Using secondary data to assess knowledge uptake and influence of the Rio Doce Panel

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1. Introduction

The Rio Doce Panel (RDP), led by the International Union for the Conservation of Nature (IUCN), is an Independent Scientific and Technical Advisory Panel (ISTAP) with the mission of providing recommendations for a resilient and sustainable reparation of the damages caused by the Fundão tailings dam collapse in 2015 in Mariana, state of Minas Gerais, Brazil. The disaster caused 19 deaths and released about 39.2 million m^3 of tailings in the Fundão creek. The released tailings travelled through the Rio Doce, disrupting ecosystems and livelihoods, to eventually reach the Atlantic Ocean in the State of Espírito Santo about 670km downstream of the dam (Sánchez et al., 2018).

In addition to the emergency responses to the disaster, Samarco (which operated the dam) and its shareholders (Vale and BHP) set an out-of-the-court agreement with several public authorities – called the 'TTAC' - to repair and compensate for the extensive environmental and socio-economic damages in the Rio Doce basin. The TTAC also mandated the creation of the Renova Foundation as the responsible organization for executing the 42 reparation and compensation programmes of the agreement. The TTAC also creates a complex deliberative governance system, with the main coordination and deliberation roles attributed to the Inter-federative Committee (the CIF, in the Portuguese acronym). The CIF congregates representatives from the two States affected by the disaster, the Union, several National and sub-National technical and regulatory organisms, and the judiciary. Representatives of the affected people and the public prosecutors were included as parties in a later version of the agreement, called "TAC-Gov" (Maroun et al., 2021; Sánchez et al., 2018).

The RDP was created in 2017 under a request from the Renova Foundation (RF) and works through the elaboration of studies with recommendations that aim to bring a long-term view to the reparation programmes, using scientific knowledge and integrative, landscape-based approaches. Although most of the recommendations address the RF, others involve different stakeholders of the reparation process that have crucial roles to the achievement of the RDP's vision. To reach those audiences, the RDP has communication and engagement strategies to promote stakeholders awareness, understanding and agreement to the recommendations. This communication strategy assumes that by knowing, understanding and agreeing with the recommendations, the stakeholders will take action and implement them.

Understanding how those audiences access and use the knowledge produced by the RDP is essential for evaluating the project's relevance and impact, as well as to allow for feedback and timely adaptive management. Nevertheless, the high number of

stakeholders involved in the reparation process and their limited availability for direct interactions with the IUCN staff challenge primary, targeted data collection that could tell more about the uptake of the RDP recommendations.

In this paper, IUCN described how its Monitoring, Evaluation and Learning (MEL) strategy worked around these constraints in data availability using secondary data and performing qualitative analyses to answer the following research question: is there evidence that the RDP recommendations are informing and influencing the way key stakeholders in the basin act?

2. Materials and methods

In IUCN's preliminary research design, we aimed to unveil eventual RDP influence on the reparation through direct interactions (interviews and focal groups) with stakeholders, during which we would investigate their awareness, understanding and use of the RDP's recommendations. Nevertheless, people we contacted often argued to be overwhelmed by work and not able to participate in such interactions. In addition, given the extensive number of groups involved in the reparation – we mapped more than 30 key stakeholders, including the Renova Foundation, private organizations, national and state's governments and agencies, research institutions and representatives of the civil society – IUCN staff would need to invest significant efforts to conduct the study, first in an exploratory manner and then refining obtained information through more targeted interviews.

To work around these limitations, we conducted the exploratory phase of the research using secondary data that is publicly available on internet or easily accessible by other means.

2.1 Building a database

We defined a list of documents issued by the previously mapped key-stakeholders that had potentially relevant information to address our research question. The documents were registers of stakeholders' action (e.g., periodic activities reports), registers of their decision making processes (meetings' minutes, deliberations), registers of the way they plan their activities (e.g., annual work plans), studies they perform on specific issues (e.g., biodiversity inventories, diagnosis of the disaster's impacts) and other information they share with the public (websites, news, interviews). The documents also included minutes and transcriptions of meetings between the key-stakeholders and the Panel, which are particularly relevant to track RDP's influence pathways.

