, Slightly important, Important, Very Important) (Question 17).

When individually analysed, responses from the groups of producers (Fig. 23), regulators and NGOs (Fig. 24) and of researchers (Fig. 25), presented similar results as the general perspective (Fig. 22), where scientific name and geographic information were the most important searching criteria. An addition to this was the common name criterion, categorized as important by these three groups. On the slightly important appeared trade name and again common name (other), showing very little difference in values. The main difference about the individual analysis was that the regulators group had traits and common name under the same level of importance (important) (Fig.25). The group “others” (Fig. 26) may be too heterogeneous in composition (e.g. students, consumers) and therefore, the results may not represent their preferences and therefore they were not considered, but are presented here for readers consideration.

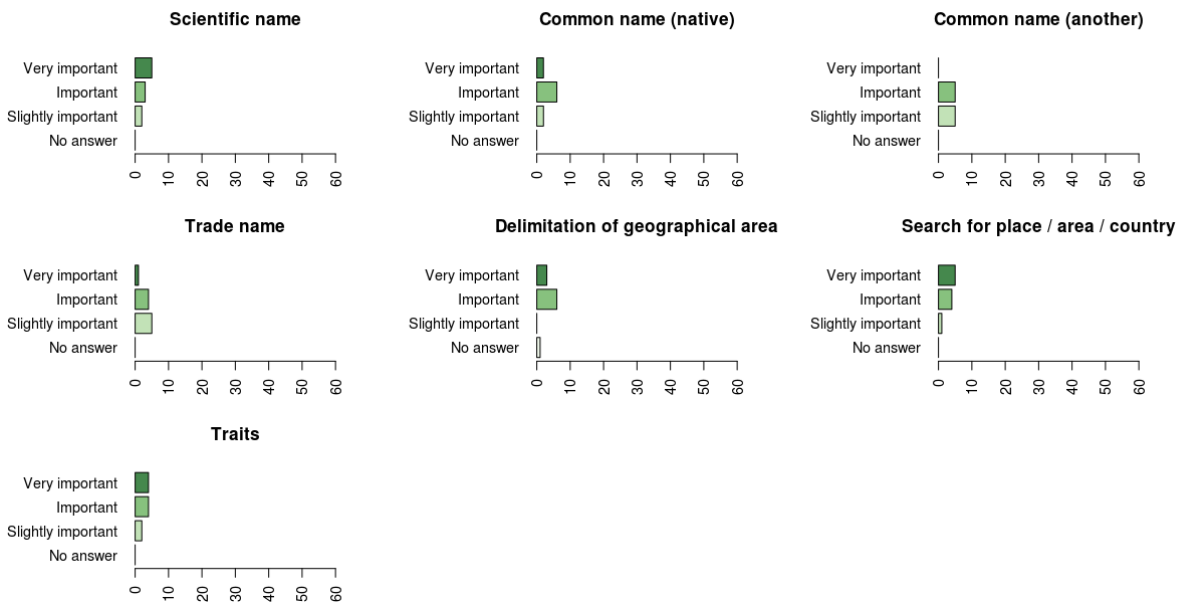

Fig. 23. Producers group searching criteria level of importance (Levels= No answer, Slightly important, Important, Very Important) (Question 17).

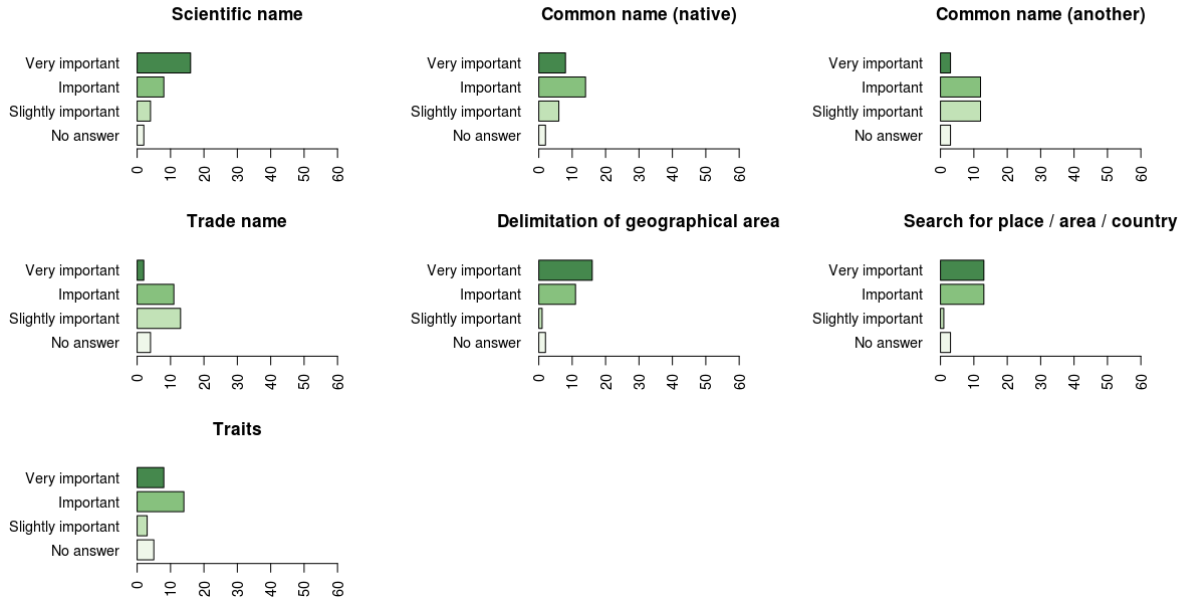

Fig. 24. Regulators and NGOs group searching criteria level of importance (Levels = No answer, Slightly important, Important, Very Important) (Question 17).

