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Country Representatives' Perceptions of the Biodiversity Science-Policy Interface

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Abstract: Biodiversity knowledge is communicated by scientists to policymakers at the biodiversity “science-policy interface” (SPI). Although the biodiversity SPI is the subject of a growing body of literature, gaps in our understanding include the efficacy of mechanisms to bridge the interface, the quality of information exchanged between science and policy, and the inclusivity of stakeholders involved. To improve this understanding, we surveyed an important but under-studied group—biodiversity policymakers and scientific advisors representing their respective countries in negotiations of the Convention on Biological Diversity (CBD) and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). We found that a wide variety of SPI mechanisms were being used. Overall, they were considered to be sufficiently effective, improving over time, and supplied with information of adequate quality. Most respondents, however, agreed that key actors were still missing from the biodiversity SPI.

Keywords: biodiversity policy; biodiversity conservation; Convention on Biological Diversity (CBD); Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)



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1. Introduction

Biodiversity is gaining recognition for its role in supporting human livelihoods. Meanwhile, global change, mostly through human activities, is increasingly threatening biodiversity. Continued development and refinement of strategies and policies are required to conserve biodiversity adequately, from the local level to the global.

Biodiversity knowledge comes from a diverse array of sources, the most prominent being scientific research. The results of such research are relayed to policymakers across the biodiversity “science-policy interface” (SPI). Despite the importance of this interface, biodiversity-related SPI literature has reported a general failure of communication between scientists and policymakers [1–5]. Past publications have proposed conceptual models to address these inadequacies [6,7], investigated specific successes and failures of collaboration between science and policy [8–11], reviewed the literature to identify important attributes of successful SPI mechanisms [12,13], and surveyed respondents regarding barriers to the communication of biodiversity science to policymakers [2,14].

Other aspects of the biodiversity SPI are less well-reported. These gaps include information on the most effective mechanisms for communicating across the SPI, the degree to which such mechanisms have improved over time, the quality of the information available to be conveyed from science to policy, and whether all of the necessary stakeholders are engaged at the SPI. Furthermore, previous studies have not specifically investigated the perceptions of respondents who represent their countries in international biodiversity policymaking and who are, thus, responsible for developing the international frameworks that guide the transfer of knowledge from science to policy at the national level. We therefore set out to better understand, first-hand through a survey, how country representatives

involved in international biodiversity policymaking perceive SPI mechanisms in their own countries. We also investigated whether such respondents' views differed with their roles as policymakers or scientists.

The United Nations-affiliated institutions that most prominently encourage and facilitate knowledge transfer at the biodiversity SPI are the Convention on Biological Diversity (CBD) and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). The CBD is the largest and most comprehensive multilateral agreement on biodiversity. CBD decisions are reached by consensus among national government representatives at meetings of the Conference of the Parties (COP) to the convention. The approval of international strategies and targets is among the most important such decisions, as these are intended to provide a framework for strategies and targets at the national level. CBD subsidiary bodies, composed of delegations representing the same national governments, provide the COP with advice relating to the implementation of the convention. IPBES, meanwhile, is described as an independent intergovernmental body established to strengthen the SPI for biodiversity. IPBES is best known for coordinating policy-relevant international assessments of biodiversity, which are negotiated and approved by representatives of the national governments that constitute the membership of the platform.

2. Materials and Methods

To understand how national representatives perceive biodiversity SPI mechanisms in their respective countries, we conducted a questionnaire survey between June and November 2019. As shown in Table 1, we asked respondents to specify: how they perceived their own work background (i.e., as primarily a "policymaker", a "scientist", or a combination of these); their best current mechanisms for communicating across the SPI (question A); the current efficacy of those mechanisms (question B) compared with mechanisms in place about 10 years ago (question C); their views on the quality of information available for communicating across the interface (question D); and which key actors, if any, were missing in the process of communicating science to policy (question E). Questions A, B, C, and E were asked with the intention of determining correlations in effectiveness between the various mechanisms. Question D was asked on the assumption that policymakers would be more likely to act on higher quality information, while scientists would be more likely to communicate information that they considered to be of high value.

