

EuropaBON Stakeholder Meeting: Well Sorted Materials

26-28 May 2021

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For an online, interactive version of the visualisations in this document, go here:

www.well-sorted.org/output/EuropaBONUserandPolicyNeeds

Introduction

Dear participant,

Thank you for taking part in submitting and sorting your ideas.

This document contains several visualisations of your ideas, grouped by the average of your online sorts. They are:

Dendrogram - This tree shows each submitted idea and its similarity to the others. The lower two ideas 'join' the more people grouped those two ideas together. For example, if two ideas join at the bottom, every person grouped those two together.

Tree Map - This visualisation presents an 'average' grouping. It is calculated by 'cutting' the Dendrogram at the dashed line so that any items which join lower than that line are placed in the same group. In addition, rectangles which share a side of the same length are more similar to each other than their peers.

Heat Map - This visualisation shows a similarity matrix where each idea is given a colour at the intersection with another idea, showing how similar the two are. This is useful to see how well formed a group is. The more red there is in a group (shown by the black lines), the more similar the ideas inside it were judged to be.

Raw Group Data - This table shows every submitted idea and its longer description. They are shown in the same order as the Dendrogram (so similar ideas are close to each other) and split into the coloured groups used in the Tree Map. In addition, each idea has been given a unique number so they are easier to find.

References

[1] Methven, T. S., Padilla, S., Corne, D. W., & Chantler, M. J. (2014, February). Research Strategy Generation: Avoiding Academic 'Animal Farm'. In Proceedings of the companion publication of the 17th ACM conference on Computer supported cooperative work & social computing (pp. 25-28). ACM.
doi>[10.1145/2556420.2556785](https://doi.org/10.1145/2556420.2556785)



Original Question

On this page, we present the original question which was posed by the event organiser.

This was originally presented above input boxes on the Well Sorted website itself, so we present it here as close to how it originally appeared as possible.

The original question was as follows:

Dear colleague,

Thank you very much for taking part in this survey on user and policy needs for EuropaBON. In order to provide the best service to users from policy and practice, we would like to invite you to share your valuable expertise **until 20 May 2021**.

EuropaBON will support policies that require information flows from biodiversity observation and monitoring (including non-biodiversity policies such as on climate change, water or land use change).

What existing and novel biodiversity data flows are needed now and over the next 5-10 years? If possible, can you also specify which policy goals they are connected to?

You can add up to 4 responses (short description called 'titles', and a longer description right below).

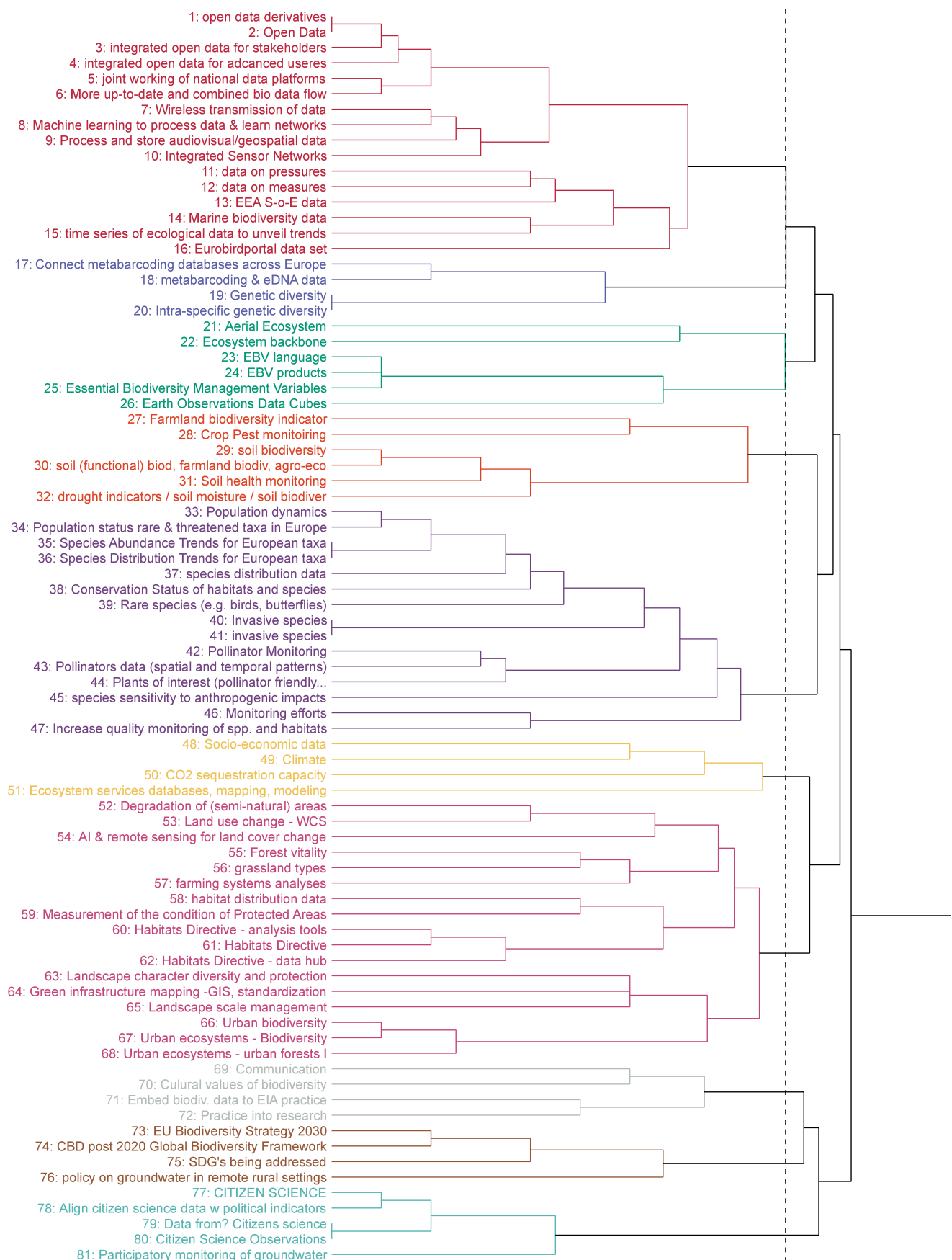
You may consider main ecosystem categories (terrestrial, freshwater and marine), main policies (e.g. the Birds Directive, Habitats Directive, Water Framework Directive and other, e.g. EEA State-of-Environment data or Climate policies) and also novel data types. Please feel free to be very specific, as this will help to shape EuropaBON.