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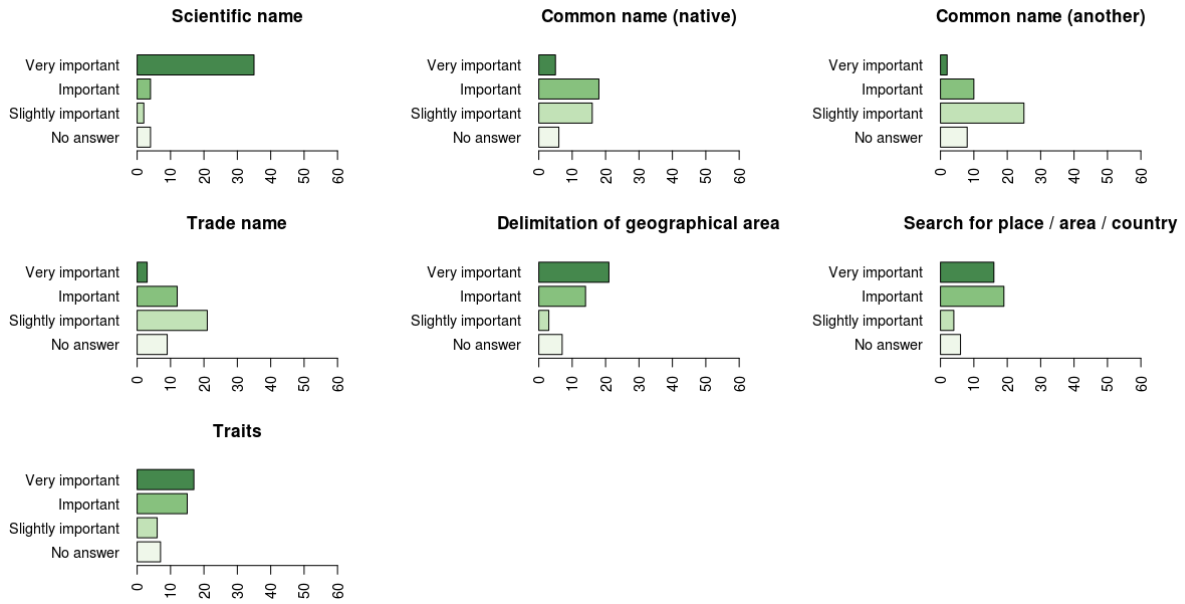

Fig. 25. Researcher and Teaching group searching criteria level of importance (Levels = No answer, Slightly important, Important, Very Important) (Question 17).

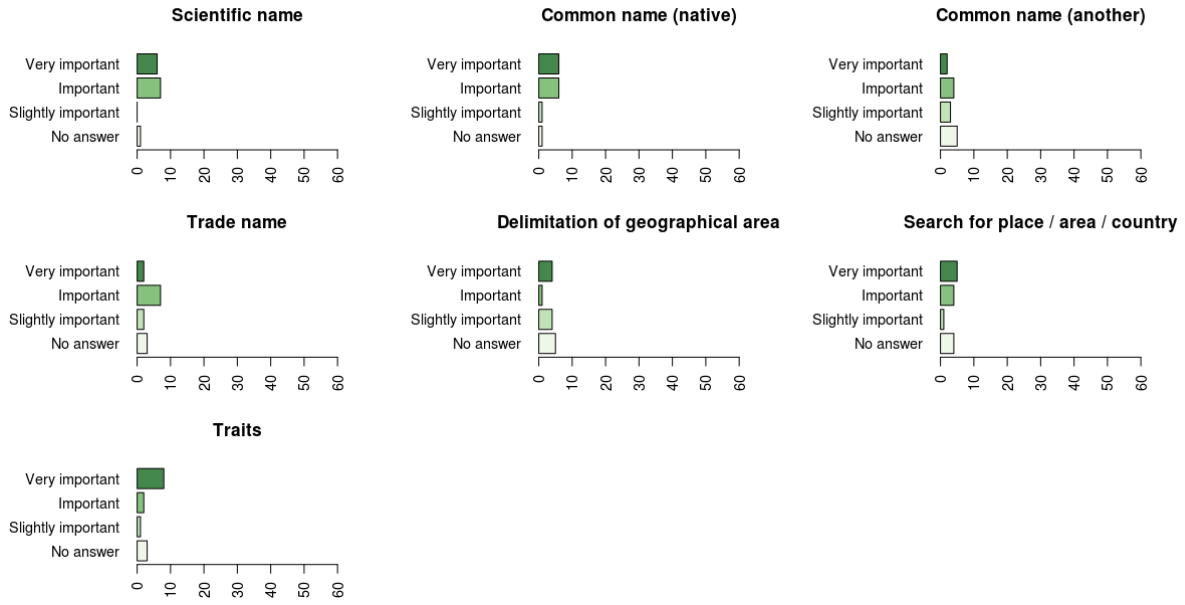

Fig. 26. Others group searching criteria level of importance (Levels = No answer, Slightly important, Important, Very Important) (Question 17).

When asked about Global/International databases they use (Question 18.1), there were 171 responses, were FAO Stat and GBIF, represented 35% (n=60) of the total (Fig. 27).

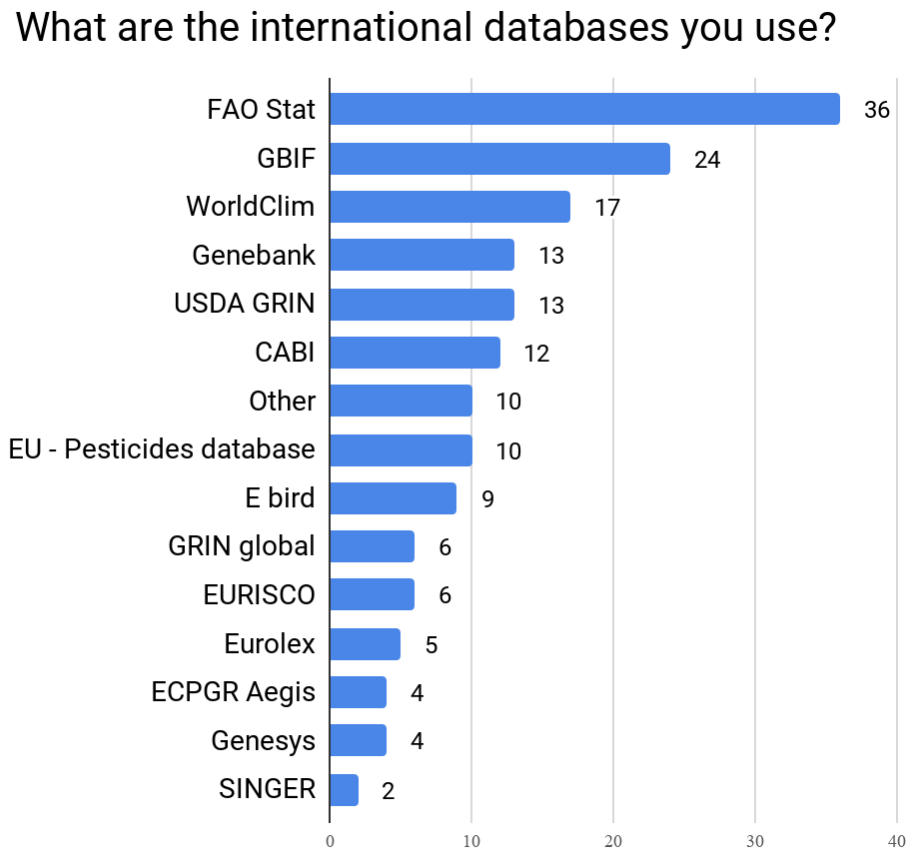

Fig. 27. Answers (57 respondents; 171 responses) to the use of Global/International databases (Question 18.1).

