

Towards a new CBD Strategy 2021-2030

Final Report on a 'Horizon Scanning' exercise

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June 2018

Supported by:



Federal Ministry
for the Environment, Nature Conservation
and Nuclear Safety

based on a decision of the German Bundestag



**HELMHOLTZ
CENTRE FOR
ENVIRONMENTAL
RESEARCH – UFZ**

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1. Introduction

The Convention on Biological Diversity's strategic plan ends in 2020 and a new strategic framework is being developed by CBD in the period 2018 to 2020 (starting with its SBSSTA-22 and SBI-2 meetings as well as COP-14, all in 2018). This process includes the possibility for organisations to provide input.

WWF Germany is currently developing a contribution - in form of a discussion paper - to the international discussions leading up to the post-2020 framework of the CBD, which is meant as a concrete input to the deliberations. The contribution aims to provide ideas and suggestions that are relevant for the positioning of different actors, such as Parties to the CBD or various non-governmental organizations and stakeholders.

On the basis of a contractual collaboration between the WWF and the UFZ, the latter carried out a consultation among international nature conservation experts. This consultation was inspired by the method of Horizon Scanning, an approach which has come to be used broadly in the environmental context¹ to identify important emerging issues. The expert consultation by UFZ/WWF elicited from participants those thematic aspects related to the CBD's mandate, which they regarded as particularly important for the decade 2021-2030 in order to pave the way to CBD's 2050 vision of 'living in harmony with nature'² as well as a prioritisation of these themes.

The expert consultation was carried out in a two-step process (described in detail below), to 1) screen for relevant topics, which were then grouped into clusters of related topics by the UFZ in consultation with WWF (survey 1), and 2) prioritise these sets of related topics, or *thematic clusters* hereafter, according to the urgency with which participants considered parties should take action (survey 2).

The two surveys were carried out by UFZ during the time period February – June 2018. They were technically implemented by the Institute for Biodiversity – Network (ibn). The analysis of the results for survey 1 was done by UFZ, for survey 2 by ibn and expanded on by UFZ.

¹ Generally, horizon scanning approaches explore what the future might look like to better understand uncertainties, see also Sutherland et al. (2011).

² Decision X/2 of CBD COP 10 (Strategic Plan for Biodiversity 2011-2020): 'The vision of this Strategic Plan is a world of "Living in harmony with nature" where "By 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people.'

2. Survey 1

2.1. Methods (1)

2.1.1. Structure of the Questionnaire

The survey's main purpose was to address the question: *What are the 3 most important topics that need to be included in the new strategy of the Convention (CBD) to achieve its three objectives?*

Experts who participated in the survey were asked about their opinion on this matter, and were invited to give their answers separately for each of the three CBD objectives: conservation of biological diversity, sustainable use of the components of biological diversity and fair and equitable sharing of the benefits arising out of the utilization of genetic resources.

In addition, participants were asked on which of the three CBD objectives they felt most knowledgeable about and which one they regarded as most important. Furthermore, they were asked to disclose some personal information (geographic origin, sex, age). The complete questionnaire is annexed to this report (annex 1).

2.1.2. Recruitment of participants

The survey was accessible from 26 January 2018 to 6 March 2018. More than 200 experts were invited to participate in the survey.

The criteria for being considered a suitable expert for the consultation were:

- a) advanced knowledge in a relevant field of expertise or academic discipline;
- b) knowledge about international nature conservation policies / Multilateral Environmental Agreements;
- c) not being closely engaged in the CBD negotiations at SBSTTA, SBI or COP meetings.

Further, the aim was to engage experts with varied expertise and professions, age and sex, and from different geographical regions.

The recruitment started on 26 January by sending out emails to the list of people that had been identified according to the criteria above.

As the initial response rate was rather low and the sample was initially biased toward experts from Western Europe, a general reminder was sent out to the entire list on 10 February 2018, excluding those experts that had already answered the survey or deliberately opted out from the survey. In addition, personalized reminders were sent out to selected experts during the period 15 February to 26 February 2018. Many of these selected experts were either from Asia or Africa because these regions were initially strongly underrepresented in the sample.

2.1.3. Data analysis

The survey contained two different kinds of questions:

- a) Single or multiple choice questions that delivered particular numbers (i.e., x participants chose a particular answer). Questions 1, 2, 6 – 9 were of this nature (see annex 1).
- b) Open questions that asked participants to enter their own text. Questions 3 – 5 were of this nature (see annex 1). Questions 3a, 4a and 5a asked for three keywords each. Additionally, participants were given the opportunity in Questions 3b, 4b and 5b to insert explanatory text related to the given keywords (and most participants used this opportunity).

While the analysis of the “type-a-questions” was very straightforward (summing up the numbers of the respective answer categories), the analysis of the “type-b-questions” was much more demanding. It entailed the following steps and challenges:

- Screening of all keywords given for one question (i.e., question 3, 4 or 5), checking for semantic overlaps and contextual communalities.
- Identifying possible “cluster terms”: These cluster terms should be sufficiently general to capture several of the keywords and the underlying meanings, but also sufficiently specific to convey the significant information and to differentiate broad thematic clusters.
- Tagging of all keywords given with one or two of the chosen cluster terms. In many cases, the explanatory comments provided by the participants proved helpful for the decision which of the cluster terms should be most appropriately assigned.

While this procedure was generally feasible, it was also linked to several serious challenges:

- Choosing and defining “cluster terms” was somewhat subjective but had a strong impact on the further analysis and the results.
- Assigning keywords to clusters was also subjective and somewhat arbitrary. In many cases, keywords could have been assigned to multiple clusters – depending on the concept envisioned by the person responsible for the assignment.
- The explanatory comments were on the one hand useful to make sense of some of the keywords. However, they often provided implicitly one or several additional keywords. *Example:* A participant entered the keyword “pollution” and gave the explanation that “protected areas are very important in the oceans, they could also help to combat marine pollution”. The keyword “pollution” would clearly fit into the cluster “Particular direct drivers” but the context given in the explanation would also justify an assignment to the cluster “Conservation, connectivity, restoration” (see Table 3 for the complete list of chosen cluster terms and their explanation).

- Finding appropriate explanations for the cluster terms: These explanations should give readers who did not participate in the survey and do not know the answers analysed a very good sense of what the cluster term comprised.

To optimize the clustering in the light of the listed challenges and to arrive at a feasible number of clusters, the following decisions were applied:

- The total number of clusters should not exceed twelve.
- One single person completed the assignment of all keywords, maximizing consistency in the association of concepts with clusters.
- A keyword was assigned to a maximum of two different clusters (two: if a keyword clearly conveyed a concept that covers aspects of two different clusters, if more than one keyword was given and if these terms belonged to different clusters, or if the explanation of the keyword conveyed additional aspects that fell into a different cluster than the keyword).
- When displaying the results of survey 1, the meaning and scope of the clusters are illustrated by a corresponding selection of keywords given by participants as answers to questions 3-5. This approach is shown in Table 3.

2.2. Results (1)

2.2.1. Number of participants, response rate

When the survey was closed on 6 March 2018, the data sheet contained 37 entries. Two of these entries were not valid; one was a test run and one was without any content. Thus, 35 experts had entered usable answers. Given that 225 experts had been invited, the response rate was approx. 15 %. Online survey response rates are generally very variable, depending on e.g. the target group, the subject, the way prospective participants are addressed and the design and complexity of the questionnaire. For an online survey as the one that is documented here, with a highly diverse target group, an external audience (i.e. with people that do not belong to the same institution of the inquirer) and no material incentive provided, a response rate of 15 % seems satisfactory.

2.2.2. Expertise of the participants – Self evaluation

The participants were asked the following question:

Question 1: Of the three objectives of the Convention (CBD), I consider myself most knowledgeable about...(multiple answers possible)

1. Conservation of biological diversity
2. Sustainable use of its components
3. Fair and equitable sharing of the benefits arising out of the utilization of genetic resources

According to this self-evaluation, about three quarters of the participants were most knowledgeable about issues related to the first two objectives of the CBD, whereas less than one quarter of the participants was most knowledgeable about issues related to the

third objective of the CBD (see Table 1). 14 participants ticked only one, 17 participants clicked two and four participants clicked three of these options (multiple answers were allowed).

Table 1: Number of participants who ticked a particular answer with regard to Question 1:

Question no. 1	Answer: Conservation	Answer: Sustainable use	Answer: Fair and equitable sharing of benefits (ABS)
I consider myself most knowledgeable about	27 (77 % of all 35 participants)	26 (74 % of all 35 participants)	7 (20 % of all 35 participants)

These results suggest that strong expertise about the first two CBD-objectives was distributed equally widely among the participants. Expert knowledge on the third CBD-objective was, however, underrepresented in the sample. The majority of the participants related their expertise to more than one of the CBD objectives.

2.2.3. Attributed importance of the three goals of the CBD

The participants were asked the following question:

Question 2: I consider the following objective(s) of the Convention (CBD) to be the most important... (multiple answers possible)

1. Conservation of biological diversity
2. Sustainable use of its components
3. Fair and equitable sharing of the benefits arising out of the utilization of genetic resources

More than four out of five participants ranked either the first or the second CBD-goal, or both, as most important. More than half of the participants considered the third CBD-goal as most important (see Table 2). 9 participants ticked only one of these options, 9 participants clicked two and 17 participants clicked three of these options (multiple answers were allowed).