Table 1. Selected questions, and their answer options, for the survey on perceptions about the biodiversity science-policy interface.

Selected Survey Question	Respondents' Answer Options
A. What do you think is the best way in which scientific information on biodiversity is communicated to national-level policymakers in your country?	Open ended; any answer could be provided
B. How well is this mechanism bridging the gap between policy and science?	Multiple choice: poorly; not very well; quite well; very well; don't know
C. How well is this mechanism bridging the gap compared with the best science-policy communication about 10 years ago?	Multiple choice: less well; the same; better; don't know
D. How would you describe the quality of available information that is communicated with this mechanism?	Multiple choice: poor; below the required level; good enough; very good
E. Are there any key actors (key people or key roles) who are not yet taking part in the process of communicating science to policy?	Open ended; any answer could be provided

Respondents were CBD and/or IPBES country representatives, or other members of delegations to meetings of the CBD COP and/or IPBES plenary, where decisions are made in the context of these two organizations. To test the survey and ensure a general understanding of its questions, the first 16 respondents were interviewed in person at a meeting of the IPBES plenary. Thereafter, individualized emails were sent to all relevant CBD country representatives, and IPBES country representatives with whom the authors

were familiar, to complete the short questionnaire. We did not send follow-up emails when we received no reply. Out of 414 people contacted, 79 responded, for a total of 95 respondents.

All of the responses were entered into a single spreadsheet. The answers to the open response questions (questions A and E) were manually coded and categorized. For the multiple-choice questions related to respondents' perceptions of the SPI mechanisms (questions B, C, and D), we represented the data as ordinal (ranked) data.

For questions B, C, and D, we conducted Mann–Whitney U tests [15] to determine whether there were statistically significant differences between the perceptions of different groups of respondents (policymakers, scientists, or a combination of policymakers and scientists). This indicated no significant difference between the groups' responses. *p*-Values were calculated using the exact method given in Cheung and Klotz [16], and we rejected the null hypothesis when $p < 0.05$.

We compared the responses of those who identified themselves as scientists with those who identified themselves as policymakers, based on the hypothesis that scientists' and policymakers' perceptions of SPI effectiveness and information quality may generally differ (e.g., policymakers may perceive SPIs as being more effective, while scientists may perceive the information quality as being higher). We also compared the combined responses of scientists and policymakers (i.e., aggregating those who identified themselves as either a scientist or policymaker in question A into a single group) with those who identified themselves as a "mix" (usually policymakers with a scientific background), based on the hypothesis that mixed respondents, having both a scientific and policymaking background, may generally perceive SPI effectiveness and information quality differently than respondents having either a scientific or policymaking background.

3. Results

Ninety-five respondents from 74 countries across all five United Nations regions responded to the survey. Twenty-one countries had two respondents each, while the rest had one each. Twenty-two respondents identified themselves as scientists, 36 as policymakers, and 36 as a mix of scientist and policymaker. One respondent could not be placed in any of these three categories and was thus excluded from certain analyses.

3.1. Question A: Mechanisms by Which Science Is Communicated to Policymakers

To summarize the responses to question A, we grouped the mechanisms reported as being the most effective for conveying scientific information into seven categories (Figure 1). These categories were, in order of descending prominence: documents, including reports, briefs, articles and official documentation adopted by government ($n = 27$); meetings, including workshops, presentations and seminars ($n = 20$); dedicated groups such as committees, working groups, and organizations or agencies set up to support government ($n = 12$); personal communication by phone or face-to-face ($n = 12$); public media including television and websites ($n = 9$); participation in delegations ($n = 5$), particularly by scientists or others with scientific expertise to advise government; collaboration, usually on projects or the compilation of strategies ($n = 3$); and notifications from the Secretariat of the Convention on Biological Diversity ($n = 2$).

Of the 95 respondents, 21 named more than one mechanism as being the most effective; in such cases, we weighted each named mechanism equally. Thirty respondents misunderstood this question, in most cases assuming it to be enquiring about the type of message to be relayed by those mechanisms.