When looking at the groups (Fig. 28) and the sources preference to access to ABD, all groups had as their main choice bibliography and web searching engines. For “researchers” and “regulators” databases appeared as the second choice, while for “producers” and “other” were personal contacts, followed by databases. In third place, for researchers and regulators were the personal contacts, and it is interesting to note that regulators have a significant preference for citizen science databases, compared to producers and researchers.

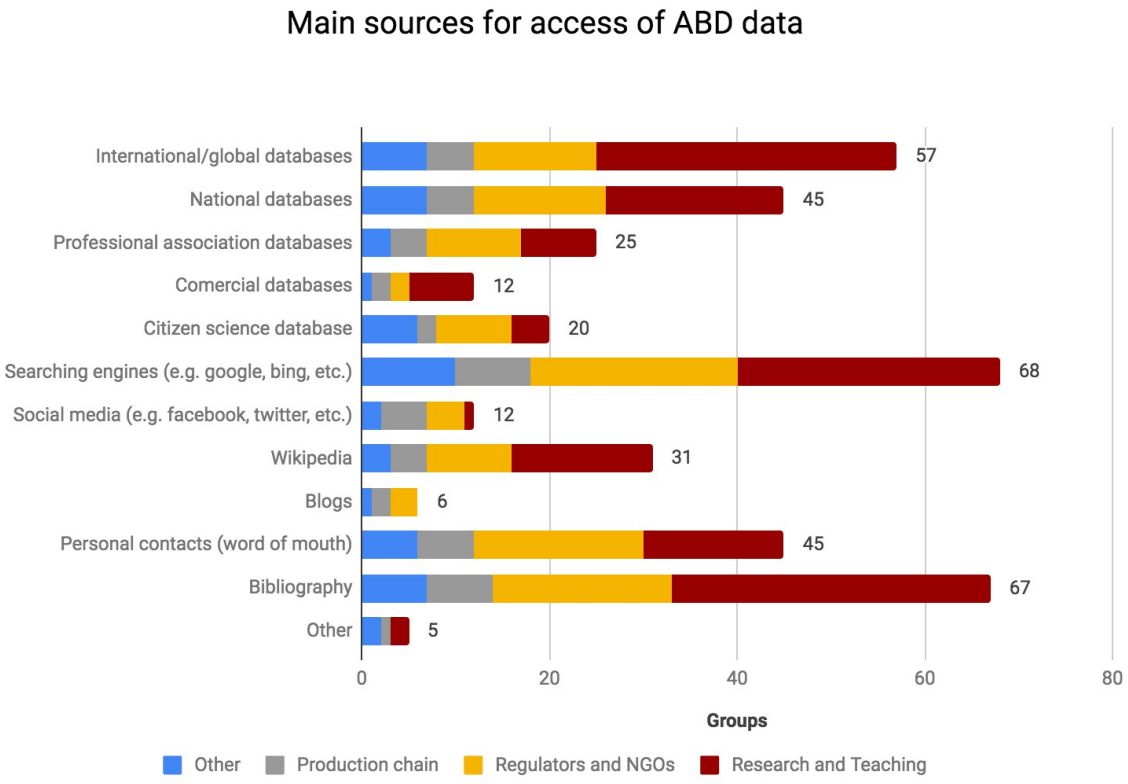

Fig. 28. Main sources for ABD data, per group of stakeholder (Question 18.1).

Also on this question, under the option “Other” representing 3,5% of responses, respondents mentioned European Fauna, Universal Chalcidoidea Database, NHM Bumblebees of the world, among others (Table 5).

Regarding national coverage databases (Question 18.2), respondents listed their main preferences (listed and described in Annex A), with 52 references of different resources. From these, Flora On (n=6, Portugal) and Anthos (n=4, Spain) appeared as the most used for the respective countries (Fig. 29). Other resources were stated in the “other” field and are listed below (Table 6).

Table 5. Other databases for ABD data.

Other
I search about scientific name and distribution.
CBS-KNAW culture collection.
European Fauna, Universal Chalcidoidea Database, Natural History Museum Bumblebees of the world.
Flora Iberica
Frame Web and Flora of Zimbabwe.
Game and wildlife Conservation Trust.
IBOLD, Global Land Cover Facility, IMapGenes, Coupled Model Intercomparison Project (CMIP5).
Permaculture Plant Data.
RHS Horticultural Database.

Fig. 29. Relative frequency of responses (n=52) regarding national databases, represented by a word cloud (Portugal=35; Spain=17) (Question 18.2). Other resources were stated in the “other” field and are listed below (Table 6).

Table 6. Other information resources stated by respondents (Question 18.2).

Other
Applications such pl@ntNet; Birds from Spain; Invasive plants
Gorgulho: Association Harvest to Plant
Regional information of Cantabria, Databases and cartography resources
ReHd - Red de huertos comunitarios de Madrid

Further on, it is important to understand how data users prefer or would prefer data available on resources. Therefore, respondents were asked to state their level of agreement to sentences (Table 7), that describe different data options regarding treatment and organization.

Table 7. Sentences presented to users in which they could choose: “I don’t agree”, “Neither agree or disagree”, “I agree” and “I totally agree” (Question 19).

Sentence 1: I prefer to access to raw data to produce my own analyses.
Sentence 2: I prefer to access to treated data to be analysed (maps, graphs and tables).
Sentence 3: I prefer to access to treated data, organized by areas of interest, to be analysed.

On the first sentence (Fig. 30), from a total of 99 respondents, almost half (44%) prefer to access raw data (Totally Agree=15; Agree=29), followed by 36.5% that are indifferent and 19% that don’t agree.