If you would like to propose less than 4 responses, please type N/A in the boxes. When you are done, simply click 'submit'.

Thank you very much for your time and expertise!

Your EuropaBON team

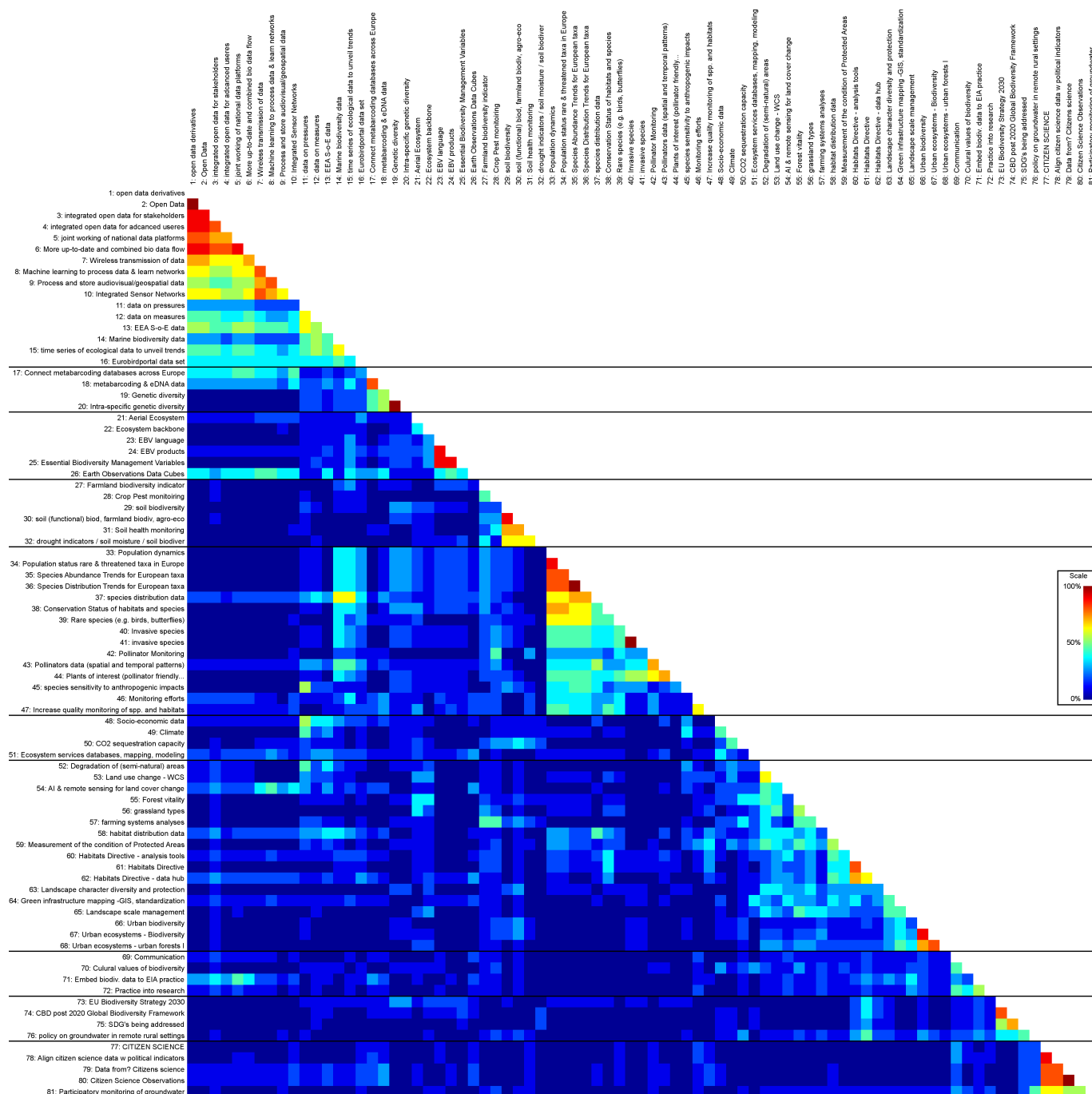
Dendrogram



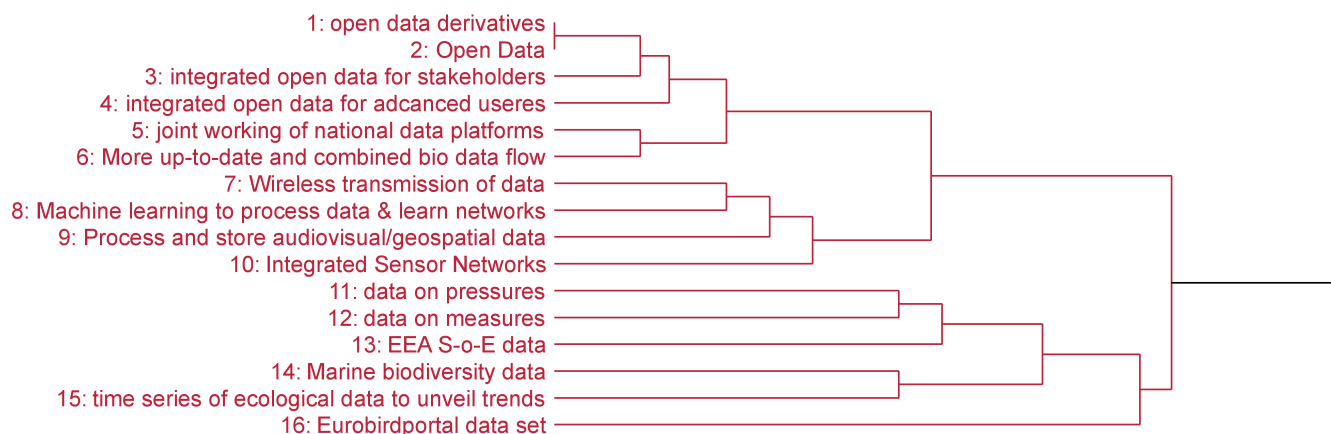
Tree Map

1: open data derivatives 2: Open Data 3: integrated open data for stakeholders 4: integrated open data for advanced users 5: joint working of national data platforms 6: More up-to-date and combined bio data flow 7: Wireless transmission of data 8: Process and store 9: Process and store 10: Integrated Sensor Networks 11: data on pressures 12: data on measures 13: EEA S-o-E data			17: Connect metabarcoding databases across Europe 18: metabarcoding & eDNA data 19: Genetic diversity 20: Intra-specific genetic diversity			27: Farmland biodiversity indicator 28: Crop Pest monitoring 29: soil biodiversity 30: soil (functional) biodiv, agro-eco 31: Soil health monitoring			69: Communication 70: Cultural values of biodiversity 71: Embed biodiv. data to EIA practice 72: Practice info research 73: EU Biodiversity Strategy 2050 74: CBD post 2020 Global Biodiversity Framework 75: SDG's being addressed 76: policy on groundwater in remote rural settings		
14: Marine biodiversity data 15: time series of ecological data to unveil trends 16: Eurobirdportal data set			33: Population dynamics 34: Population status rare & threatened taxa in Europe 35: Species Abundance Trends for European taxa 36: Species Distribution Trends for European taxa 37: species distribution data 38: Conservation Status of species 39: Rare species (e.g. birds, butterflies) 40: invasive species 41: invasive species 42: Pollinator data (spatial and temporal patterns) 43: Pollinators data (spatial and temporal patterns) 44: Plants of interest (pollinator friendly... 45: species sensitivity to anthropogenic impacts 46: Monitoring efforts 47: increase quality monitoring of spp. and habitats			77: CITIZEN SCIENCE 78: Align citizen science data w political indicators 79: Data from? Citizens science 80: Citizen Science 81: Participatory monitoring of groundwater Observations			78: Align citizen science data w political indicators 79: Data from? Citizens science 80: Citizen Science 81: Participatory monitoring of groundwater Observations		