We accessed all listed documents and included them in an *NVivo* (a qualitative research software) project. Given the nature of some documents (e.g., monthly meetings minutes) the database is constantly updated. By the time of the development of this paper, more than 1,100 documents, dating from 2016 to 2022, were included in the database. The documents were mainly from the Renova Foundation and the CIF, but also from the national and state governments, the

judiciary, public prosecutors, and affected people's representatives, as well as media articles.

2.2 Setting topics and keywords, and coding relevant information into topics

We defined a set of 50 topics addressed by the Rio Doce Panel in its knowledge products and recommendations, which were defined as 'nodes' in our NVivo project[1]. Then, we explored our dataset to find information on how stakeholders were dealing with those subjects, coding relevant information into one or more of the created 'topics' nodes.

There were two ways of exploring the dataset to find relevant information to be coded into the topics:

i) We read all documents with a high potential of having relevant information to our analysis (e.g., transcription of a meeting between the Panel and RF staff about a RDP study), directly coding the identified excerpts into the node of the related topic;

ii) For long documents (e.g., RF's activities reports with several hundred pages) or in case the number of documents were too high (e.g., hundreds of monthly meeting minutes of all CIF's technical chambers), we used text analytic searches. We defined a list of keywords or expressions related to the mapped topics and used them in those searches. We then read all the results and coded relevant information into the related topics' nodes.

2.3 Coding evidence of action related to the implementation of the recommendations

Once the content of the dataset was coded into topics, we read the content of the topics nodes related to each of the RDP recommendations and coded evidence of
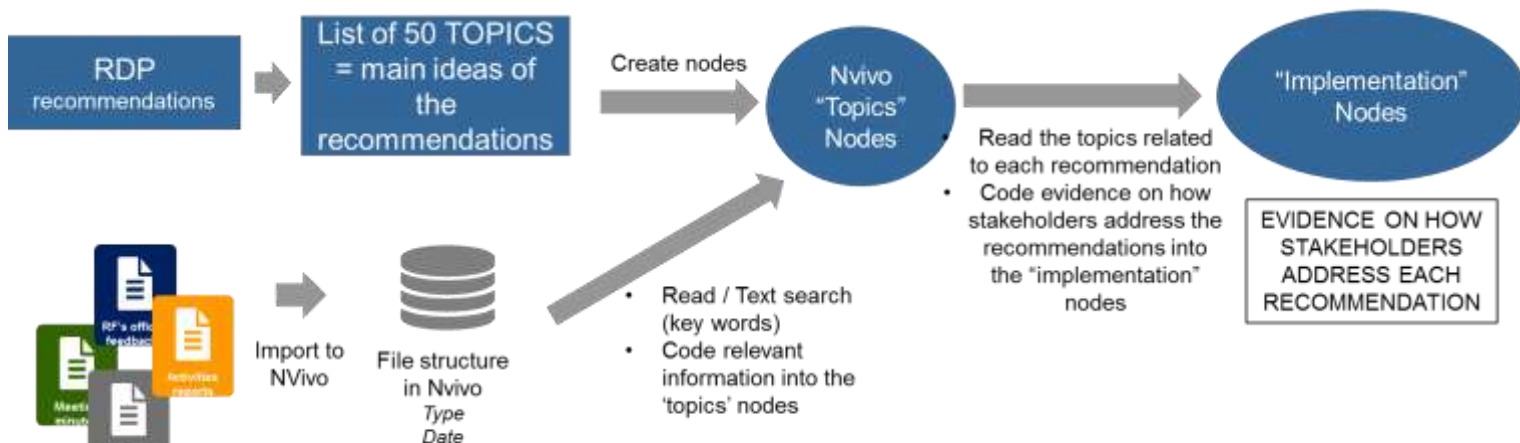

Figure 1. Scheme representing the methods used to code relevant information on how stakeholders were acting in the implementation of each recommendation.

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[1] We decided to use a list of topics to build the nodes instead of the list of recommendations because one recommendation can address more than one topic, and the same topic can be present in several recommendations. This also allows us to use the same NVivo project to answer other relevant questions, for example how the frequency in which all different stakeholders talk about a given topic – say Nature-based Solutions – vary in time.

stakeholder action specifically related to the given recommendation into a corresponding "implementation" node (Figure 1).