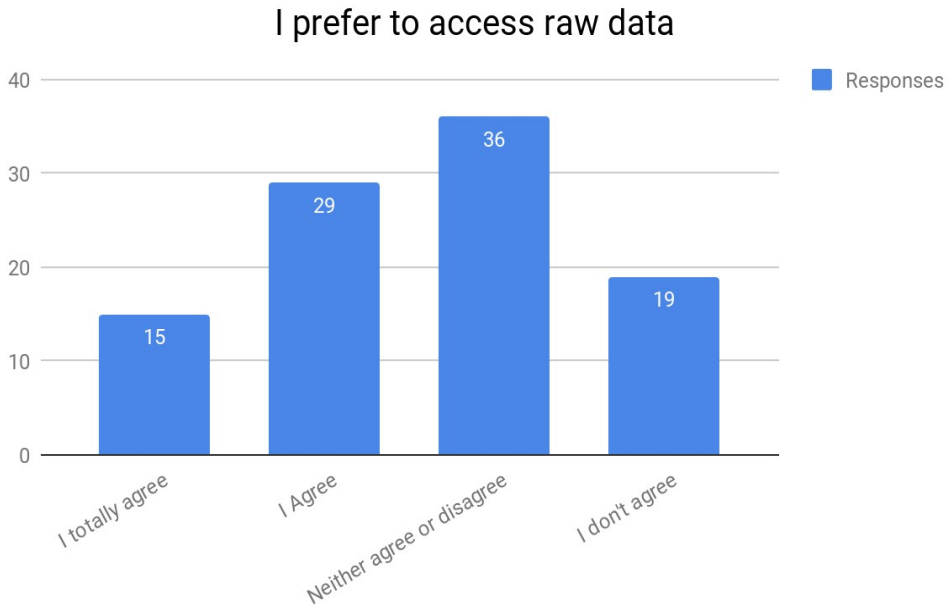

Fig. 30. Level of agreement to sentence 1, in absolute numbers (n=99) (Question 19).

Regarding access to treated data (sentence 2) which means having access to graphs, tables, and others, 75% of respondents prefered it (Totally Agree=23; Agree=51) (Fig. 31). Also in this sentence, there was the lowest number of disagreement (n=3).

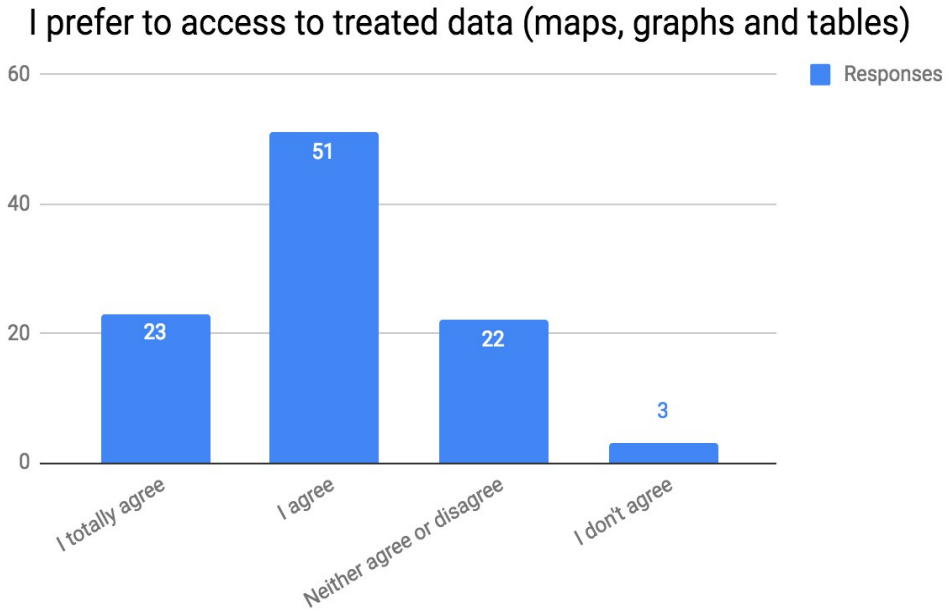

Fig. 31. Level of agreement to sentence 2, in absolute numbers (n=99) (Question 19).

Moreover, when asked about treated data organized by main areas, responses showed the highest level of total agreement (n=31), summing up to 82% of general agreement (Totally agree=31; Agree=50) from respondents, followed by 14% as "Neither" and 4% of Disagreement (Fig. 32).

So, considering the responses for all three sentences, users prefer to have access to treated and geographically organized data, which may save time and help users that don't know how to treat data and/or to use GIS tools.

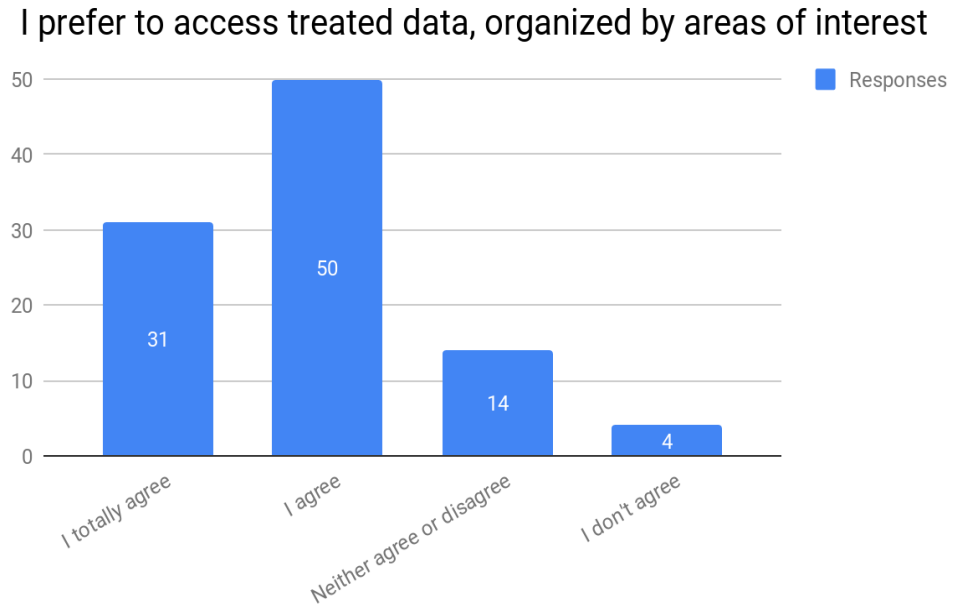

Fig. 32. Level of agreement to sentence 3, in absolute numbers (n=99) (Question 19).

In order to better understand data use and what users do after downloading it from sources, they were asked if they treated data (Fig. 33) (Question 20), and what type of transformations they carry out (Fig. 34) (Question 21).