21: Aerial Ecosystem Observations Data Cubes 22: Ecosystem backbone 23: EBV language 24: EBV products 25: Essential Biodiversity Management Variables			52: Degradation of (semi-natural) areas 53: Land use change -VICS 54: AI & remote sensing for land cover change 55: Forest vitality 56: grassland types 57: farming systems analyses 58: habitat distribution data 59: Measurement of the condition of Protected Areas 60: Habitats Directive - analysis tools 61: Habitats Directive 62: Habitats Directive - data hub 63: Landscape character diversity and protection 64: Green infrastructure mapping -GIS, standardization 65: Landscape scale management 66: Urban biodiversity 67: Urban ecosystems - Biodiversity 68: Urban ecosystems - urban forests l			48: Socio-economic data 49: Climate services 50: CO2 sequestration capacity 51: Ecosystem databases, mapping, modeling			77: CITIZEN SCIENCE 78: Align citizen science data w political indicators 79: Data from? Citizens science 80: Citizen Science 81: Participatory monitoring of groundwater Observations		

Heat Map



Raw Group Data: Red Group



Colour	#	Title	Description
Red	1	open data derivatives	Standardized maps for species ranges, species richness, functional properties of assemblages, phylogenetic info (e.g. phylogenetic uniqueness). Easy to browse in the web and to download for further use.
	2	Open Data	Allow the GIS databases to receive external input proposals, regarding, for example, changes in land use or the identification of a species or live in a new location, in order to allow an investigation by experts and thus allow a constant update.
	3	integrated open data for stakeholders	Stakeholders, ranging from high-level governmental agencies to ground-work-doing nature conservationists, need simple access to biodiversity access that is integrated, cleaned, follows an accepted taxonomy, provides a simple core-set of metadata.
	4	integrated open data for advanced users	A second-level data product with more (metadata) information (e.g., many if not all of the core-darwin standards).
	5	joint working of national data platforms	establish joint interfaces and interoperability between national, regional and EU platforms, implement Open Science and FAIR data