Table 2: Number of participants who ticked a particular answer with regard to Question 2:

Question no. 2	Answer: Conservation	Answer: Sustainable use	Answer: Fair and equitable sharing of benefits (ABS)
I consider the following objective(s) of the CBD to be the most important	28 (80 % of all 35 participants)	30 (86 % of all 35 participants)	20 (57 % of all 35 participants)

The tendency among the participants to regard the first two CBD objectives as the most important seems not surprising, given that most of them also considered themselves as

most knowledgeable about them (see Table 1 above). However, a much larger share of participants assigned high importance (also) to the third CBD-objective than the proportion that stated to have the strongest expertise in this field. Half of the participants preferred not to rank the importance of the CBD objectives – by ticking all three options.

2.2.4. Topics suggested for being highly relevant for post-2020 CBD framework

The participants were asked which topics they think should be included in the new strategic framework of the CBD. This inquiry was split into three questions, each one referring to one of the main goals of the CBD:

Question 3: What, in your opinion, are the top 3 (most important) topics that need to be included in the new Strategic Plan of the Convention (CBD) to achieve its objective **on the conservation of biological diversity**?

Question 4: What, in your opinion, are the top 3 (most important) topics that need to be included in the new Strategic Plan of the Convention (CBD) to achieve its objective **on sustainable use of the components of biological diversity**?

Question 5: What, in your opinion, are the top 3 (most important) topics that need to be included in the new Strategic Plan of the Convention (CBD) to achieve its objective **on fair and equitable sharing of the benefits arising out of the utilization of genetic resources**?

Table 3 summarizes the results for questions 3-5. The numbers and colours in the last three columns show the distribution of the keywords among ten different thematic clusters for the three CBD-objectives (Cons. = Conservation, SU = Sustainable use, ABS = Fair and equitable sharing of benefits). A given keyword was assigned to a maximum of two different clusters (see section about challenges on page 4).

The total numbers of keywords given per CBD-objective were: *Conservation*: 103 keywords, assigned 124 times to clusters (= 'cluster entries'); *Sustainable use*: 91 keywords, 111 cluster entries; *ABS*: 58 keywords, 77 cluster entries. As the number of keywords and number of cluster entries differed among the three different questions, the results of this analysis are given in relative terms (% of total number of cluster entries, see Table 3).

Across all three CBD objectives, keywords falling into three clusters “4: Policy coherence, government, enforcement”, “5: Capacity building, (traditional) knowledge, knowledge generation” and “8: Mainstreaming, sectoral integration, sustainable production” were mentioned most frequently (the latter only for CBD-objectives 1 and 2, see Table 3). Thus, these clusters can be regarded to represent issues that receive the highest priority among the participants of the survey. Table 3 further reveals that clusters 4 and 5 were regarded as being of particular relevance for the third CBD-objective, whereas cluster 8 was given highest priority with regard to the second CBD-objective.

In addition, clusters could be found that ranked highly for only one of the three CBD-objectives and relatively low for the other two: for the first objective (conservation), this

was “2: Conservation, connectivity, restoration”, for the second objective (sustainable use), this was “6: Development, human-well-being”, and for the third objective (fair and equitable sharing of benefits), this was “9: Ethics, rights, cultural diversity”.

While the keywords related to the first and the second CBD-objective fell into all ten different clusters, the keywords mentioned with regard to the third CBD-objective fit only into seven different clusters (missing clusters: “2: Conservation, connectivity, restoration”, “3: Particular direct drivers”, and “7: Financing mechanisms”, see last column of Table 3 where these clusters received 0%).

The clusters “1: Awareness, behaviour, education”, “3: Particular direct drivers”, “7: Financing mechanisms” and “10: Neglected issues” received relatively low scores across all three CBD-objectives.

Note: The following keywords were excluded from the further analysis, as they could not be attributed to any cluster in particular: *Conservation*: **Knowledge systems** [explanation: knowledge systems are losing more than biodiversity, and science-policy work is not being able to integrate them to the stock of knowledge for make decisions], **integrity** [explanation: contribute to the maintaining of the integrity of ecosystems], **Oceans** [explanation: oceans are our lives; we need the oceans more than the oceans need us], **multiple drivers on a global scale** (discussion on the Anthropocene) [explanation: --]; *Sustainable use*: **Use of biodiversity resources** [explanation: status of uses both locally, nationally and internationally]; **global** [explanation: there is actually one interconnected global ocean].

Table 3: Clustering of keywords and frequency with which they were mentioned by participants

	Cluster	Explanation / Examples	Cons.	SU	ABS
1	Awareness, behaviour, education	referring e.g. to awareness rising, sensitisation, education, communication	6%	2%	8%
2	Conservation, connectivity, restoration	referring e.g. to conservation measures for terrestrial, marine or freshwater species (area-based or species-specific), protected areas, connectivity, restoration, reintroductions, extinctions	15%	3%	0%
3	Particular direct drivers	referring e.g. to climate change, pollution, invasive species, poaching, or other particular direct drivers that are not regarded as fitting into the category "neglected issues"	6%	8%	0%
4	Policy coherence, governance, enforcement	referring e.g. to good / better / more effective / local / inclusive governance, governance structures, policy coherence, effective implementation, compliance, enforcement, particular provisions such as given by the CBD framework (and possible general or structural modifications thereof such as the adoption of new targets or protocols), the necessity to involve all relevant stakeholders, participation (e.g. of developing countries) in CBD process, the call for global / regional / national / local approaches	17%	14%	35%
5	Capacity building, (traditional) knowledge, knowledge generation	referring e.g. to capacity building, science, knowledge generation, innovations, specific knowledge gaps and the call for addressing them, e.g. via monitoring of biodiversity or by monitoring of policy implementation and policy effectiveness, reporting, sharing of information, addressing fundamental / conceptual issues (such as "definition of sustainability"), integration / use of traditional and local knowledge	15%	18%	27%
6	Development, human well-being	referring e.g. to development, poverty reduction, socio-economics, human well-being, health, livelihoods, sufficient income, food security, benefits to people	10%	13%	3%
7	Financing mechanisms	referring e.g. to nature funds, financial compensation, investments to promoting biodiversity conservation, market-based instruments	3%	4%	0%
8	Mainstreaming, sectoral integration, sustainable production	referring e.g. to sectoral integration, green accounting, internalization of negative externalities, certification schemes, commodity chains, telecoupling, market forces, system changes (e.g. reducing harmful subsidies), energy, resource-use, operation within planetary boundaries / safe limits, sustainable agriculture / fishery / forestry, social-ecological systems, ecological landscapes, compatibility between human activities and biodiversity conservation, balance of needs, landscape stewardship, ecosystem services	18%	32%	9%
9	Ethics, rights, cultural diversity	referring e.g. to the right to live, property rights, indigenous peoples rights, intra- and inter-generational justice, integration of relevant claims, fairness, respect, the necessity to keep promises, responsibility, respect for cultural diversity, cultural values and the necessity to conserve biocultural diversity	9%	5%	17%
10	Neglected issues	referring e.g. to microorganisms, animal welfare, freshwater biodiversity, novel ecosystems, digitalization, or other specific issues that are regarded to have been insufficiently addressed by the CBD	2%	2%	1%

Colour coding in Table 3:

0 %	
1 – 10 %	
11 – 20 %	
21 – 30 %	
31 – 35 %	

2.2.5. Personal information revealed by the participants

Of the 35 participants, two thirds were men and one third was women (see Figure 1).

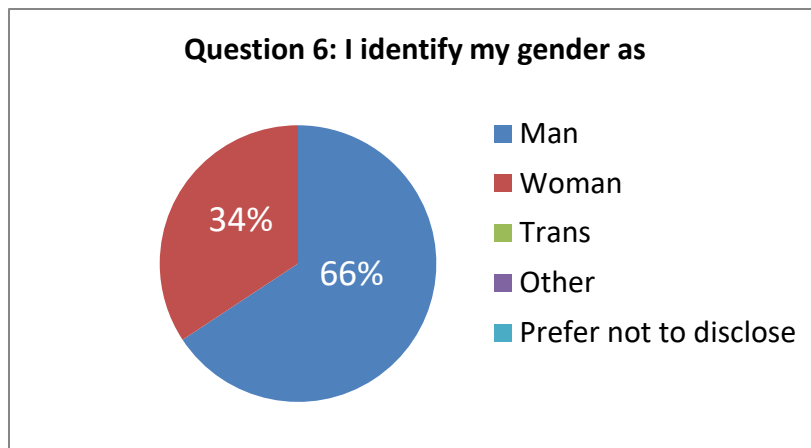


Fig. 1: Distribution of genders among the 35 participants of survey 1.

Figure 2 shows the distribution of the different age groups among the participants of survey 1. Two thirds of the participants were between 45 and 64 years old and nearly one third were between 25 and 44 years old.