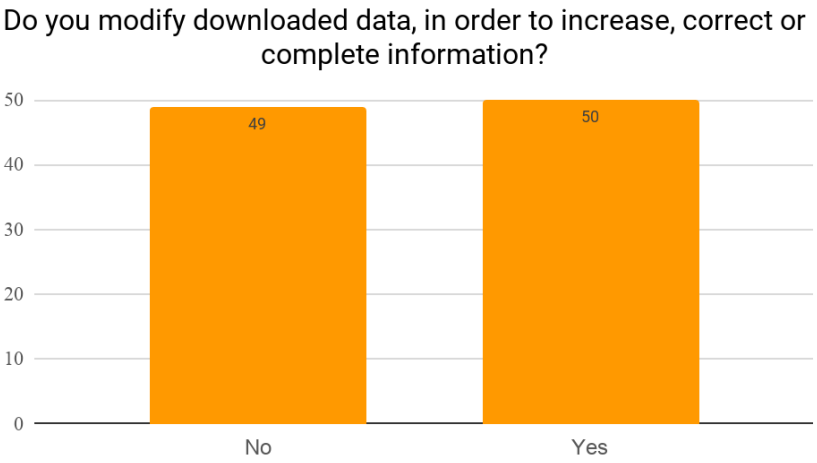

Fig. 33. Respondents answers in absolute numbers (n=99) (Question 20).

When asked about the type of changes they do, there was a total of 79 responses, where the majority affirmed to add small details to it (Fig. 34).

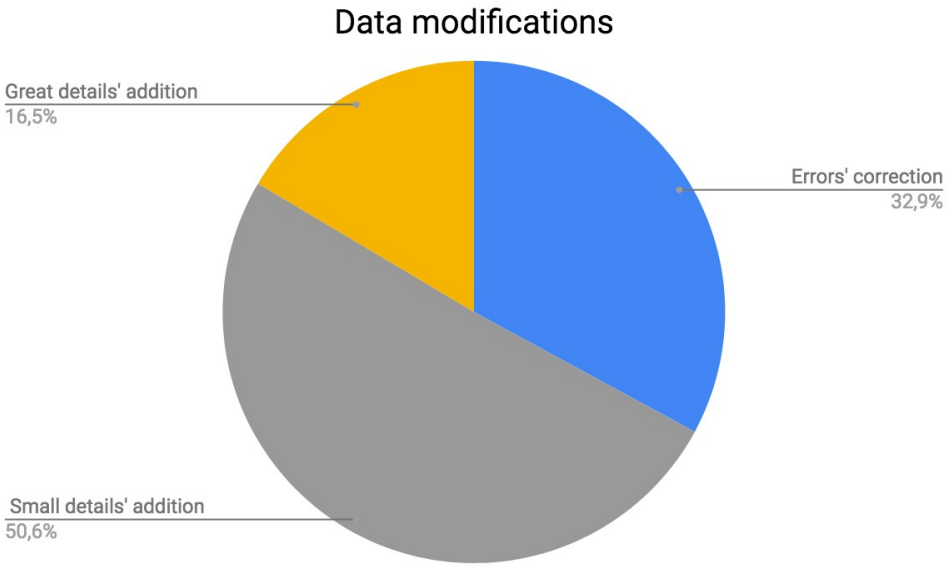

Fig. 34. Main alterations carried out by data users (n=79), after database information download (Question 21).

Then, error correction had 33% (n=26) of responses, but in this enquiry the sort of errors are unknown, as well as its grade of work required. Last, 17% of respondents (n=13) admitted to perform great details addition.

Moreover, they were asked if they publish alterations made (Question 22) and where (Question 23) they do it. From a total of 59 responses, 40 respondents (Fig. 35) answered negatively; and the majority that do publish choose other platforms or sources (Fig. 36), instead of returning processed data to the original source.

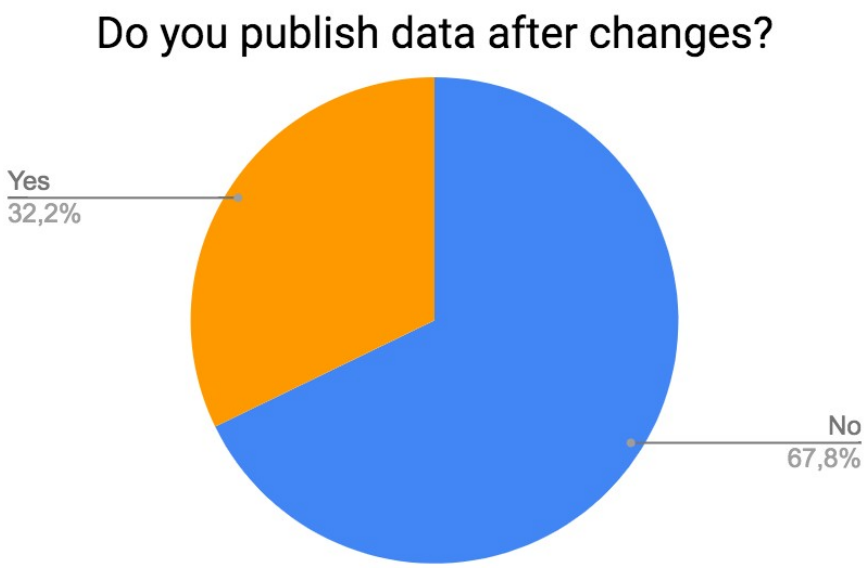

Fig. 35. Percentage of respondents that share data after alterations (Yes/No question) (Question 22).

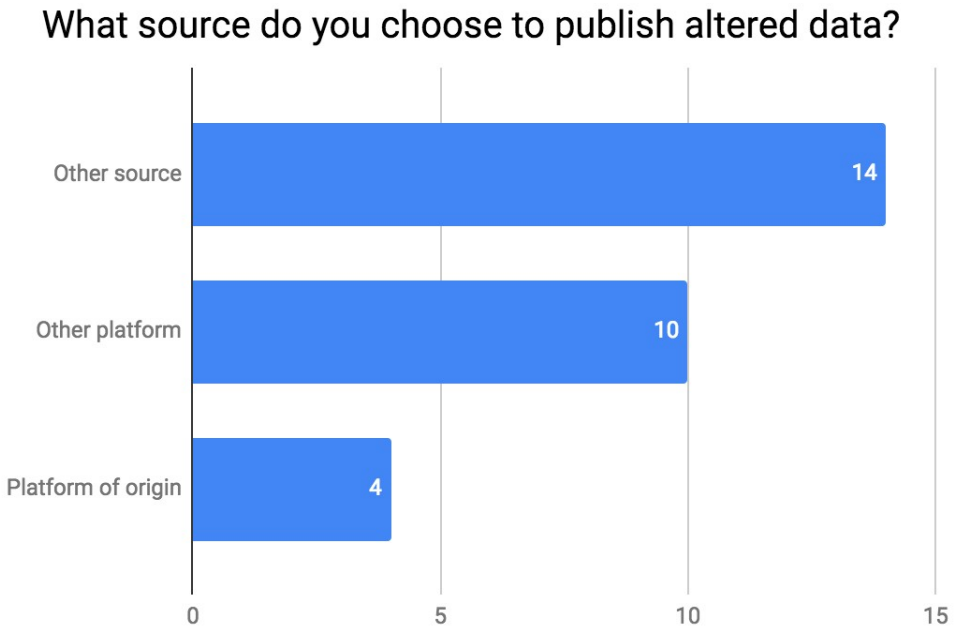

Fig. 36. Data publication sources chosen by respondents, after being processed (Question 23).