	6	More up-to-date and combined bio data flow	If we want to reach more knowledge about the state of biodiversity in nearly future, and that allows us to make more accurate inferences about their fluctuations, I consider relevant to have more reliable and explanatory data sources in space and time.
	7	Wireless transmission of data	For automated biodiversity monitoring stations, wireless transmission of data to (cloud based) data storage devices is needed. This can be achieved via LoRaWAN or 5G or other solutions. Sensors and hardware network infrastructure will be required.
	8	Machine learning to process data & learn networks	From species lists derived from automated monitoring stations or metabarcoding, machine learning

		approaches shall be used to derive ecological interactions via semantic learning approaches. The infrastructure for this is lacking so far.
9	Process and store audiovisual/geospatial data	Novel data types such as (i) images (phenocams etc), (ii) citizen science based imagery, (iii) audiovisual content (audiologs, videos) and (iv) spatiotemporal data will require novel metadata structures to be implemented.
10	Integrated Sensor Networks	Integrated sensor networks aiming to capture climate, phenological, functional, and biological observations (e.g. camera traps) are key for multi-scale/level monitoring. Their role, structuring, implementation, and continuity need more funding and research
11	data on pressures	data on the impact of the main pressures on biodiversity
12	data on measures	data on the effect of measures on biodiversity
13	EEA S-o-E data	Integration of meteorological, climatological, and aeroecological data to highlight changes in time and space regarding distribution and abundance of birds, insects, and bats
14	Marine biodiversity data	Marine biodiversity data are still largely underrepresented, especially from outside EEZs. Out of sight, out of mind. This is dangerous in that the marine environment has often been destroyed before we knew what was there.
15	time series of ecological data to unveil trends	time series of biological data, or long term monitoring must be required for representative habitats in different geographical regions.
16	Eurobirdportal data set	Workflow integrating bird observations from different web portals across Europe (eurobirdportal.org). It does not yet directly produce elaborated data (EBVs) but phenology and distribution EBVs could be easily integrated into near-real time decisions.