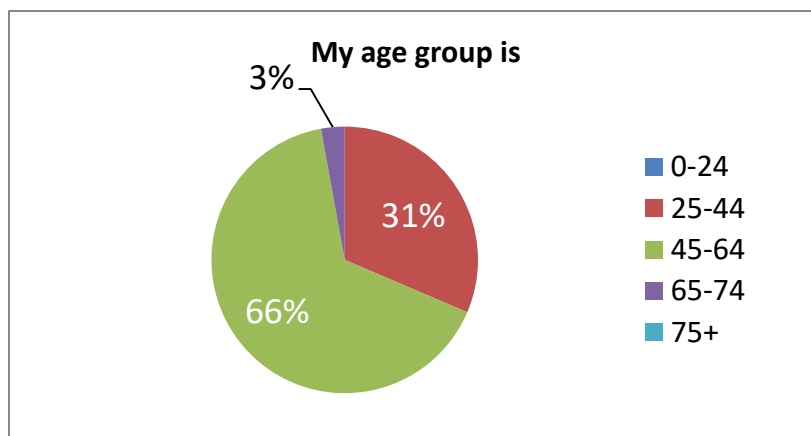


Fig. 2: Distribution of age groups among the 35 participants of survey 1.

Figure 3 shows how often the geographical regions were represented among the participants of survey 1. The largest group of participants was from Europe, the second largest group was from Asia.

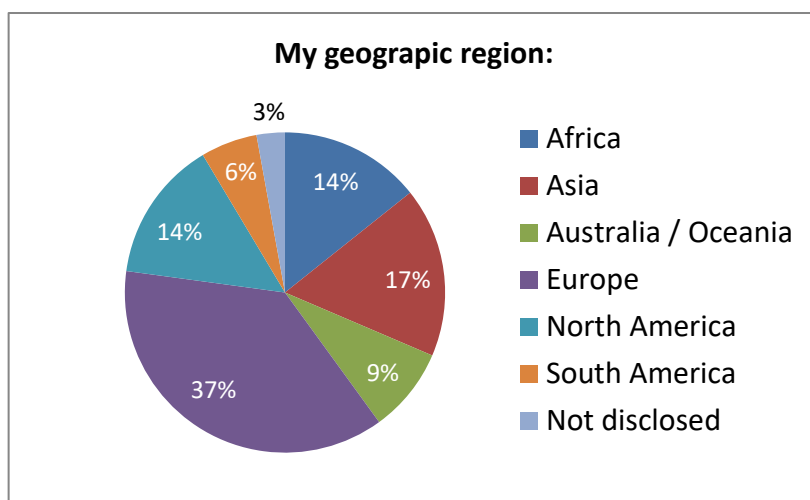


Fig. 3: Representation of geographical regions among the 35 participants of survey 1.

In summary, the sample of survey 1 was biased toward male participants and toward the age group '45-64 years'. Europe was clearly over-represented, whereas Australia/Oceania and South America were clearly under-represented.

3. Survey 2

3.1. Methods (2)

3.1.1. Structure of the Questionnaire

The main purpose of this questionnaire was to prioritise the identified clusters according to the urgency with which Parties should implement them. Experts were asked to select three clusters they considered to be most important.

Participants were also asked which of the three CBD objectives they felt most knowledgeable about, and were asked to disclose some personal information (geographic origin, sex, age). The complete questionnaire is annexed to this report (annex 2).

3.1.2. Recruitment of participants

The second survey was accessible from 21 May 2018 to 5 June 2018.

The criteria for being considered a suitable expert for the consultation was the same as for survey 1 (see page 2).

The second survey was sent to 223 international experts on 21 May 2018 with an initial deadline of 31 May. A reminder was sent on the 31st May with an extended deadline until 5 June with a slightly reformulated invitation specifying the two-step process again and highlighting that this survey was part 2 of the process. This reformulation was made because two persons had responded personally by email thinking they had already

completed the survey, as they interpreted the survey to be identical to the request sent two months earlier.

3.1.3. Data analysis

The survey contained two mandatory questions, and the optional questions on personal information (see annex 2). In this survey, only closed questions were included (participants could only chose between given options by ticking boxes, they could not insert text), delivering clearly interpretable results.

3.2. Results (2)

3.2.1. Number of participants, response rate

42 valid responses were received, which corresponds to a response rate of about 19%, slightly higher than for survey 1. For two optional questions (geographical region and option for follow-up) only 41 persons responded.

3.2.2. Expertise of the participants – Self evaluation

Participants were asked which objective of the CBD they considered themselves to be more knowledgeable about (same question as in survey 1). Nearly three quarters of the participants were most knowledgeable about issues related to the first objective of the CBD, and over two thirds about the second objective, whereas less than one fifth of the participants felt most knowledgeable about issues related to the third objective of the CBD (see Table 4). 20 participants ticked only one, 18 participants clicked two and four participants clicked three of these options (multiple answers were allowed).

Table 4: Number of participants who ticked a particular answer with regard to Question 1:

Question no. 1	Answer: Conservation	Answer: Sustainable use	Answer: Fair and equitable sharing of benefits (ABS)
I consider myself most knowledgeable about	31 (74 % of all 42 participants)	29 (69 % of all 42 participants)	8 (19 % of all 42 participants)

Thus for survey 2, similar to survey 1, the results suggested that more expertise for the first two CBD-objectives was present among participants. Expert knowledge on the third CBD-objective was underrepresented in the sample. The majority of the participants related their expertise to only one of the CBD objectives.

3.2.3. Attributed urgency of thematic clusters

The central question of survey 2 asked participants to select three clusters according to the urgency with which they considered Parties to the Convention should address them.

Question 2: Please consider and tick which three clusters you consider to be the most urgent for Parties to address in the next decade in order to achieve the CBD's three objectives and the 2050 vision.

The clusters listed in survey 2 were those resulting from survey 1 (see Table 3). In order to give survey participants some background information on each of the clusters, the questionnaire was set up in such a way that they could access more details (i.e. keywords) on each category if they so desired (built in as an extra page in the online questionnaire).

It should be noted that one participant ticked more than three options (five: 1, 2, 3, 5, 7), which means these categories had one 'vote' too many in the weighting. Removing these had an insignificant effect on the overall result, so we have kept them in the below figure and analysis.

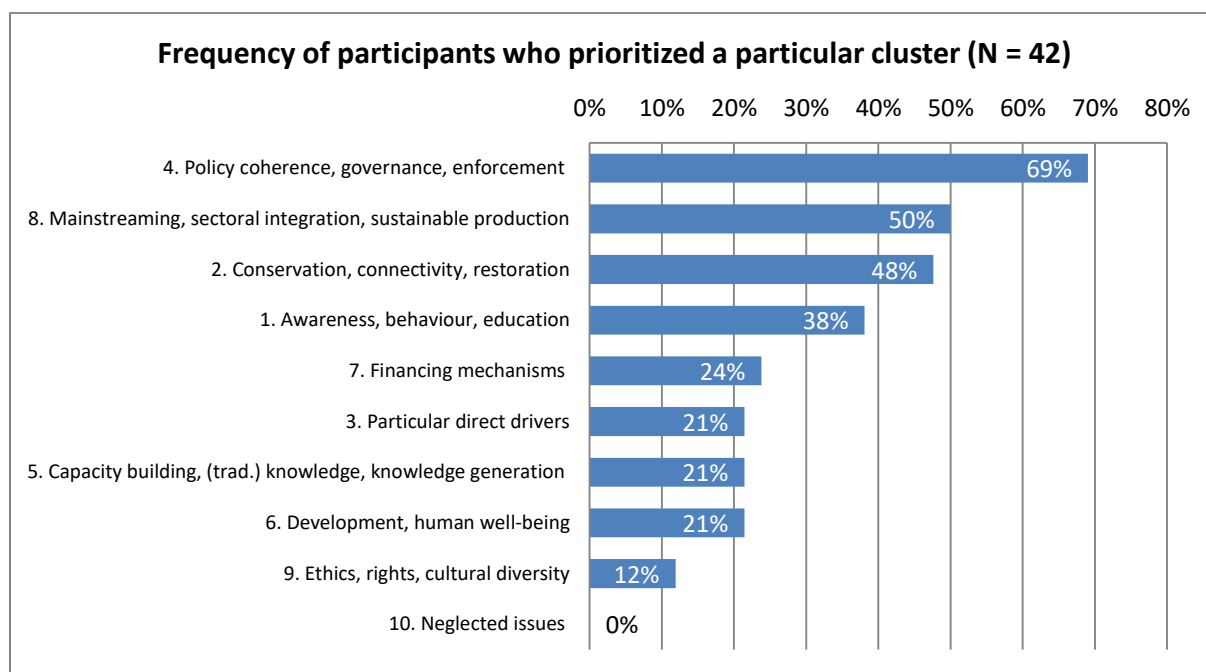


Fig. 4: Prioritisation of thematic clusters by participants of survey 2.