Reasons behind not to publish data are several (Question 24), such as lack of time from users (30%), that could also be related to the category about professional obligations (18.3%). Moreover, 28.3% said they don't have a platform for the purpose and 23.3% don't know how to do it (Fig. 37). Also, after data is processed, 13 respondents have stated to share it in person or by email or to publish it in scientific papers.

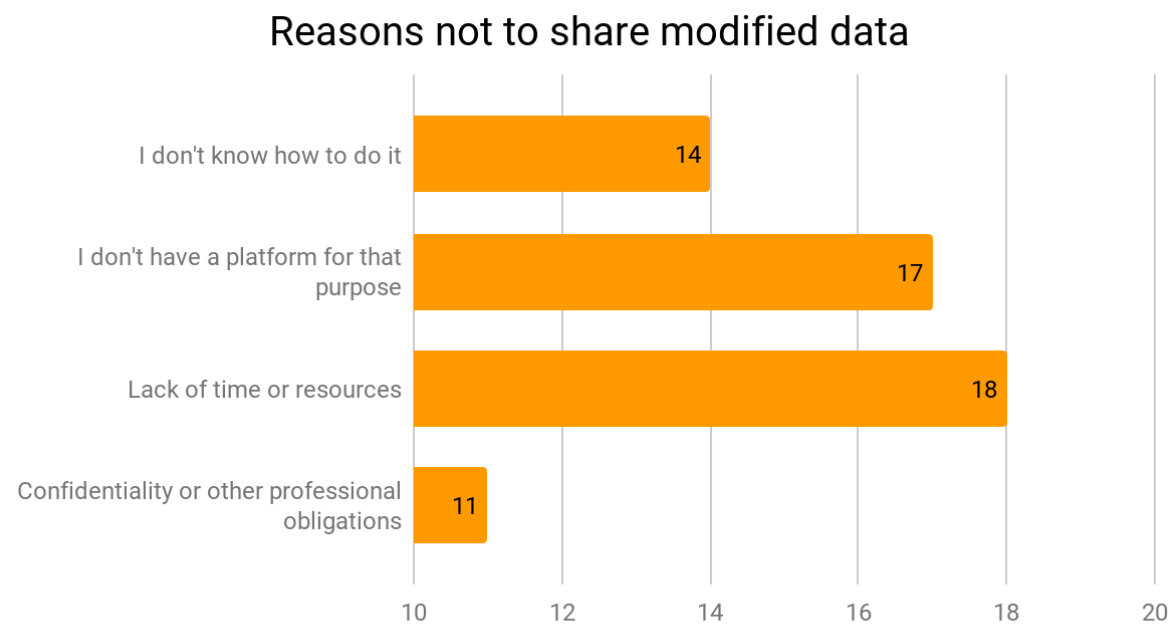

Fig. 37. Main reasons given by respondents that stated not to share data (Question 24).

Furthermore, when questioned about ABD data they would like to find in databases (Question 25), respondents expressed the need for more detailed information regarding biological and ecological aspects of ABD data and this category was the most mentioned by them, with 26% of the comments related to it. The second most cited (13%), was about regional varieties data, which could also be included on the first category, but there is a need to highlight that general and specific information in these category seems to be in demand by ABD actors. Also in

demand are climate data and production methods, along with other suggestions listed by respondents on Table 8.

Table 8. List of information mentioned by respondents in main categories (Question 25).

Which ABD data you would like to find, but can't?			
Category	Count	%	Stated by respondents
Biological/ Ecological	**8**	**26**	**Plant morphology, species function and habitat, ecosystems services, pollinators and varieties interactions, fungi biodiversity, culture physiology, soil diseases and pests.**
Climate	**3**	**10**	**Present and past climate data.**
Conservation	2	6	Threats, conservation status, rarity.
Don't know	1	3	Don't know.
Fertilizers	1	3	Application impact and areas to apply it.
Genetic	1	3	Genetic characterization
Livestock	1	3	Abundance of livestock species in a yearly basis and at farm level.
Phytosanitary	1	3	Regulation
Production methods	**3**	**10**	**Beneficial consortia, productivity, sampling.**
Regional species/varieties	**4**	**13**	**Varieties, seeds, commercial aspects, location.**
Seeds	2	6	Trade options
Sociological	1	3	Human interactions to agricultural practices.
Species distribution	2	6	Locality
Topography	1	3	Soil and landscape information such as characteristics and diseases.

Furthermore, the main outcomes stated by respondents, after accessing databases (Question 26) (Fig. 38) are: scientific publications (36%), followed by teaching activities material (24%), public institutions reports (23%) and NGOs or community reports (16%).

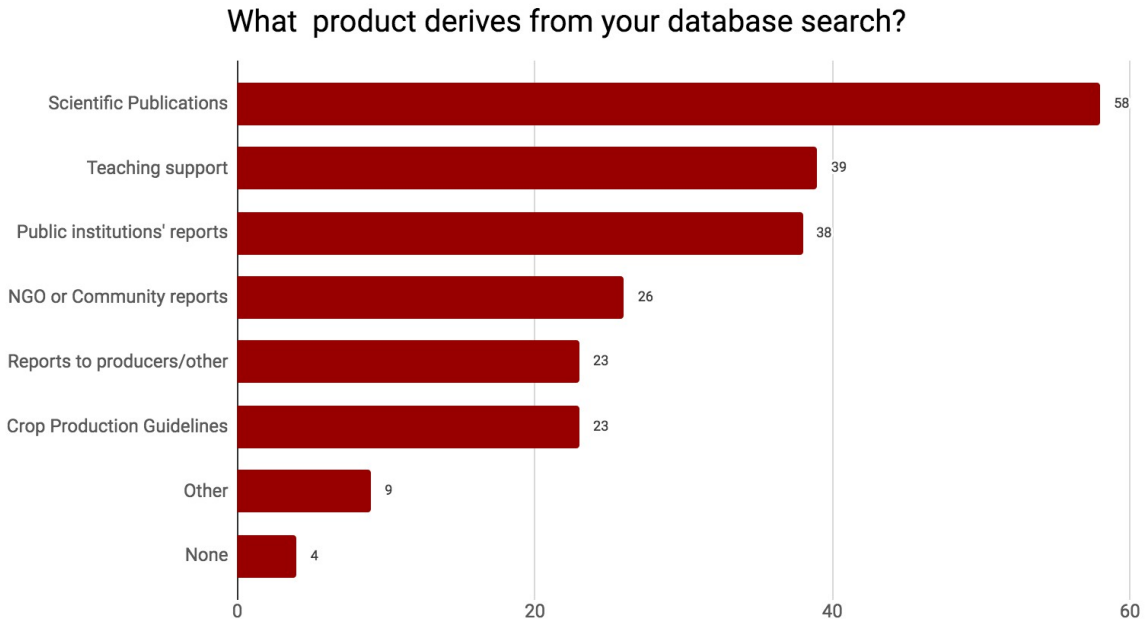

Fig. 38. Products derived from database users, multiple choices allowed (n=47 respondents, n=220 choices) (Question 26).