Raw Group Data: Blue Group

17: Connect metabarcoding databases across Europe

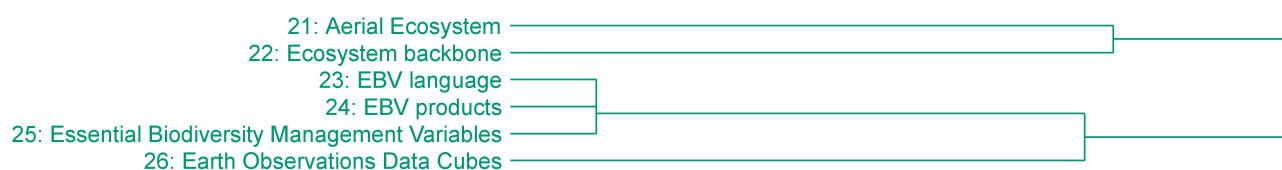
18: metabarcoding & eDNA data

19: Genetic diversity

20: Intra-specific genetic diversity

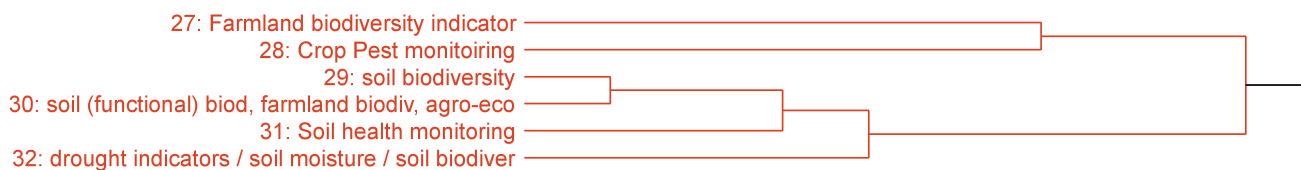
Colour	#	Title	Description
Blue	17	Connect metabarcoding databases across Europe	Large-scale genomics and metabarcoding approaches generate Terabytes of data that need to be stored and retrieved in online repositories, including quality-checking.
	18	metabarcoding & eDNA data	use genomic data to inform policy goals (Biodiv, WFD etc)
	19	Genetic diversity	In spite of its crucial importance for species and population survival, genetic diversity has been insofar overlooked in any general policy related to biodiversity management and protection.
	20	Intra-specific genetic diversity	CBD

Raw Group Data: Green Group



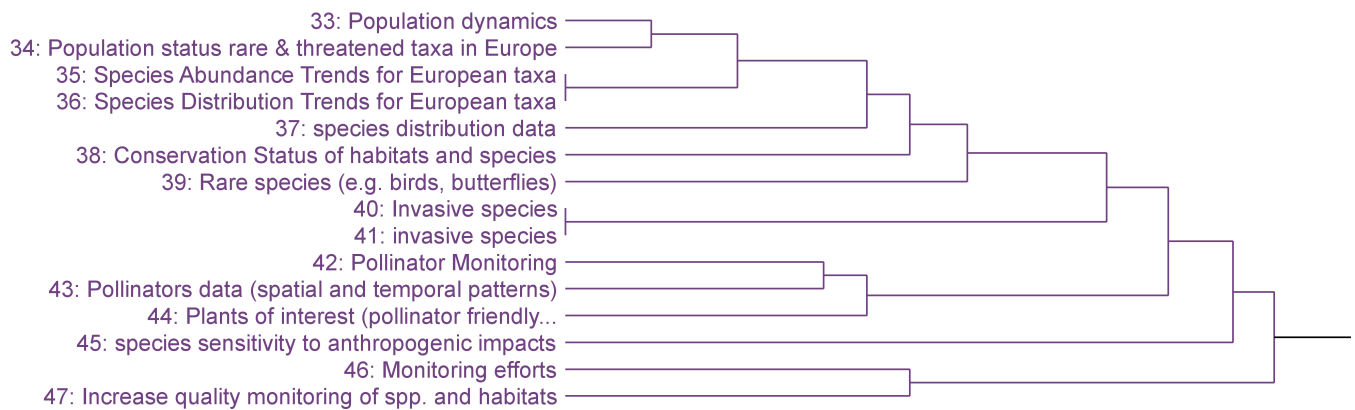
Colour	#	Title	Description
Green	21	Aerial Ecosystem	Uncleaned/raw radar data to study biodiversity flows across ecosystems from EU and non-EU weather surveillance radar networks
	22	Ecosystem backbone	We should adopt the new UICN ecosystem typology as biological entities link to ecosystems EBV (funct, struc, communities), similar to the referential of species for species EBV (pop, traits, genetic). It would match EU directives and Red lists structures.
	23	EBV language	We need EBV to be the language of directive and monitoring programs. More than EBV, it should be the triptic : biological entity - EBV - geographical scale. Directives should express what they need, as red list and other evaluation scheme, not how to do.
	24	EBV products	EBV should not be raw data. They are always estimated in some way, therefore carrying confidence level and uncertainty, carrying science more than data. Outcomes should focus on that. For instance, Corine Land Cover map is widely used, not its raw data.
	25	Essential Biodiversity Management Variables	EBV match the "State" of biodiversity in DPSIR framework. For management, pressures should be recorded at the same level (biological and geographical), as impacts/cost on society (e.g. wolf attacks), and responses. EBMV.
	26	Earth Observations Data Cubes	Multi-scale Earth Observations data from (satellites to drones) are key to devise monitoring schemes aiming to directly or indirectly support the Birds and Habitats Directives and contribute with EBVs for assessing the status and trends across bio levels