Of the ten clusters the participants were asked to prioritize, four were considered most frequently as being among the most important issues for the CBD (they were ticked by more than a third of all participants as being in the top three, see Figure 4). These clusters were, in order of importance: '4. Policy coherence, governance, enforcement' (29 persons, 69%), '8. Mainstreaming, sectoral integration, sustainable production' (10 persons, 50%), '2. Conservation, connectivity, restoration' (20 persons, 48%), and '1. Awareness, behaviour, education' (16 persons, 38%).

3.2.4. Personal information revealed by the participants

Of the 42 participants, three fifth were men and two fifth were women (see Figure 5).

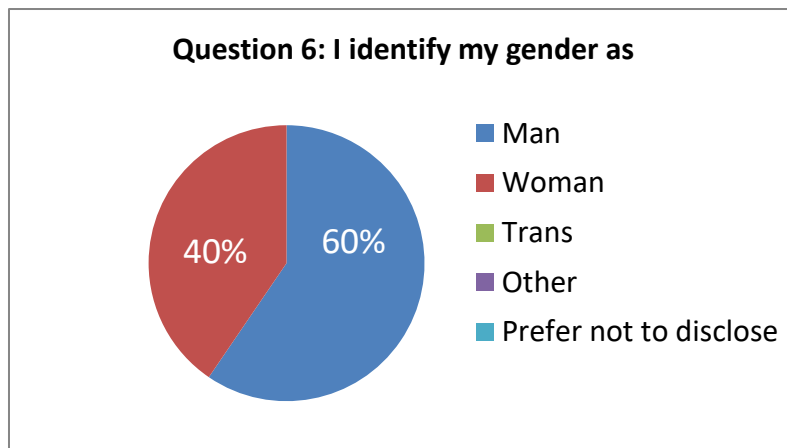


Fig. 5: Distribution of genders among the 42 participants of survey 2.

Figure 6 shows the distribution of the different age groups among the participants of survey 2. More than half of the participants were between 45 and 64 years old and nearly the other half were between 25 and 44 years old.

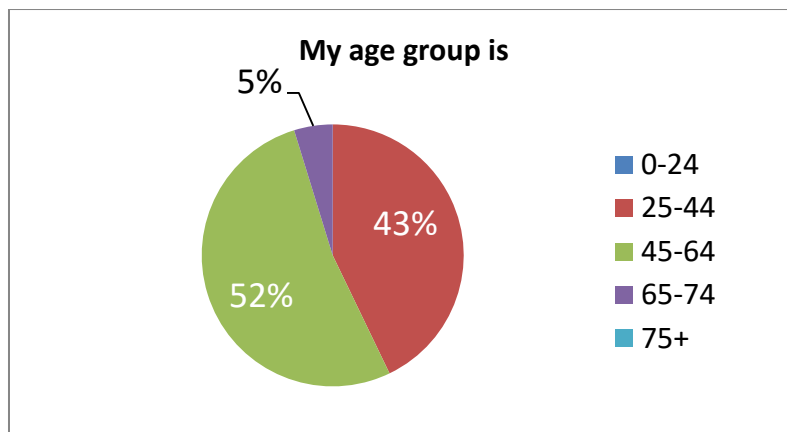


Fig. 6: Distribution of age groups among the 42 participants of survey 2.

Figure 7 shows how often the geographical regions were represented among the participants of survey 2. The largest group of participants was from Europe (nearly half of the participants); the second largest group was from North America.

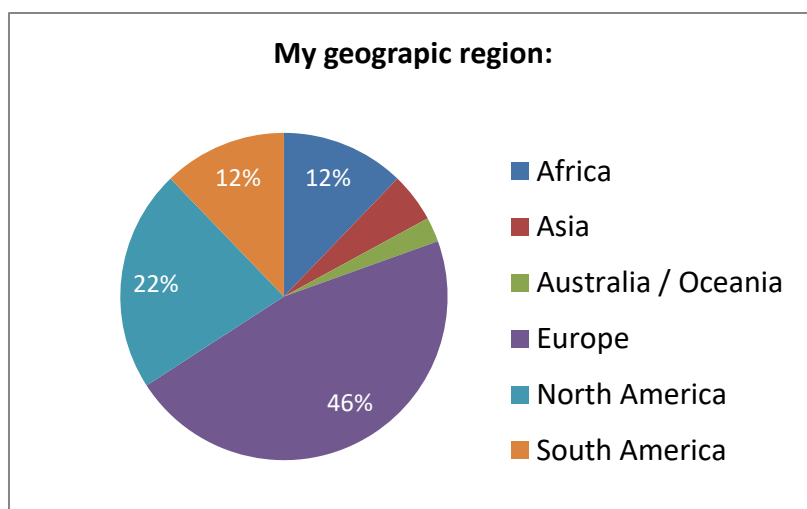


Fig. 6: Representation of geographical regions among the participants of survey 2 (here, 41 persons responded).

Thus the sample of survey 2 was biased toward male participants and the age group '45-64 years' was most strongly represented. This is a similar pattern to that found in survey 1. In survey 2 Europe was over-represented, whereas Australia/Oceania and Asia were clearly under-represented.

3.3. Willingness to be contacted again regarding the project

All participants from survey 1 agreed to the phrase: "I am happy to be contacted again in the context of this project....". About two-and-a-half months after the completion of the first survey they were contacted again for the second online survey of this project.

In the second survey, of the 41 participants to this question, 38 agreed to the above phrase, and 3 requested to not be contacted again.

Of the 34 participants of survey 1 who entered their names (one took part anonymously), 13 (38 %) took part in survey 2.

In total, for both surveys, 7 persons opted out from receiving a reminder for survey participation, or further information/results of the project (6 after the first invitation, 1 after the second).

4. Summary & Conclusions

A two-step expert consultation was carried out to 1) identify important topics for achieving the CBD's objectives, and 2) prioritise thematic clusters of these topics according to the participant's views on their importance for Parties to address them in the next decade.

4.1. Main results

4.1.1. Survey 1

35 biodiversity experts from all over the world gave keywords on and made short statements about issues that they consider pivotal for achieving the three CBD objectives ‘conservation’, ‘sustainable use’ and ‘fair and equitable benefit sharing’. About 250 keywords were collected and these keywords were categorized into 10 broad thematic clusters. Measured by the number of keywords that fell into these clusters, the following three represent issues that the participants regarded as most urgent to address:

“4: Policy coherence, government, enforcement”,

“5: Capacity building, (traditional) knowledge, knowledge generation” and

“8: Mainstreaming, sectoral integration, sustainable production”.

Objective-specific relevance was assigned to the clusters “2: Conservation, connectivity, restoration” (objective 1), “6: Development, human-well-being” (objective 2), and “Ethics, rights, cultural diversity” (objective 3). The clusters “1: Awareness, behaviour, education”, “3: Particular direct drivers”, “7: Financing mechanisms” and “10: Neglected issues” received relatively low scores across all three CBD-objectives.

4.1.2. Survey 2

42 biodiversity experts from all over the world prioritized the thematic clusters identified from step 1. Four clusters were selected by participants as being among the top three most important for Parties to address in the next decade. These were: ‘4. Policy coherence, governance, enforcement’, ‘8. Mainstreaming, sectoral integration, sustainable production’, ‘2. Conservation, connectivity, restoration’, ‘1. Awareness, behaviour, education’.

Thus, there was a very high overlap in the clusters regarded as important between survey 1 and survey 2 (as measured by frequency of responses fitting into the cluster in survey 1 and frequency of being ticked as among the top three in survey 2). While the thematic clusters ‘4. Policy coherence, governance, enforcement’ and ‘8. Mainstreaming, sectoral integration, sustainable production’ were identified among the three most important clusters in both surveys, the cluster ‘5. Capacity building, (traditional) knowledge, knowledge generation’ was not selected as being highly important in survey 2. Instead, survey 2 identified the clusters ‘2. Conservation, connectivity, restoration’ and ‘1. Awareness, behaviour, education’ as the third, respectively, fourth most important clusters of which cluster 2 was identified in survey 1 as very important only for the first CBD objective and cluster 1 was given not a very high priority at all.

4.2. Interpretation of differences between survey results and of specific prioritizations

The differences between the results of the two surveys could be related to differences in the methods that were applied and the ways in which the survey questions were formulated: Survey 1 participants had provided their own ideas and wordings, while in survey 2; they were given a set of thematic clusters to prioritise.

Cluster-5-keywords (clustered later as “Capacity building, (traditional) knowledge, knowledge generation”) were mentioned very often by participants of survey 1 but this cluster was not so prioritized in survey 2. One possible explanation could be that participants don’t see this issue as the responsibility of Parties per se, but of other actors (perhaps more educational institutions and research funding agencies). An alternative explanation could be that when presented with a broader range of topics (such as the combination of the terms capacity building, (traditional) knowledge and knowledge generation) than participants may have had in mind themselves, other thematic clusters may outweigh the importance of a single concept (e.g. capacity building OR (traditional) knowledge OR knowledge generation). Additionally, participants could have perceived cluster 5 as being partly covered by thematic cluster “1. Awareness, behaviour, education”, which did turn out to be highly selected by participants. This could possibly also explain why the thematic cluster ‘1. Awareness, behaviour, education’ was not among the frequent clusters in survey 1, but was clearly considered to be very important in survey 2: maybe some of the answers persons provided in survey 1 and were grouped into cluster 5 were more clearly identifiable in survey 2 under cluster 1. Alternatively, it could well be that cluster 1 immediately struck participants of survey 2 as essential when they read the list of clusters. Potentially, also the ordering of the clusters had an effect on the prioritization (cluster 1 being the first and ranking higher than cluster 5 in the list of clusters offered to the participants).

