

# Qualitative Methods for the Next Generation of Impact Assessment



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## Dedication:

We would like to dedicate the work presented here, and the research underpinning it, to the memory of our two core team colleagues Meinhard Doelle and Richard Roberts, who died tragically during the course of this work. Meinhard and Richard were both uniquely dedicated to IA theory, process, and practice, and their clear-sighted ideas and direction have shaped the evolution and professional practice of assessment. Their loss was not only felt profoundly by us but also by the IA community in Canada and globally. Richard and Meinhard always put the needs of others first and were dedicated humanitarians.

# Contents

List of Tables.....	IV
List of Figures .....	IV
List of Abbreviations .....	V
<b>Part 1: Why a Study on Qualitative Methods in Impact Assessment?.....</b>	<b>1</b>
How to Read this Report.....	3
<b>Part 2: Our Approach.....</b>	<b>4</b>
Structured Literature Review .....	5
Workshop .....	6
Survey.....	7
Semi-Structured Interviews .....	9
World Café.....	10
Data Analysis .....	10
Validity and Reliability .....	11
Limitations.....	12
Compilation of Findings .....	12
<b>Part 3: Why Are Qualitative Methods Essential in Impact Assessment?.....</b>	<b>13</b>
Qualitative Methods Enable the Integration of Values and Subjective Perspectives.....	14
Qualitative Methods Provide Rich, Contextual Information.....	16
Qualitative Methods Embrace Complexity.....	17
Qualitative Methods Support the Broadening Scope of IA .....	18
Qualitative Methods Complement Quantitative Approaches.....	19
<b>Part 4: Strengthening the Effectiveness of Qualitative Methods in Impact Assessment.....</b>	<b>20</b>
Need #1: Elevating the Perceived Value of Qualitative Methods.....	23
Need #2: Enhancing Qualitative Methods Skills and Training.....	24
Need #3: Ensuring that Qualitative Methods Influence IA Processes and Outcomes.....	26
Need #4: Consistent Implementation of Standards for Methodological Rigour .....	29
Need #5: Greater Community and Indigenous Inclusion, Leadership, and Control.....	33
Need #6: Adequate Attention to Ethical Considerations.....	35
<b>Part 5: Qualitative Methods for Impact Assessment—An Overview.....</b>	<b>36</b>
Qualitative Methods Available for IA.....	37
Methods by IA Process Step .....	41
Method Attributes .....	43

<b>Part 6: Methods Toolkit</b> .....	<b>45</b>
Deliberative Methods .....	46
Delphi Method .....	50
Document Analysis .....	54
Focus Groups .....	58
Fuzzy Set Theory .....	63
Interviews .....	68
Matrices .....	74
Multi-Criteria Analysis (MCA) .....	78
Narrative Methods .....	83
Q Methodology .....	88
Qualitative Data Analysis .....	91
Scenario Methods .....	96
Participatory Spatial Methods .....	101
Qualitative Surveys .....	107
Network & Systems Analysis .....	111
Visual Methods .....	116
Seasonal Calendars .....	121
Workshops .....	124
<b>Part 7: Qualitative Method Selection Considerations</b> .....	<b>128</b>
Method Selection Should Be Purpose-Driven .....	129
Method Selection Should Be Responsive and Respectful .....	130
Method Selection Should Be Informed .....	131
Selected Methods Should Be Manageable .....	131
Method Selection Requires Awareness of Engagement Dynamics .....	132
Method Selection Should Be Flexible .....	133
Consider Diverse Methods .....	133
<b>Part 8: Conclusions and Paths Forward</b> .....	<b>134</b>
<b>References</b> .....	<b>138</b>
<b>Appendices</b> .....	<b>140</b>
Appendix A: Ethics Approval and Consent Forms .....	141
Appendix B: Research Instruments and Materials .....	148
Appendix C: Qualitative Study Reporting — Quality Checklist .....	156