When asked about their aim while accessing databases, respondents answered: knowledge acquirement; occurrence data; professional purposes; environmental education material; teaching and courses material; reports' elaboration to private agro-food companies; and consulting.

IV. Agrobiodiversity actors: network and cooperation

Regarding the interaction with entity types (Question 27), for searching, sharing and providing information on ABD, respondents (n=99) from research institutions and universities had a very high response for all categories, (searching, sharing and providing), followed by regulators and producers. Another important aspect from researchers category was that their primary source for data interaction was always with universities, research centres and other academic related professionals or institutions. Further, they showed to be the most interactive group, when compared to the other ones.

When **searching** for information (Fig. 39) the main interaction between researchers was with research centres and universities, with producers and with associations of interest. Regulators interacted mainly with associations of interest, consultants and producers. For data **sharing** (Fig. 40), researchers share their data with other researchers, universities, international organizations and with producers. Regulators presented similar results, however they share significantly less with producers when compared. Producers share with other producers, with international organizations and with research centres. For **providing** information (Fig. 41), researchers provide mostly for producers, associations of interest, civil organizations, and normative entities. Regulators provide for producers, certifiers and normative entities. Producers provide to other producers and to distributors, which is the only case where distributors are highlighted on the interactions net.

Fig. 39. ABD actors (99 respondents; multiple question) interaction for data searching (Question 27).

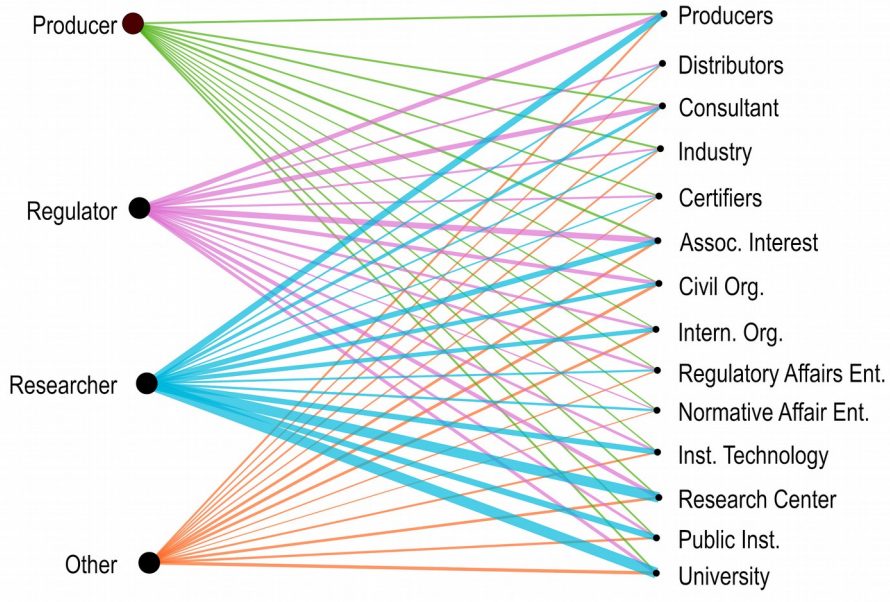

Fig. 40. ABD actors (99 respondents; multiple question) interaction for data sharing (Question 27).

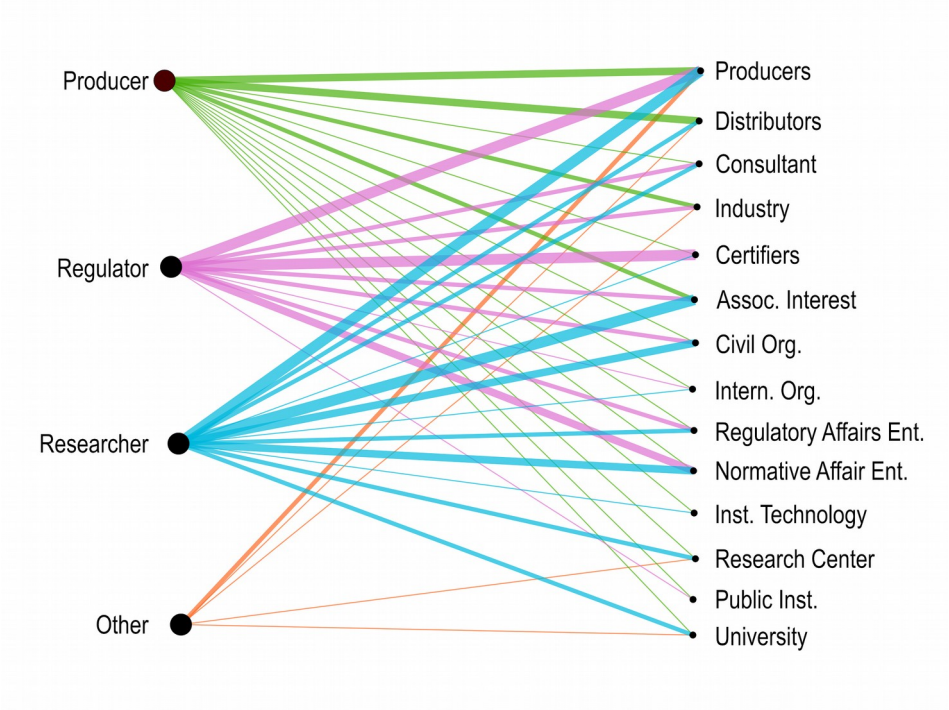

Fig. 41. ABD actors (99 respondents; multiple question) interaction for data providing (Question 27).