Raw Group Data: Orange Group



Colour	#	Title	Description
Orange	27	Farmland biodiversity indicator	A pan-european indicator of the biodiversity value of farmland (based on multi-species approach)
	28	Crop Pest monitoring	Crop pests are one of the biggest pressures on many widely grown crops. Evidence is growing that management, especially non-chemical methods, are context dependent. Information on the population trends of key pests would support sustainable agriculture
	29	soil biodiversity	N/A
	30	soil (functional) biod, farmland biodiv, agro-eco	agro-ecosystems are less intensive monitored, as also no EU Soil directive, soils are less well represented in terms of biodiversity. Crucial for CAP evaluation and ensuring essential ESS are preserved/enhanced
	31	Soil health monitoring	Soil health is a constraining factor on yields and a big concern for farmers. Biodiversity and environmental factors can affect soil health to unknown extents. Monitoring likely drivers now will allow us to better manage soils sustainably in the future
	32	drought indicators / soil moisture / soil biodiver	soil biodiversity (soil policy; climate policy; nature directives)

Raw Group Data: Purple Group



Colour	#	Title	Description
Purple	33	Population dynamics	Source-Sink dynamics for numerous species (mostly unknown) to contextualize research findings, and find compromises to accept e.g. excess mortalities where they naturally occur
	34	Population status rare & threatened taxa in Europe	Urgent work is needed to robustly assess the population status of rare and threatened taxa in Europe at national scales using methods appropriate to that scale to build a more representative picture of biodiversity change among such high priority species.
	35	Species Abundance Trends for European taxa	There's an urgent need to develop & regularly update Species Abundance Trends for a range of taxa building & extending the work on birds & butterflies. But more work is needed for taxa groups to provide a more representative picture of biodiversity change
	36	Species Distribution Trends for European taxa	There's an urgent need to develop & regularly update Species Distribution Trends for a range of taxa building & extending previous work. More work is needed to monitor & map different taxa to provide a more representative picture of biodiversity change
	37	species distribution data	data on the occurrence and absence of species, ideally as well data on population size and conditions, trends
	38	Conservation Status of habitats and species	Connected to the article 17 of the Habitats Directive
	39	Rare species (e.g. birds, butterflies)	Existing monitoring programs (e.g. birds and butterflies) mainly focus on common species because they can be conducted with volunteers and in easily accessible habitats. Rare species (many on the bird and habitat directive) are not well monitored.
	40	Invasive species	N/A
	41	invasive species	EU wide IAS monitoring as major threat to red list species (link EU Nature Directives)
	42	Pollinator Monitoring	Pollinators are a key component to European farming