Thematic cluster ‘2. Conservation, connectivity, restoration’ and thematic cluster ‘8. Mainstreaming, sectoral integration, sustainable production’ were very important in survey 2 and had been identified in survey 1 as relating primarily to the CBD’s objective 1 and 2, respectively. Thus, the high priority of these clusters may also be related to the expertise of the two sets of participants – in both cases this was highest in relation to objective 1, and followed closely by objective 2. Nevertheless, while expertise of the participants was highest for objectives 1 and 2, in survey 1 we also checked whether the perceived importance of the objectives corresponded strongly to the level of expertise, which it did not (objective 3 was considered as very important although expertise was comparatively low, see Table 2 on page 6). The mainstreaming theme being important can also be related to this being the CBD’s current focus (at COP13 and COP14). This correspondence could have causality in either direction, either the expertise shows this as a critical theme and the CBD is on the right track by paying attention to it; or, the CBD’s focus on this has crystalized in experts’ minds that this is an essential theme.

Theme ‘4. Policy coherence, governance, enforcement’ was the most highly prioritized cluster by participants (survey 2). In fact, biodiversity and the uses thereof are addressed by an increasing number of policy instruments at a variety of governance levels. However, in the light of the progressing decline of global biodiversity, the political response to the biodiversity crisis seems unsatisfactory. This may explain why participants rank the importance of cluster 4 very high: they may see a strong need for more, improved and better aligned policy processes addressing biodiversity and its sustainable use as well as for a stronger enforcement of existing regulations. Another

possibility is that participants perceive an increasing complexity of biodiversity governance, e.g. due to its tight links with many other policy processes (such as those related to economics and development or climate change). These links also bear a higher potential for inconsistencies among policies (in addition to synergies). Thus, it may also well be that participants attributed high importance to cluster 4 partly because they see a strong need for an increased effort of coordination between these processes. The overview by the Convention on International Trade in Endangered Species of wild fauna and flora – CITES - showing the process leading to the post-2020 framework of the CBD³ is a telling example of the variety of steps in the process and number of potentially related events (at the global level). This issue is one that is increasingly gaining attention from researchers and practitioners, as demonstrated by the recent creation of the ‘Rethinking Biodiversity Governance’⁴ network, which in the lead up to CBD’s post-2020 framework is considering these topics.

It should be noted that both surveys identified clusters that address indirect drivers (clusters 4, 5 and 8 in survey 1 and clusters 4 and 8 in survey 2) as being of particular importance, whereas the cluster ‘3. Particular direct drivers’ ranked rather low in both surveys (containing not more than 8 % of the entries in survey 1 and receiving rank 6 in survey 2). This could suggest that the participants regard tackling the indirect drivers as the most urgent and promising way to make progress toward the CBD objectives and that this could be worth considering when the post-2020 framework of the CBD is negotiated.

4.3. Methodological caveats

Regarding the methodology we used under the given time and human resources constraints, some caveats were identified. First, survey participation among regions, age and sexes was not as balanced as we aimed for, this was largely a result of our networks being stronger in particular regions, the bulk of professional staff active at the global level being in two age categories out of four, and women often being both less present and less visible in the professional world than men, probably more so in the older age group which made up the bulk of participants. The response rate of 15-20%, based on our experience with few previous online surveys, appears satisfactory given the broad range of persons addressed – many of which had had no prior direct contact to the team. Ideally, we would have made further efforts to engage more persons, especially the missing demographics, but we hope that further consultations in the post-2020 CBD process will be targeted at particular regions and demographics as well. Second, related to the clustering, we stated some cautions in the methods section above already: to some degree this clustering depends on the viewer’s lens. We minimized potential for incoherence by having the attribution of key words to particular clusters be done by a single person rather than several, but disciplinary background of course has an influence. For instance, if the person had been a political scientist, perhaps there would have been more differentiation among key words provided around cluster ‘4: Policy

³ <https://cites.org/sites/default/files/notif/E-Notif-2018-063.pdf>

⁴ <https://www.fni.no/news/fni-hosts-expert-network-on-biodiversity-article1538-330.html>

coherence, governance, enforcement’. But this criticism would apply to any person clustering the terms, and only a highly elaborate deliberation process would allow for a more balanced grouping. Despite this possible drawback, we think that the overall direction is robust and is suitable to the aims of this study. Third, regarding the prioritization, we wanted survey participants to prioritise thematic clusters with minimal effort (maximizing the number of responses and completion of the survey). So rather than asking them to give their order of priority for all ten clusters, we decided to ask only for the three most important clusters and count the frequency with which the clusters were considered to be among the top three to provide a prioritization among all. Other ways could have been envisioned but we considered this method to give sufficient information for the purposes of this study.

4.4. Comparison to the regular ‘Horizon Scan’ by Sutherland et al.

The ‘horizon scanning exercise’ documented here clearly differs in many ways from the yearly ‘Horizon Scan of Emerging Issues for Global Conservation and Biological Diversity’ performed by a group of researchers around W. J. Sutherland from Cambridge University. From a methodological perspective, the online survey reported here is a simplified format compared to the Cambridge-method that involves experts also in physical meetings and Delphi procedures (see e.g. Sutherland et al., 2011). With regard to the content, we did not ask for *emerging* issues *per se*, although these may have been included in the responses to survey 1, but most *important* issues. The clusters presented above (see Table 3 and Figure 4) also represent much broader thematic fields than the topics identified by the horizon scan of the Sutherland-group. The latter usually identifies topics that would fit into the cluster ‘3. Particular direct drivers’ – although their issues are usually still *potential* drivers likely to become important – or, even more so, into the cluster ‘10. Neglected issues’ since that is in fact what the horizon scan by Sutherland et al. aims to identify. In many cases, the topics identified by the latter method relate to current or anticipated technological innovations (see e.g. Sutherland et al., 2017). Nevertheless, when applying the lens of the above priority clusters (the three most important clusters from survey 1: 4, 5, 8 and from survey 2: 4, 8, 2, 1), the issues identified by Sutherland et al. can be attributed to these to some extent too: When screening through the issues identified between 2016 and 2018 (see annex 3), it becomes clear that they relate more strongly to cluster ‘8: Mainstreaming, sectoral integration, sustainable production’ and to cluster ‘2: Conservation, connectivity, restoration’ in terms of the promise they hold as well as the risks they pose. Far fewer of these issues relate to the other priority clusters.

In the following paragraphs, we give examples⁵ of some of the emerging issues identified by Sutherland et al. (2016, 2017, 2018) that relate to the top prioritized clusters of survey 2: ‘4. Policy coherence, governance, enforcement’, ‘8: Mainstreaming, sectoral

⁵ All emerging issues attributed to cluster 1 were mixed with other clusters, so for cluster 1 we use examples that bridge across clusters to illustrate emerging issues; but the other examples were selected because attribution to clusters was clearer towards one cluster rather than many.

integration, sustainable production’, ‘2: Conservation, connectivity, restoration’ and ‘1. Awareness, behaviour, education’.

4.4.1. Cluster ‘4: Policy coherence, governance, enforcement’

For cluster 4, ‘International Collaborations to Encourage Marine Protected Area Expansion in the High Seas’ (identified as an emerging issue by Sutherland et al., 2018) have been moving forward with the UN General Assembly (UNGA) having drafted key elements of a legal instrument to protect biodiversity in the high seas (i.e. in areas beyond national jurisdiction which cover 44% of the Earth’s surface), which would be managed under the UN Convention for the Law of the Sea UNCLOS. This would allow for more concerted conservation management, including the use of marine protected areas, in the high seas, where environmental policy is currently still piece-meal.

The vastness and remoteness of many marine ecosystems allow for illegal, unreported and unregulated (IUU) fishing in many areas, but ‘Satellite Access to Shipborne Automatic Identification Systems’ (identified by Sutherland et al., 2016) hold promise for decreasing these activities. With the increased obligation of vessels to carry automatic identification systems which show the location and speed of vessels, IUU fishing, as well as identification of illegal transits, dumping or spillage will increase compliance with emissions, fishing and other regulations.

4.4.2. Cluster ‘8: Mainstreaming, sectoral integration, sustainable production’

For cluster 8, ‘Artificial Glaciers to Regulate Irrigation’ could be a relevant issue (identified as an emerging issue by Sutherland et al., 2016). Artificial glaciers have been created e.g. in the Himalayas in order to support agriculture in the face of climate change, which relates to sustainable production. Indeed, since glacial melt timing and availability has changed due to climate change, water is no longer available in the growing season and therefore has been diverted in winter to freeze and melt at the right time again. While positive social effects have been reported in addition to the increase in the time period crops can be grown, land use change could also have negative environmental consequences. The consequences of changes in social structure due to more profitable crops and enhanced yields was not mentioned but may also be worthy of consideration.