3.2. Questions B, C, D: Perceptions of SPI Effectiveness and Information Quality

Although 30 of the respondents misunderstood question A, it was obvious that their answers to subsequent questions referred to the mechanisms used to communicate across the SPI within their governments. Their responses to questions B, C, and D were, therefore, considered in the analysis. Responses to questions B, C, and D are shown in Figures 2–4.

The data gathered for question B revealed that all 3 categories of respondent perceived the effectiveness of SPI mechanisms according to a normal distribution, with most indicating that mechanisms were faring “quite well” or “not very well” (Figure 2). We found no significant difference between the effectiveness ratings reported by scientists versus policymakers nor between scientists and policymakers combined versus mixed respondents. All three types of respondents tended to perceive their SPI mechanisms as having improved over the past 10 years (Figure 3), but no significant difference was found between the different groups. There was also no significant difference in perception between the different groups regarding the quality of information conveyed through current SPI mechanisms (Figure 4), with the majority of responses from each group being either “good enough” or “very good”.

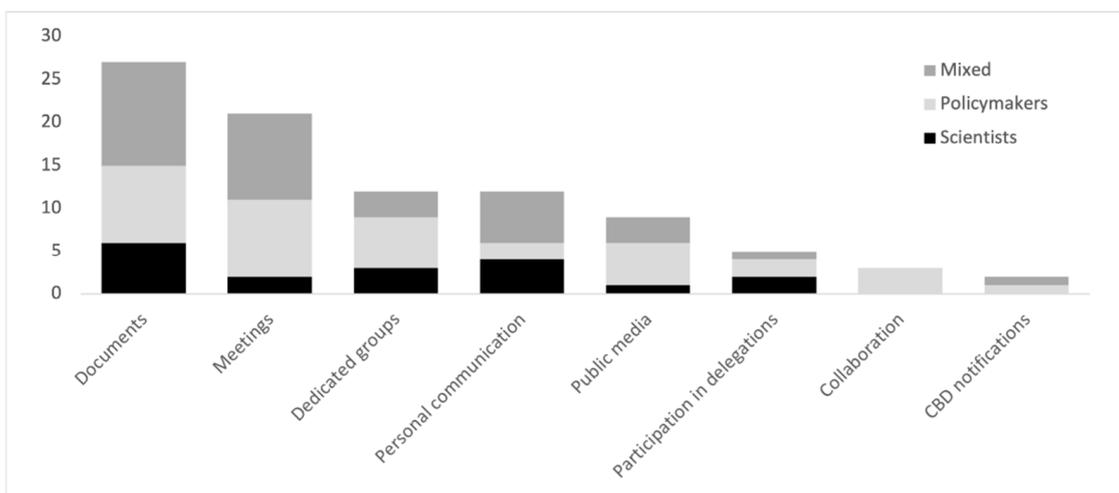


Figure 1. Mechanisms perceived to be best at communicating biodiversity science to policy. The number of respondents is indicated on the vertical axis and the category of mechanism on the horizontal axis.