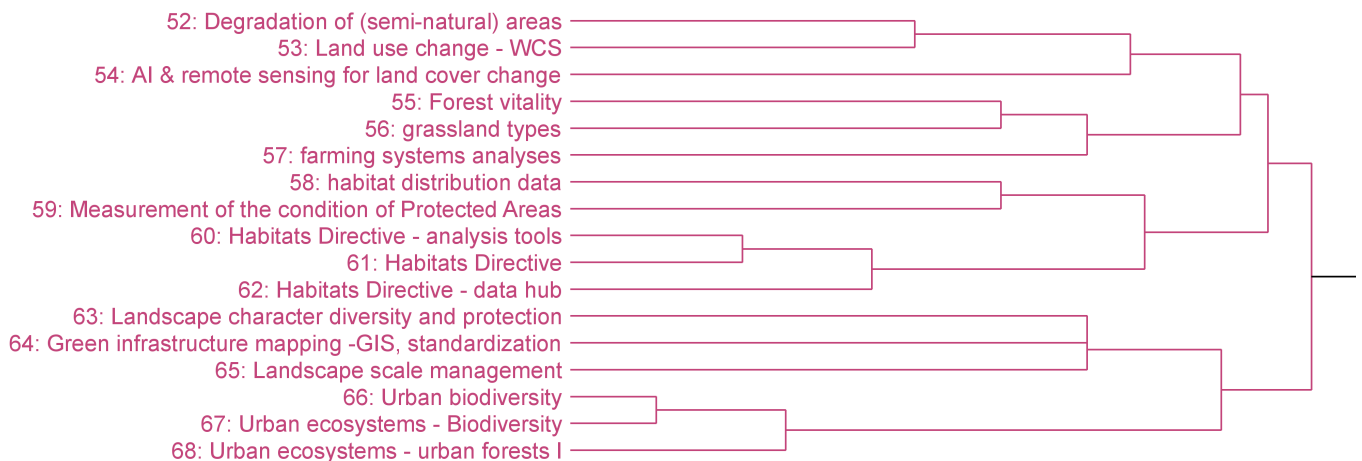
		sustainability but we know very little about what species are important in what parts of the EU, what their population trends are and how to tailor management to fit address declines where they occur
43	Pollinators data (spatial and temporal patterns)	A European database with information on pollinator patterns, in terms of location, numbers, temporal patterns and their relationship with environmental variables. Policies: Farm2Fork and Biodiversity Strategy, Habitats Directive
44	Plants of interest (pollinator friendly...	...monumental and alien plant species) (spatial and temporal patterns): location, expansion, numbers, temporal flowering patterns and their relationship with environmental variables. Policies: Farm2Fork and Biodiversity Strategy, Habitats Directive.
45	species sensitivity to anthropogenic impacts	systematic species sensitivity data to anthropogenic impacts, included in MSFD
46	Monitoring efforts	Each member state must ensure annual planning for the monitoring of biodiversity, with an emphasis on habitats and species, based on a cross-sectional methodology at European level for each fauna and flora group in terrestrial or marine environments.
47	Increase quality monitoring of spp. and habitats	Due to the constant pressures on species and their habitats, I consider a priority to continue developing reliable, and mainly update, methods and tools that improve monitoring processes. Because of its broad spectrum, it fits in any of the main policies.

Raw Group Data: Yellow Group



Colour	#	Title	Description
Yellow	48	Socio-economic data	This is largely missing when biodiversity is monitored. What does biodiversity mean for job availability? For human health? For tourism? etc.
	49	Climate	More and better information from subterranean and subaquatic chemical properties to inform climatological models and applications.
	50	CO2 sequestration capacity	mitigation potential of vegetation types (climate policy)
	51	Ecosystem services databases, mapping, modeling	Combined problem of landscape character protection and green infra mapping A good standard on methodology would be useful to embed it into national/EU level spatial planning SEA level, preferably open to use.

Raw Group Data: Pink Group



Colour	#	Title	Description
Pink	52	Degradation of (semi-natural) areas	A pan-European geodataset of habitat degradation (trend of decrease in functionality and/or biodiversity)
	53	Land use change - WCS	Web Coverage Services for land use change related data (copernicus). Support initiatives like https://opendatascience.eu/geo-harmonizer/ .
	54	AI & remote sensing for land cover change	near real time monitoring for land use and land cover change to inform a range of policies (biodiv., agriculture, climate, water, health)
	55	Forest vitality	A pan-european geodataset indicating events of defoliation and leaf decoloration in forests. This can then be linked to climate change, through drought indices etc.
	56	grassland types	Implications for the CAP
	57	farming systems analyses	CAP and Nature Directive
	58	habitat distribution data	data on the occurrence and absence of habitats (ecosystems), ideally as well area and condition (structure and function) of habitats, trends
	59	Measurement of the condition of Protected Areas	While Europe has a growing PA network for which it is proud, there's little or no scientifically robust joined-up monitoring of PA condition, or integrity, across the network. We lack common metrics, indicators & frameworks & cannot judge site performance
	60	Habitats Directive - analysis tools	Work on a centrally organised analysis pipeline to analyse data collected for the Habitats Directive. E.g. tools to assign floristic compositional data to Natura 2000 habitats.
	61	Habitats Directive	Equivalence and connectivity of ecosystems among aerial, aquatic, and terrestrial habitats such that flows across and through these systems become more integrated