This process yielded a document where all the recommendations were linked to a list of pieces of evidence showing how stakeholders were perceiving, discussing, and acting in relation to the RDP recommendations.

3. Results and conclusions

Table 1 gives an example of the analyses' results (analysis of the first Thematic Report 1 recommendations).

We identified relevant evidence of stakeholder action aligned to the RDP recommendations in the field of impact assessment, rural development, and alternative livelihoods. We also identified that some of the recommendations – those dealing with human health, fishing bans, or the management of water flows from the Juparanã lagoon – could not be implemented as imagined by the RDP because of judicial decisions. Implementing the recommendation require long discussion and concertation processes between stakeholders, especially regarding more complex issues, such as tackling the future of the basin's governance system and the creating Climate Action plans. Because these stakeholders do not always agree on their role or do not perceive these issues as a priority for reparation efforts, the implementation process is hindered. .

Table 1. Example of the analysis' results, with evince of how stakeholders act in relation to the disaster's impact assessment, main topic of the first recommendation of the Thematic Report 1. The results were simplified for brevity.

RDP recommendation	IUCN Analysis - Implementation	IUCN Analysis - Gaps/Challenges
TR01-Recommendation 1: Prepare a comprehensive assessment of the impacts of the dam failure considering for each valued environmental and social component the baseline at some point in the past prior to the failure as well as trends in the state of those valued components.	• The RF showed interest in more details on how to implement the recommendation, which culminated in the elaboration of IP04 by the Panel. • The RF created an Impact Curatorship and hired independent external consultants to assist in structuring a detailed approach to systematically assess impacts. • The RF conducted several participative "Diagnosis workshops" to identify the baseline for social, economic, and environmental indicators to be used as a reference for reparation action plans • Some RF programs performed studies to assess the impact of the disaster on specific components • The judge of the 12th Court and the Public prosecutors commissioned specific studies to investigate the impacts of the disaster on environmental, economic and social components.	• Although IP04 was launched in October 2019 and the Impact Curatorship area was created later on that same year, the efforts to systematize the information on impacts begun very recently. The capability of the pilot system being implemented to build a comprehensive assessment of the dam's failure impact on all relevant components is unknown. • Implementation of the recommendations requires a robust data, information and knowledge base that so far is scattered not only in the several departments of RF but also with stakeholders• Essential points of the recommendation depend on the outcomes of the ongoing efforts of the Impact Curatorship

The results allowed for a more efficient and targeted primary data collection in the search of evidence of the RDP contribution to the process. The results helped us filtering down the list of stakeholders to interview, privileging cases where we identified behaviors aligned to the RDP's recommendations, and to strategically plan the interviews' scripts, focusing on topics the stakeholders had acted upon. This process allows for less and shorter interviews that provide more relevant information. Interlocutors who were not inclined to participate in exploratory interviews or provide specific information on their work when first contacted by us felt encouraged to do so after seeing the results of the analysis, providing valuable information to our research.

This approach allowed us to assess that a RDP recommendation was pivot for the creation of the Impact Curatorship in Renova Foundation. This newly-created sector's aim is to identify the impacts of the disaster and collaborates closely with the RDP. We also tracked an important unintended RDP influence in the inclusion of chapters addressing Impact assessment and Climate Change in the Paraopeba's watershed Reparation Plan, built in response to the disaster caused by the rupture of a Vale's tailings dam in Brumadinho.

Besides unveiling the knowledge uptake pathways and the contributions of the RDP to the Rio Doce reparation process, this analysis can also help us identify and understand the reasons for failure in knowledge uptake, providing relevant information to inform and drive the projects' adaptive management efforts.

Finally, our findings may also be useful as a learning for future similar projects or as a case study in researches interested on how audiences access, perceive, understand and use scientific knowledge related to environmental issues. This is particularly important for advisory panels as IUCN's ISTAP, which are sought to be an impactful tool for dealing with controversial and complex environmental issues, as well as for other scientific panels that produce and share knowledge with the objective of influencing policies and behavioral changes. In the current context of accelerated biodiversity decline and climate crisis, understanding how those processes occur is critical to leverage the transition from knowledge production to action and impact.

References

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