‘Sand Becoming a Scarce Resource’ (identified as an emerging issue by Sutherland et al., 2017) is an issue for many sectors, e.g. manufacturing of concrete, production of glass, asphalt, electronics. As demand grows, risks and opportunities for biodiversity considerations in these sectors are changing. Sand mining can negatively affect habitats, but ecosystem-based designs of mining sites are being developed, providing an opportunity for mainstreaming biodiversity issues into the resource extraction sector.

4.4.3. Cluster ‘2. Conservation, connectivity, restoration’

For cluster 2, ‘Genetic Control of Mammal Populations’ is an example of an emerging issue identified by Sutherland et al. (2018). This method is increasingly being planned and carried out, e.g. to control invasive rodents on islands using gene editing and gene-

drive technologies (which spread deleterious alleles in populations to reduce the number of rodent individuals). The effects can be dramatic (e.g. model projections for the use of CRISPR-Cas9⁶ show that an island mouse population of 50 000 could be erased within 4-5 years), but while the intention is to restore ecosystems, actual ecological consequences of these manipulations like cascading effects in food webs, or spreading to non-target regions or species, are unknown.

‘Manipulating Coral Symbionts to Avoid Mass Coral Bleaching’ via genetic manipulation or traditional transfer and release of resistant strains (identified as an emerging issue by Sutherland et al., 2017) is another issue where risks of disease transfer (due to human-created connectivity) or cascade responses are not yet fully understood.

Connectivity is also central to the ‘Effects of Border Fences on Wild Animals’ issue (identified as an emerging issue by Sutherland et al., 2017). Indeed, political developments may lead to more borders fencing in the USA and Europe, which restricts the movement and therefore connectivity of transboundary populations, including protected species.

4.4.4. Cluster ‘1. Awareness, behaviour, education’

For cluster 1, ‘Effect of Culturomics on Conservation Science, Policy, and Action’ was identified in 2018 in the Sutherland Horizon-Scan. Culturomics is a research field that analyses large databases to understand human culture and behaviour. The insights gained can be used to enhance conservation efforts by targeting particular groups, or optimizing communication to enhance conservation; but on the other hand, “it is probable [that] organisations seeking to counteract or prevent conservation policy and actions” will apply these insights in their interest (Sutherland et al., 2018).

Another interesting issue is the development of ‘Artificial Superintelligence’ (identified by Sutherland et al., 2016). Artificial intelligence is already used in the environmental field e.g. in early detection and control of pests or diseases, as well as conserving energy in buildings. The issue, however, is that projections exist that by 2050 computers may become more capable than humans to improve their function, but discussions on embedding human values into computer software now to prevent socially undesirable outcomes later may not be taking environmental issues sufficiently or at all into account - a lack of awareness now that could influence future behaviour of machines.

Thus, there are a number of emerging issues from recent horizon scanning exercises that directly relate to the themes participants provided us with in the expert consultation process, and it may be beneficial to take the above issues and others (see annex 3) into account when thinking about the direction of the post-2020 framework of the CBD.

⁶ Clustered regularly interspaced short palindromic repeats

4.5. Relating the prioritized thematic clusters to the IPBES assessments of 2018

Strong thematic overlaps exist also between the four thematic clusters discussed above and issues tackled by the IPBES assessments completed in 2018:

Issues subsumed under cluster ‘4: Policy coherence, governance, enforcement’ are addressed in detail by all IPBES assessments completed in 2018 as they all contain chapters dedicated to the evaluation of possible policy responses (IPBES/6/15/Add.1, 2018; IPBES/6/15/Add.2, 2018; IPBES/6/15/Add.3, 2018; IPBES/6/15/Add.4, 2018; IPBES/6/15/Add.5, 2018). In addition, the IPBES assessments also make suggestions on which policy options would very likely help in combating the adverse effects of the ongoing degradation of the Earth’s ecosystems. Among those options are the following: education and awareness-raising (corresponding to cluster ‘1: Awareness, behaviour, education’ of this study), measures that protect or restore biodiversity and ecosystem services (corresponding to cluster ‘2. Conservation, connectivity, restoration’ of this study), and the elimination of incentives harmful to biodiversity and ecosystem services as well as the mainstreaming of biodiversity across sectors (corresponding to cluster ‘8: Mainstreaming, sectoral integration, sustainable production’ of this study).

In the following, these thematic overlaps are illustrated in more detail with reference to the thematic IPBES assessment on land degradation and restoration (LDR assessment) and the regional IPBES assessment for Europe and Central Asia (ECA assessment):

4.5.1. Thematic overlaps with the IPBES LDR assessment

The LDR assessment suggests e.g. the following steps (amongst others) to prevent irreversible degradation of ecosystems more effectively and to accelerate the implementation of restoration measures: “greater commitment and effective cooperation” with regard to multilateral environmental agreements, “greater alignment” of policy agendas (e.g. with regard to “food, energy, water, climate, health, rural, urban and industrial development”), the adoption of “holistic policy responses” as well as “institutional coordination, multi-stakeholder engagement and the development of governance structures that bridge different government functions, types of knowledge, sectors and stakeholder groups (including consumers)” (IPBES/6/15/Add.5, 2018, p. 7-8 and 25; corresponding to cluster 4 of this study). Issues subsumed under cluster 8 of this study – e.g. related to the keywords: internalization of negative externalities, certification schemes, commodity chains, tele coupling, market forces, system changes (e.g. reducing harmful subsidies), and sustainable agriculture / fishery / forestry – are among the themes most prominently discussed in the LDR assessment. In fact, “rapid expansion and unsustainable management of croplands and grazing lands” is identified as the most extensive global driver of land degradation (IPBES/6/15/Add.5, 2018, p. 6). Accordingly, high consumption lifestyles and the increasing demand for traded commodities are problematized, leading to the conclusion that – depending on regional and national contexts – the following actions and pathways need to be part of the overall strategy to combat land degradation: “internalizing and appropriately regulating the environmental and social costs of traded commodities”, “eliminating perverse incentives that promote degradation”, “more land-, energy-, water-, and material-efficient and low-

emission production systems for food, fibre, bioenergy, mining, and other commodities” as well as “sustainable land management practices in croplands, rangelands, forestry, water systems [...]” (IPBES/6/15/Add.5, 2018, p. 8, 21 and 27).

The LDR assessment also mentions “more effective protected area systems”, “integrated land use planning and watershed management” and “private and community based conservation” as possible options to address land degradation (IPBES/6/15/Add.5, 2018, p. 26-27; corresponding to cluster 2 of this study). Last but not least, the LDR assessment calls for “education and awareness-raising at the individual level, especially among consumers” and in general, for better and more open-access information on the impacts of traded commodities (IPBES/6/15/Add.5, 2018, p. 7 and 24; corresponding to cluster 1 of this study).

4.5.2. Thematic overlaps with the IPBES ECA assessment

Not surprisingly, also the policy options highlighted by the ECA assessment correspond closely to the thematic clusters prioritized in survey 2. The assessment suggests e.g. that “long-term transformation through continuous education, knowledge-sharing and participatory decision-making characterize the most effective pathways for moving towards sustainable futures (addressing issues covered by clusters 1, 4 and 8 of this study, IPBES/6/15/Add.4, 2018, p. 4). Furthermore, it stresses that “well-designed, context-specific mixes of policy instruments”, an “improved coordination” across sectors as well as progress with regard to the mainstreaming of biodiversity and ecosystem services “into all sectoral policies, plans, programmes, strategies and practices” is needed (IPBES/6/15/Add.4, 2018, p. 5), which corresponds to the thematic clusters 4 and 8. The ECA assessment also points out that large parts of the assessed region negatively affect biodiversity and ecosystem services “both within Europe and Central Asia and other parts of the world” due their high consumption of natural resources – addressing an issue central to the thematic cluster 8 (IPBES/6/15/Add.4, 2018, p. 10). Related to the issue of production and consumption, it is noted that some “sustainable approaches to agriculture [...] mitigate the adverse effects of intensive agriculture” but that “the major trend across the region is intensification [...]” that reduces biodiversity and ecosystem services (IPBES/6/15/Add.4, 2018, p. 17) – lending support to the prioritization of cluster 8.

Issues related to thematic cluster ‘2. Conservation, connectivity, restoration’ are also addressed in the ECA assessment, e.g. when the expansion of protected areas within the region is acknowledged, together with the cautionary note that “this alone cannot prevent biodiversity loss” (IPBES/6/15/Add.4, 2018, p. 17).

4.6. Relating the prioritized thematic clusters to issues of the TEEB study

The full title of the TEEB synthesis report published in 2010 reads: “The Economics of Ecosystems and Biodiversity. Mainstreaming the economics of nature: A synthesis of the approach, conclusions and recommendations of TEEB” (TEEB, 2010). Thus, “mainstreaming” was the central issue and therefore many issues discussed by TEEB are closely linked to cluster ‘8: Mainstreaming, sectoral integration, sustainable production’.