	62	Habitats Directive - data hub	A central European data hub where all raw data collected with respect to the Habitats Directive are centralized and harmonized. Metadata that stores all details about sampling design aspects. API to interact with the data.
	63	Landscape character diversity and protection	European Landscape Convention Missing: Standardized methodology for sampling, modeling, remote sensing data analysis. Many countries preparing nowadays the appropriate maps, with different methodologies.
	64	Green infrastructure mapping -GIS, standardization	GIS problem: how to identify green infrastructure elements, especially functionality wise. It's made on-the-spot yet, though there are extremely detailed remote sensing possibilities, but links missing between modeling, spatial planning, biologists
	65	Landscape scale management	Updated information on the level of habitats and species on a GIS basis, on a landscape scale with detail and accuracy that allows it to be viewed and used by various organisations and departments as an official reference, including members states
	66	Urban biodiversity	... as it interacts with quality of citizens' experience, air and water quality and specific ecosystem services. A neglected facet of many Smart City initiatives
	67	Urban ecosystems - Biodiversity	For cities there are no standard indicators for biodiversity. We would need data in line with indicators for urban biodiversity.
	68	Urban ecosystems - urban forests I	A City land use B City tree % C City shrub % D City plantable space % E Tree location details F Tree species G Tree diameter H Tree height I Tree crown details J Tree canopy cover K Soil details L Tree distance to buildings M Average height of shrubs mass

Raw Group Data: Silver Group



Colour	#	Title	Description
Silver	69	Communication	the update of the information must circulate in a transversal way, either in the update of the protection statute, as in the distribution, intensity or frequency of an occurrence, that is an information shared in order to integrate other sectoral plans or
	70	Culural values of biodiversity	Cultural ecosystem services related to biodiversity are crucial for a variety of policy goals (e.g. nature-based solutions) and building an evidence base for biodiversity - it's not just about quantitative values which policy makers might not understand.
	71	Embed biodiv. data to EIA practice	An important use of biodiversity/ecosystem services/landscape character/green infrastructure databases would be in EIA processes. Open databases (and knowledge transfer on the existence and use of them) end user input from the EIA assessments results
	72	Practice into research	Capturing what is going on 'in the field' and inform science about the practical approaches, including open question that science should address

Raw Group Data: Brown Group

73: EU Biodiversity Strategy 2030

74: CBD post 2020 Global Biodiversity Framework

75: SDG's being addressed

76: policy on groundwater in remote rural settings

Colour	#	Title	Description
Brown	73	EU Biodiversity Strategy 2030	The new EU biodiversity strategy should include the genetic dimension of biodiversity as a cornerstone. A large EU network, G-BiKE, includes researchers and practitioners aiming at addressing the inclusion of genetic diversity in the new strategy
	74	CBD post 2020 Global Biodiversity Framework	The next fundamental step is represented by the approval of this international agreement. EU can play a leading role in this process by forming a large group of countries willing to bring the genetic diversity at the forefront of any new policy.
	75	SDG's being addressed	In monitoring water through citizen science be aware of Goal 5 (gender) 10 (equality), 16 (peace, justice etc) 17 (partnerships) 6 (clean water) - all of these relevant to citizen science
	76	policy on groundwater in remote rural settings	Collect data that is made accessible to policy and fill hydrological void around groundwater and rainfall in remote rural settings using citizen science

Raw Group Data: Cyan Group

77: CITIZEN SCIENCE
 78: Align citizen science data w political indicators
 79: Data from? Citizens science
 80: Citizen Science Observations
 81: Participatory monitoring of groundwater

Colour	#	Title	Description
Cyan	77	CITIZEN SCIENCE	Using volunteers to collect data to protect groundwater and measure levels as well as rainfall
	78	Align citizen science data w political indicators	establish workflows for citizen science data to inform political indicators (all policies)
	79	Data from? Citizens science	Citizens gathering data. Or data from: A Remote sensing B Manual surveys C High tech sensors/IoT
	80	Citizen Science Observations	Web apps where citizens record biological observations are becoming increasingly important for monitoring. Their role needs to be strengthened, amplified and quality assessments performed. Forming targeted communities and rewarding users needs discussion
	81	Participatory monitoring of groundwater	Make sure that the use of volunteers for monitoring wells is participatory - use participatory action research methods