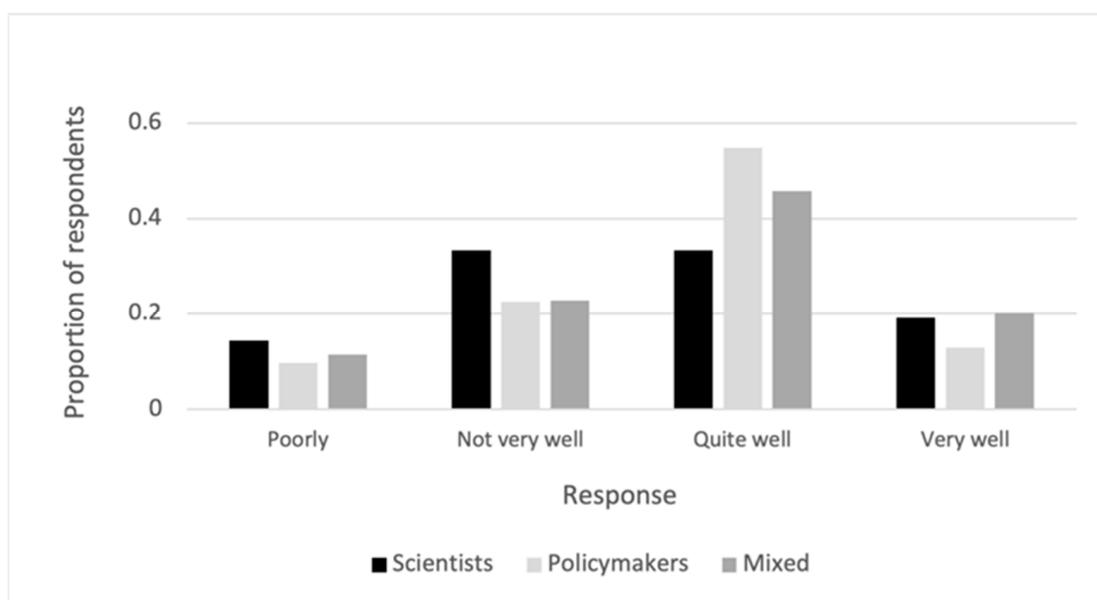


Figure 2. Distribution of responses given by scientists, policymakers, and mixed respondents to the question, “how well is (the best available) mechanism bridging the gap between policy and science?”.

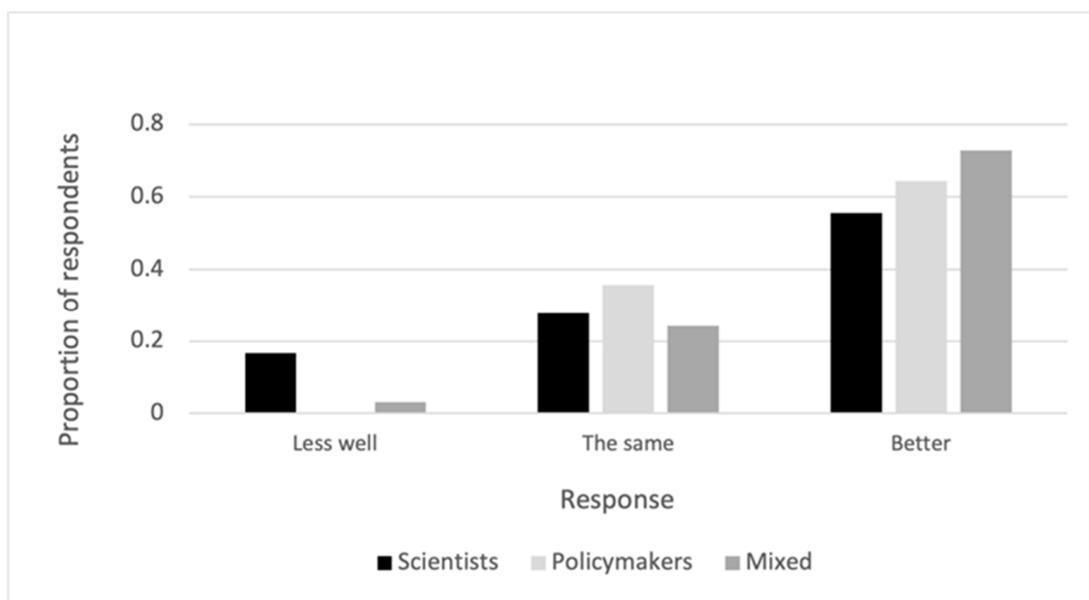


Figure 3. Distribution of responses given by scientists, policymakers, and mixed respondents to the question, “how well is (the best available) mechanism bridging the gap compared with the best science-policy communication about 10 years ago?”.