4. Discussion

Almost 60% of respondents stated to use ABD databases. A big portion of these are researchers, followed by regulators and staff from NGOs. From the 40% that stated not to use databases, the reasons could be a representation from this particular sampling, but it may also be a trend among ABD users, that responded that they didn't know databases or how to use it. Even though there is a current need to carry out deeper and wider sampling to better respond this question, it shows the importance in investing in capacity building for potential users and in communication regarding sharing, accessing and using information from databases with ABD data. It might represent a great step towards the increase in number of users worldwide and in providing open access frameworks for biodiversity data worldwide, specially for ABD data and food production information.

When using databases, users seem to be interested mainly in ecological, environmental and climatic data, which were expected, considering the background of respondents. However, database users also search for photos, but in this particular case the frequency is lower when compared to the above mentioned tipologies, as once they access and download it, users do not need to go back to databases for some time. On the other hand, for other data types users seem to regularly search for it, either to update or to improve their personal databases.

Considering data improvement issues, the minority declared to perform major transformations , which may represent a positive outcome, meaning that databases have good quality data overall. Also, error correction represented 33% (n=26) of responses, but in this question the sort of errors are unknown, as well as its level of work required.

Moreover, when respondents that use databases meliorate their data, after downloading it and making the necessary or desired alterations, they may not return the information to the source, which means errors, small or large corrections will remain at the original sources, in platforms that are not open access or of smaller geographic scope. In the long term perspective and considering data quality improvement efforts, this represents a challenge to be overcome, as information

won't be in a dynamic flux of enhancement. Likewise, when users keep cleaned data under their personal databases or share it with colleagues only, it will limit data sharing range. Language and networking restrictions may be representative barriers to information spreading.

Furthermore, from users that access data, 82% presented a general preference to work with organized and treated data, which means that enabling this type of data might strengthen the number of users and biodiversity data usage in general. This preference could be representing groups that are not used to working with GIS systems/tools or other digital resources. Also relevant, was the percentage of people (19%) that disagreed with sentence 1, where preference for raw data was declared. This result suggests that these users are less interested in the raw data, especially considering that they had a low number of disagreement to the other sentences presented, where some kind of treatment was "offered". Therefore, treated data may be a way to attract more users to ABD databases.

The principal outcome (36%) provided from respondents once they have accessed databases for ABD information are published in the form of scientific papers. This is a reflection of the majority of users being researchers or high education professors. However, a significant part is used for reports elaboration, through NGO or European Community reports (16%) and Public institutions' reports (23%), which are important tools for regulators and that may reach other actors (e.g. civil society, producers, etc.) more easily than articles, showing the importance of databases for this group of stakeholders. So, investing in capacity building for regulators in database use and analysis might represent a great step towards the use of scientific information for decision making at local levels.

In that regard, increasing capacity at regional levels to the use of databases in ABD may lead, in the long term perspective, to diminish duplication of efforts and loss of information (Chavan & Ingwersen, 2009). Further, there are technical and infrastructural bottlenecks for ABD data compilation and sharing that need greater and more efficient attention, that must be looked at, as well as more serious impediments that consist of socio-cultural and policy-political aspects of the existing 'data publishing mechanism' (Chavan & Ingwersen, 2009). In this particular cases,

training and more deep capacity building in core institutions from both countries may speed up and facilitate the mobilization of ABD data in the Iberian peninsula. Also, governance issues deserve attention, in order to speed up and spread out ABD data use and sharing worldwide.

5. References

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6. Annexes

A – National Databases Listed by respondents.

Country	National Database	Name description
Portugal	ICNF	Instituto da Conservação da Natureza e das Florestas
Portugal	Checklist	Unknown
Portugal	Flora-On	Flora de Portugal Interactiva
Portugal	National Catalogue of Varieties	DGAV
Portugal	Portuguese Germoplasm Bank	Genesys
Portugal	National Herbaria	Unknown
Portugal	Flora-On	Flora de Portugal Interactiva
Portugal	Biodiversity4all	Citizen science platform
Portugal	Portuguese Digital Flora	Flora-On
Portugal	eBird	Birds observation database online
Portugal	Flora-On	Flora de Portugal Interactiva
Portugal	Flora-On	Flora de Portugal Interactiva
Portugal	Flora-On	Flora de Portugal Interactiva
Portugal	Flora-On	Flora de Portugal Interactiva

Portugal	Odonata-algarve	Odonata in the Algarve
Portugal	Naturdata	Biodiversidade online
Portugal	Biodivesity4all	Citizen science platform
Portugal	florestar.net	Portal
Portugal	ICNF	Instituto da Conservação da Natureza e das Florestas
Portugal	ICNF	Instituto da Conservação da Natureza e das Florestas
Portugal	APA	Agência Portuguesa do Ambiente
Portugal	CCDR	Comissão de Coordenação e Desenvolvimento Regional
Portugal	ICNF	Instituto da Conservação da Natureza e das Florestas
Portugal	NGOs	Non-governamental Organizations
Portugal	APA	Agência Portuguesa do Ambiente
Portugal	National Statistics Institute	Instituto Nacional de Estatística
Portugal	Forest Inventories	Unknown
Portugal	None	Unknown
Portugal	None	Unknown
Portugal	Permaculture	Unknown
Portugal	Naturdata	Portal de biodiversidade online
Portugal	Azores Biodiversity Portal	Portal de biodiversidade online
Portugal	University databases	Unknown
Portugal	SPEA	Sociedade Portuguesa para Estudos das Aves
Portugal	University of Trás-os-Montes e Alto Douro	Unknow
Spain	Anthos	Sistema de información sobre las plantas de España
Spain	Anthos	Sistema de información sobre las plantas de España
Spain	Anthos	Sistema de información sobre las plantas de España
Spain	Anthos	Sistema de información sobre las plantas de España

Spain	SIGPAC	Sistema de Información Geográfica de parcelas agrícolas
Spain	National Rural Census	Instituto Nacional de Estadística
Spain	Autonomous bases	Unknown
Spain	CRF	Centro Nacional de Recursos Fitogenáticos (CRF)
Spain	CONECT-e	Unknown
Spain	CRF	Centro Nacional de Recursos Fitogenáticos (CRF)
Spain	BDC	Unknown
Spain	GBIF-España	Global Biodiversity Information Facility
Spain	Autonomous bases	Unknown
Spain	IGN	Instituto Geográfico Nacional
Spain	MAPAMA	Ministerio de Agricultura, Pesca y Alimentación/Ministerio para la Transición Ecológica
Spain	MAPAMA	Ministerio de Agricultura, Pesca y Alimentación/Ministerio para la Transición Ecológica
Spain	MAPAMA	Ministerio de Agricultura, Pesca y Alimentación/Ministerio para la Transición Ecológica

B – Link to the Questionnaire.