Among those are, in particular, all approaches that better allow to “incorporate the values of ecosystem services and biodiversity into economic decision making” (TEEB, 2010, p. 28). These include issues related to economic accounting (evaluating environmental externalities and incorporating them in product value chains or national accounts) and to economic incentives (such as market prices, taxes and subsidies). Participants of survey 1 mentioned related keywords several times in the context of CBD objective 1 (conservation) and CBD objective 2 (sustainable use), but not in the context of CBD objective 3 (access and benefit sharing).

5. Outlook

The results of this study will contribute to the discussion paper WWF Germany is preparing for input to the post-2020 CBD strategic framework development process.

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7. Annexes

7.1. Annex 1: Survey 1 questions

WWF information horizon scanning



Background and aim of this survey

The Convention on Biological Diversity (CBD) is the most comprehensive international agreement dealing with biodiversity. The CBD's current Strategic Plan (<https://www.cbd.int/sp/>) ends in 2020 and discussions about a post-2020 strategic framework have already begun. WWF Germany intends to contribute to these discussions and to support Parties and stakeholders in preparing positions for the official CBD negotiations by producing a discussion paper (see WWF project information - <http://www.biodiv.de/en/projekte/aktuell/cbd-strategy.html>).

WWF Germany is, inter alia, compiling expert views (with this survey) on important topics that will be key in relation to biodiversity in the next decade and may thus be considered for inclusion in such a follow-up strategy. We're using a horizon-scanning-like process to identify such topics (see WWF information horizon scanning exercise http://www.biodiv.de/fileadmin/user_upload/PDF/Projekte-aktuell/180122_WWF_Info_CBD_post_2020_horizon_scanning_final.pdf).

In this survey, you will be asked questions relating to the CBD's three objectives:

Objective 1: the conservation of biological diversity

Objective 2: the sustainable use of its components

Objective 3: the fair and equitable sharing of the benefits arising out of the utilization of genetic resources

We invite you to fill in this survey (9 questions) and take 5-15 minutes to contribute to shaping the CBD's future strategy.

Data protection

We request your name as part of the survey to be able to contact to you for follow-up or questions. If you do NOT wish to be contacted again, you can send an email to lisa.marquard@ufz.de with "opt out" in the title. Please note that we will not associate your name with any information you provide in this survey in any published format or provide this information to external parties (only project Partners: WWF Germany, Institute for Biodiversity - ibn, Helmholtz-Centre for Environmental Research - UFZ). You are of course free to exit the survey at any time. Thank you for your time.

1. Last name:

2. First name:

3. Affiliation:

4. Question 1: Of the three objectives of the Convention (CBD), I consider myself most knowledgeable about...(multiple answers possible)

Wählen Sie alle zutreffenden Antworten aus.

- ☐ 1. Conservation of biological diversity
- ☐ 2. Sustainable use of its components
- ☐ 3. Fair and equitable sharing of the benefits arising out of the utilization of genetic resources

5. Question 2: I consider the following objective(s) of the Convention (CBD) to be the most important... (multiple answers possible)

Wählen Sie alle zutreffenden Antworten aus.

- ☐ 1. Conservation of biological diversity
- ☐ 2. Sustainable use of its components
- ☐ 3. Fair and equitable sharing of the benefits arising out of the utilization of genetic resources

3a - Conservation of Biological Diversity

Question 3a: What, in your opinion, are the top 3 (most important) topics that need to be included in the new Strategic Plan of the Convention (CBD) to achieve its objective on the conservation of biological diversity? Please provide only keywords here (3a) and specifications below (3b)

6. **Topic 1 (keyword):**

7. **Topic 2 (keyword):**

8. **Topic 3 (keyword):**

3b - Conservation of Biological Diversity

Question 3b: Please expand on the keywords here and feel free to include your views on why these topics are important and how they are linked to other policy processes such as Agenda 2030, Rio Conventions, Biodiversity conventions...Please formulate your ideas in no more than 120 words per topic.

9. **Topic 1 :**

10. **Topic 2:**

11. **Topic 3:**

4a - Sustainable Use

Question 4a: What, in your opinion, are the top 3 (most important) topics that need to be included in the new Strategic Plan of the Convention (CBD) to achieve its objective on sustainable use of the components of biological diversity? Please provide only keywords here (4a) and specifications below (4b)

12. **Topic 1 (keyword):**

13. **Topic 2 (keyword):**

14. **Topic 3 (keyword):**

4b - Sustainable Use

Question 4b: Please expand on the keywords here and feel free to include your views on why these topics are important and how they are linked to other policy processes such as Agenda 2030, Rio Conventions, Biodiversity conventions...Please formulate your ideas in no more than 120 words per topic.

15. **Topic 1:**

16. **Topic 2:**

17. **Topic 3:**

5a - Access and Benefit Sharing

Question 5a: What, in your opinion, are the top 3 (most important) topics that need to be included in the new Strategic Plan of the Convention (CBD) to achieve its objective on fair and equitable sharing of the benefits arising out of the utilization of genetic resources? Please provide only keywords here (5a) and specifications below (5b)

18. **Topic 1 (keyword):**

19. **Topic 2 (keyword):**

20. **Topic 3 (keyword):**

5b - Access and Benefit Sharing

Question 5b: Please expand on the keywords here and feel free to include your views on why these topics are important and how they are linked to other policy processes such as Agenda 2030, Rio Conventions, Biodiversity conventions...Please formulate your ideas in no more than 120 words per topic.

21. **Topic 1:**

22. **Topic 2:**

23. **Topic 3:**

Optional additional information

24. **Question 6: I identify my gender as**

Markieren Sie nur ein Oval.

- ☐ Man
- ☐ Woman
- ☐ Trans
- ☐ other
- ☐ Prefer not to disclose

25. **Question 7: My age group is:**

Markieren Sie nur ein Oval.

- ☐ 0 - 24
- ☐ 25 - 44
- ☐ 45 - 64
- ☐ 65 - 74
- ☐ 75 +

26. Question 8: My geographical region:

Markieren Sie nur ein Oval.

- ☐ Africa
- ☐ Asia
- ☐ Australia / Oceania
- ☐ Europe
- ☐ North America
- ☐ South America

27. Question 9: Please choose an option for follow-up:

Markieren Sie nur ein Oval.

- ☐ I am happy to be contacted again in the context of this project (to hear about the results, or potentially for the second online survey on the prioritization of themes, depending on what expertise will be required).
- ☐ Please do not contact me again

Thank you for completing this survey!

Supported by:



Federal Ministry for the
Environment, Nature Conservation,
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based on a decision of the German Bundestag

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7.2. Annex 2: Survey 2 questions

WWF Horizon Scanning 2



Background and aim of this survey

The Convention on Biological Diversity (CBD) is the most comprehensive international agreement dealing with biodiversity. The CBD's current Strategic Plan ends in 2020 and discussions about a post-2020 strategic framework have already begun. WWF Germany intends to contribute to these discussions and to support Parties and stakeholders in preparing positions for the official CBD negotiations by producing a discussion paper (see WWF project information - <http://www.biodiv.de/en/projekte/aktuell/cbd-strategy.html>).

WWF Germany has compiled expert views on important topics that will be key in relation to biodiversity in the next decade and may thus be considered for inclusion in such a follow-up strategy. This was done in a previous survey of expert views to identify such topics (see WWF information horizon scanning exercise - http://www.biodiv.de/fileadmin/user_upload/PDF/Projekte-aktuell/180122_WWF_Info_CBD_post_2020_horizon_scanning_final.pdf).

Broadly related topics from the previous survey have now been clustered. In the present survey of expert views, we ask you to prioritise these clusters according to the urgency with which Parties to the Convention should address them.

We invite you to fill in this survey and take ca. 5-7 minutes to contribute to shaping the CBD's future strategy.

Data protection

We request your name as part of the survey to be able to contact to you for follow-up or questions. If you do

NOT wish to be contacted again, you can opt out here. Please note that we will not associate your name with any information you provide in this survey in any published format or provide this information to external parties (only project Partners: WWF Germany, Institute for Biodiversity - ibn, Helmholtz-Centre for Environmental Research - UFZ).

You are of course free to exit the survey at any time. Thank you for your time.

1. **Last name:**

2. **First name:**

3. **Affiliation:**

4. **Of the three objectives of the Convention (CBD), I consider myself relatively more knowledgeable about:**

Wählen Sie alle zutreffenden Antworten aus.

- ☐ 1. Conservation of biological diversity
- ☐ 2. Sustainable use of its components
- ☐ 3. Fair and equitable sharing of the benefits arising out of the utilization of genetic resources

Please consider and tick which three clusters you consider to be the most urgent for Parties to address in the next decade in order to achieve the CBD's three objectives and the 2050 vision.

5. Please tick which three clusters you consider to be the most urgent...

Wählen Sie alle zutreffenden Antworten aus.

- ☐ 1. Awareness, behaviour, education
- ☐ 2. Conservation, connectivity, restoration
- ☐ 3. Particular direct drivers
- ☐ 4. Policy coherence, governance, enforcement
- ☐ 5. Capacity building, (traditional) knowledge and knowledge generation
- ☐ 6. Development, human well-being
- ☐ 7. Financing mechanisms
- ☐ 8. Mainstreaming, sectoral integration, sustainable production
- ☐ 9. Ethics, rights, cultural diversity
- ☐ 10. Neglected issues

6. Background information on clusters

Markieren Sie nur ein Oval.