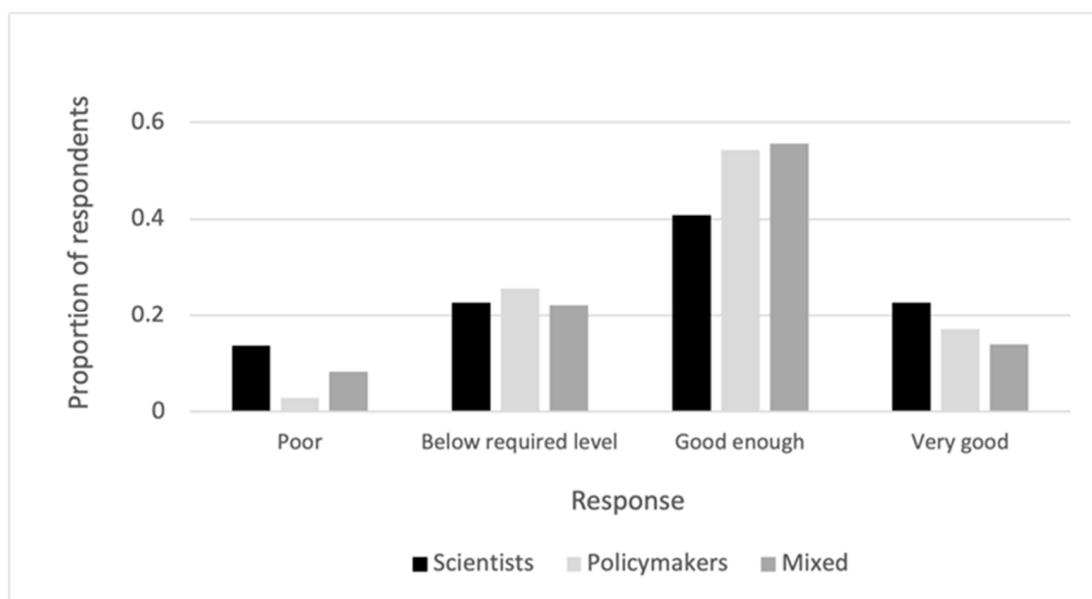


Figure 4. Distribution of responses given by scientists, policymakers, and mixed respondents in response to the question, “how would you describe the quality of available information that is communicated with this mechanism?”.

3.3. Question E: Key Actors Missing from the Process of Communicating Science to Policymakers

In determining which actors were considered to be missing at the SPI, we categorized responses to question E as follows: academia, communicators/media, civil society/NGOs, indigenous peoples and local communities (IPLCs), other sectors, leaders/politicians, local authorities, private sector/business, and “other” (Figure 5). Of the 81 respondents who provided clear answers, 65 thought that some actors were missing, 14 thought not, and 2 said they did not know. The category of actors most frequently considered missing was academia, with a number of other categories trailing fairly far behind.

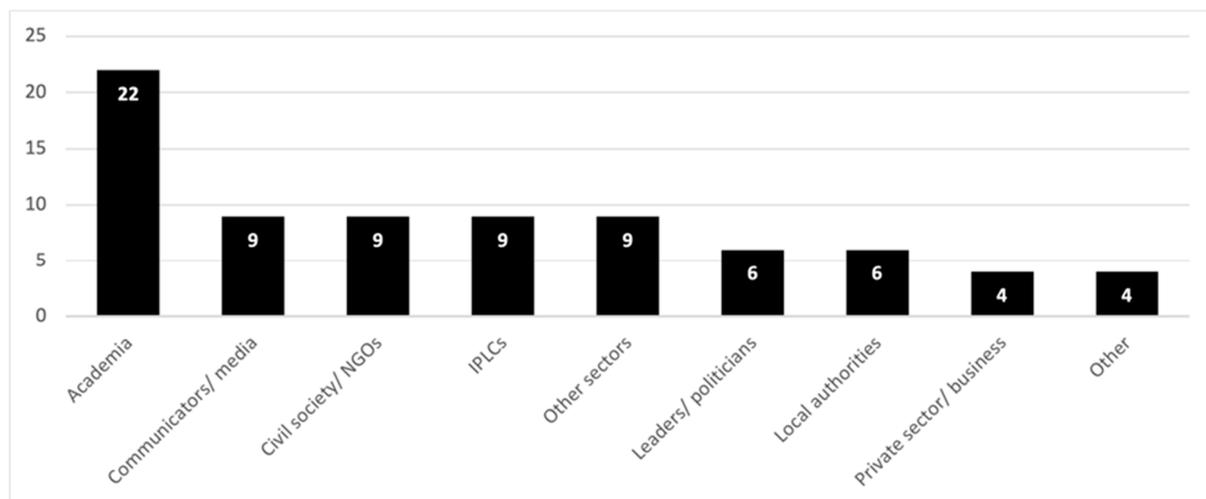


Figure 5. Key actors considered, by respondents to the survey, to be missing from the science-policy interface.

4. Discussion

The diversity of reported SPI mechanisms was perhaps their most outstanding overall feature. Although statistical analysis was not possible for responses to question A due to the small number of respondents per category, it was apparent that no single category of mechanism stood out as being more effective than others, with most perceived to be at least good enough for their purpose. This may indicate that different mechanisms work in different circumstances, as indicated by previous studies [14,17,18], or that respondents were simply not familiar with other viable mechanisms. Although the largest single category (27) was documentation of various kinds, the three next most common, collectively amounting to 45, all point to the importance of interpersonal communication.

The generally positive views reported here concerning the efficacy of biodiversity SPI mechanisms, along with its improvement over time, contrasts somewhat with the literature [1–5]. This may be because of the respondents being a niche group that is exposed to, and likely often focused on, international biodiversity policymaking. This may warrant some cautious optimism, bolstered by the similarity of answers between scientists, policymakers and mixed respondents, as found by Rose and colleagues [14]. Nevertheless, a firm conclusion about the efficacy of biodiversity SPI mechanisms in this case would require more in-depth analysis comparing the perceptions of pairs of scientists and policymakers from the same country delegations. The current study had only fifteen such pairs.

The perceived adequacy of the quality of the information available to communicate at the SPI may have something to do with the various IPBES reports that have been released since 2016, providing vetted and comprehensive collated information for policymakers. That said, the IPBES reports point to a variety of knowledge gaps that require attention.

The fact that a large majority of respondents said that actors were missing from the SPI is slightly at odds with their generally positive impressions of the effectiveness of SPI mechanisms. Nevertheless, these results are not incompatible, and may simply suggest that adequate perceptions or good mechanisms could be made better by more inclusive participation. Of the 22 respondents who noted the absence of academia, just eight were scientists. A further eight were policymakers and six were mixed. This small sample again suggests a level of consensus between the different respondent groups that would require a much more in-depth country-by-country comparative pairing to verify or refute. Between countries, however, the diversity of categories suggests disparities in their approaches. For example, we know from first-hand experience that some governments routinely appoint scientists as part of national delegations to meetings of the CBD COP and IPBES plenary, while other governments never appoint scientists. Meetings of the Subsidiary Body on Scientific, Technical and Technological Advice to the CBD have a

stronger academic component, but that does not guarantee that their delegations will communicate sufficiently with delegations to the meetings of the COP, in cases where the delegations differ. For effective engagement of scientists in the policymaking process, communication of policymakers' needs and constraints to scientists is required, as well as communication of scientific information from scientists to policymakers.

The fact that previous studies reported less positive views of communication between stakeholders at the SPI, on the other hand, may be a cause for concern. While their backgrounds differed, respondents to our survey had their involvement at the international level of policymaking in common, and it is possible that different actors with different roles in national SPIs account for this disparity and may belie a less optimistic picture of progress.

Regarding the agreement on the absence of key stakeholders, a future survey could help to determine whether the breadth of representation has improved, worsened, or remained static. Meanwhile, IPBES has been making increased efforts toward inclusiveness and has become known, especially, for its consideration of indigenous and local knowledge at the SPI [19]. This recognition of IPLCs and the knowledge that they could contribute to improving our understanding of biodiversity and its management is intended, in part, to provide a model for national governments to mimic. More broadly, improved stakeholder involvement at the biodiversity SPI is a core principle of the current 2011–2020 strategic plan of the CBD [20] and likely also the post-2020 global biodiversity framework that will soon succeed it.

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Data Availability Statement: Restrictions apply to the availability of these data. Data was obtained from survey respondents and are available from the authors with the permission of the relevant respondents.

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