- ☐ Yes, I want more details on the clusters before making my decision
 - ☐ No thanks, I've identified the three most important clusters and am ready to wrap up soon
- Weiter mit Frage 7*

Background information on clusters

Below, you will find keywords that illustrate which kinds of topics were grouped into each of the ten clusters you are prioritising in this survey. We are aware of the fact that the clusters are not clearcut and partly overlapping

1. Awareness, behaviour, education

awareness rising, sensitisation, education, communication

2. Conservation, connectivity, restoration

conservation measures for terrestrial, marine or freshwater species (area-based or species-specific), protected areas, connectivity, restoration, reintroductions, extinctions

3. Addressing particular direct drivers

climate change, pollution, invasive species, poaching, or other particular drivers that you consider as very important but that - according to your opinion - don't fit into the category "Neglected issues" (see also cluster 10)

4. Policy coherence, governance, enforcement

good / better / more effective / local / inclusive governance, governance structures, policy coherence, effective implementation, compliance, enforcement, particular provisions such as given by the CBD framework (and possible general or structural modifications thereof such as the adoption of new targets or protocols), the necessity to involve all relevant stakeholders, participation (e.g. of developing countries) in CBD process, the call for global / regional / national / local approaches

5. Capacity building, knowledge, knowledge generation

capacity building, science, knowledge generation, innovations, specific knowledge gaps and the call for addressing them, e.g. via monitoring of biodiversity or by monitoring of policy implementation and policy effectiveness, reporting, sharing of information, addressing fundamental / conceptual issues (such as "definition of sustainability"), integration / use of traditional and local knowledge

6. Development, human well-being

development, poverty reduction, socio-economics, human well-being, health, livelihoods, sufficient income, food security, benefits to people

7. Financing mechanisms

nature funds, financial compensation, investments to promoting biodiversity conservation, market-based instruments

8. Mainstreaming, sectoral integration, sustainable production

sectoral integration, green accounting, internalization of negative externalities, certification schemes, commodity chains, telecoupling, market forces, system changes (e.g. reducing harmful subsidies), energy, resource-use, operation within planetary boundaries / safe limits, sustainable agriculture / fishery / forestry, social-ecological systems, ecological landscapes, compatibility between human activities and biodiversity conservation, balance of needs, landscape stewardship, ecosystem services

9. Ethics, rights, cultural diversity

the right to live, property rights, indigenous peoples rights, intra- and inter-generational justice, integration of relevant claims, fairness, respect, the necessity to keep promises, responsibility, respect for cultural diversity, cultural values and the necessity to conserve biocultural diversity

10. Addressing neglected issues

microorganisms, animal welfare, freshwater biodiversity, novel ecosystems, digitalization, or other specific issues that you regard to have been insufficiently addressed by the CBD

PLEASE RETURN TO THE PREVIOUS PAGE by clicking on BACK, and tick your three priority clusters

Optional additional information

7. Optional 1: I identify my gender as

Markieren Sie nur ein Oval.

- ☐ Man
- ☐ Woman
- ☐ Trans
- ☐ other
- ☐ Prefer not to disclose

8. Optional 2: My age group is:

Markieren Sie nur ein Oval.

- ☐ 0 - 24
- ☐ 25 - 44
- ☐ 45 - 64
- ☐ 65 - 74
- ☐ 75 +

9. Optional 3: My geographical region:

Markieren Sie nur ein Oval.

- ☐ Africa
- ☐ Asia
- ☐ Australia / Oceania
- ☐ Europe
- ☐ North America
- ☐ South America

Thank you for completing this survey!

10. Please choose an option for follow-up:

Markieren Sie nur ein Oval.

- ☐ I am happy to be contacted again in the context of this project (to hear about the results, or potentially for the second online survey on the prioritization of themes, depending on what expertise will be required).
- ☐ Please do not contact me again

7.3. Annex 3: Emerging issues for global conservation and biological diversity

Table composed according to Sutherland et al. 2016, 2017 and 2018

Year of the scan	Emerging issue	Top thematic cluster(s) the emerging issue relates to	Some key words on the relation between the emerging issue and the thematic clusters of this study
2018	Thiamine deficiency as a possible driver of wildlife population extinctions		(general conservation)
2018	Geographic expansion of chronic wasting disease		(general conservation; landscape stewardship)
2018	Breaks in the dormancy of pathogenic bacteria and viruses in thawing permafrost		(general conservation)
2018	RNA-based, gene-silencing pesticides		(general conservation)
2018	Genetic control of mammal populations	2	cascading effects, consequences on non-target populations or ranges
2018	Use of lasers in commercial deep water fishing	2, 8	in principle: conservation & sustainable fisheries, but with substantial risks for undesirable effects
2018	Use of metal-organic frameworks (MOFs) for harvesting atmospheric water	8	resources use, sustainable production, landscape stewardship
2018	Aquaporins engineered to increase plant salt tolerance	8	restoration, connectivity, ecological landscapes, landscape stewardship
2018	Effect of culturomics on conservation science, policy, and action	1,4	awareness/behaviour/education; and to a lesser extent governance, because can be used against implementation and compliance
2018	Changes in the global iron cycle	8	resource use, compatibility of human activities and biological conservation (possible consequences of ocean fertilisation)
2018	Underestimation of soil carbon emissions	5	knowledge generation
2018	Rapid climate changes on the Qinghai-Tibet plateau		(knowledge generation. NB: Many themes are related somehow to knowledge generation because of unknown effects that remain to be studied or seen)
2018	International collaborations to encourage marine protected area expansion in the high seas	4	governance and enforcement
2018	Belt and road initiative in China	8, 2	potential for mainstreaming; and negative effect on conservation (due to extinctions and introductions)
2018	Potential effects on wildlife of increases in electromagnetic radiation	2	connectivity

2017	Manipulating coral symbionts to avoid mass coral bleaching	2	conservation/connectivity/ restoration - reintroductions, also risks writ 'assisted evolution' consequences
2017	The use of robots to target invasive marine species	2	removing invasive species
2017	Electronic noses to combat illegal wildlife trade and improve biosecurity	2	for conservation/connectivity/restoration
2017	Bumblebee invasions in new regions	2	negative effects on conservation
2017	Extensive use of bacteria and fungi to manage agricultural pests	5,2	knowledge generation because lacking understanding, also on effects regarding conservation
2017	Sand becoming a scarce resource	8	mainstreaming, sustainable production, innovation
2017	Effects of border fences on wild animals	2	conservation, connectivity
2017	Effects of changing waste management on animal movements and populations	2,8	connectivity; and social-ecological systems
2017	Increasing wind speeds at the sea surface	2,8	connectivity; social-ecological systems, innovation, system changes/energy, compatibility human activities & conservation
2017	Development of floating wind farms	8, 2	mainstreaming, sustainable production, energy; connectivity
2017	Creating fuel from bionic leaves	8	mainstreaming, energy, innovation
2017	Lithium-air batteries	8	energy, compatibility human activities & conservation
2017	Reverse photosynthesis for biofuel production	8	energy, landscapes, compatibility between human activities & conservation
2017	Mineralizing anthropogenic carbon dioxide	8	innovation, (neg effect on) sustainability, innovation
2017	Blockchain technology	8, 4, 2	commodity chains; governance/implementation/enforce ment; conservation
2016	Artificial superintelligence	1,2,8	awareness/education/communicatio n; general conservation; mainstreaming
2016	Changing costs of energy storage and consumption models	8,5,2	energy/mainstreaming; knowledge generation/monitoring; general conservation
2016	Ecological civilization policies in China	4,1	policy coherence/governance; awareness and international example of behaviour/education
2016	Electric pulse trawling	8, 2, 4	sustainable fisheries - potential negative effects on conservation and enforcement/governance issues
2016	Osmotic power	8	compatibility human activities & conservation; (maybe sustainable production/greener energy)
2016	Managed Bees as Vectors	8, 2	social-ecological systems; neg. effects

on conservation

2016	Unregulated fisheries in the central Arctic Ocean threaten expanding fish stocks	4, 8	governance; and (un)sustainable fisheries
2016	Increasing extent of construction of artificial oceanic islands	8, 4	mainstreaming, landscapes, innovation; governance
2016	Increasing aquatic concentrations of testosterone	2,8	conservation; compatibility human activities & conservation
2016	Effects of engineered nanoparticles on terrestrial ecosystems		(compatibility human activities & conservation)
2016	Satellite access to shipborne automatic identification systems	4	governance, effective implementation, enforcement, compliance
2016	Passive acoustic monitoring to prevent illegal activity	8, 4, 1	mainstreaming monitoring; enforcement; awareness
2016	Synthetic body parts of endangered animals	2	conservation/reintroduction
2016	Artificial glaciers to regulate irrigation	8	mainstreaming/resource use, social-ecological systems, system change
2016	Invasive species as reservoirs of genetic diversity	2	conservation/reintroduction