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## List of Tables

Table 2.1. Survey participant locations.....	7
Table 4.1. Summary of the needs, barriers to, and enablers for, the effective use of qualitative methods in IA. ....	21
Table 5.1. Final list of 17 qualitative methods categories with brief descriptions. ....	38
Table 5.2. IA process steps for which qualitative methods are applied.....	42
Table 5.3. Method attributes. ....	43
Table 5.4. IA-related scenarios and relevant methods.....	44

## List of Figures

Figure 2.1. IA roles reported by survey participants.....	8
Figure 2.2. Years of IA experience reported by survey participants.....	9
Figure 2.3 World Café session at the May 2023 IAIA annual conference.....	10
Figure 2.4. Method of triangulation.. ....	11
Figure 5.1. Survey respondents who “often” apply the indicated methods in IA.....	40
Figure 5.2. IA process steps under the Canadian federal Impact Assessment Act.....	41
Figure 6.1. Fuzzy sets for terrain slope linguistic variables. ....	63

## List of Abbreviations

AHP .....	analytic hierarchy process	NLHFRP ....	Newfoundland and Labrador Hydraulic Fracturing Review Panel
ANP .....	analytic network process	OCAP .....	ownership, control, access, and possession
BPAC .....	Best Practice Advisory Committee	PCA .....	principal component analysis
CAQDAS....	computer-assisted qualitative data software	PGIS .....	participatory geographic information systems
CIA .....	cultural impact assessment	PPGIS .....	public participation geographic information systems
CLD .....	causal loop diagram	PRA .....	participatory rural appraisal
EIA .....	environment impact assessment	QCA.....	qualitative comparative analysis
EU.....	European Union	QIA .....	Qikiqtani Inuit Association
GBA+.....	gender-based analysis plus	SEA.....	strategic environmental assessment
GIS.....	geographical information systems	SESA .....	strategic environmental and social assessment
HIA .....	health impact assessment	SIA.....	social impact assessment
IA .....	impact assessment	SLR.....	structured literature review
IAA.....	Impact Assessment Act (of Canada)	SWOT .....	strengths, weaknesses, opportunities, threats
IAAC .....	Impact Assessment Agency of Canada	T8FN .....	Treaty 8 First Nations
IAIA.....	International Association for Impact Assessment	ToR.....	Terms of Reference
IQ.....	Inuit Qaujimagatuqangit	UNDRIP.....	United Nations Declaration on the Rights of Indigenous Peoples
MCA .....	multi-criteria analysis	WHIASU ....	Wales Health Impact Assessment Support Unit
MCDA.....	multi-criteria decision analysis		
MCDM.....	multi-criteria decision-making		
MVEIRB .....	Mackenzie Valley Environmental Impact Review Board		

# Part 1:

## Why a Study on Qualitative Methods in Impact Assessment?



Many jurisdictions, including Canada under the *Impact Assessment Act (IAA)*, are moving into next-generation, sustainability-oriented impact assessment (IA) (Hacking & Guthrie, 2008; Gibson et al., 2016; Sinclair et al., 2018).

Sustainability-oriented IA moves beyond a primary focus on biophysical impacts to consider a broader range of potential social, health and well-being, economic, cultural, cumulative, and equity implications of proposed projects. Canadian IA under the IAA (2019), for example, now explicitly requires consideration of health, social, and economic issues; consistent use of gender-based analysis plus (GBA+); evaluation of contributions to sustainability; bridging of Indigenous and Western scientific knowledge; and meaningful public participation.

Quantitative methods are typically used to examine cause and effect associated with biophysical impacts and to identify, for example, alternatives and mitigation measures. Delivering effective IA within the broadening scope of next-generation, sustainability-oriented IA, however, requires new thinking and effective methods that enable meaningful inclusion of diverse knowledges, values, and information sources. For many of the broader range of impacts considered in next-generation, sustainability-oriented IA, cause and effect can only be established—and alternatives and mitigation measures suggested—through qualitative methods that can explain the values and connections people have with the places and land where projects are proposed.

While this report is primarily intended for those involved in Canadian IA, the project was implemented by an international project team and informed by experts around the globe. Therefore, we anticipate this report will also be relevant to those working in a range of IA systems and geographical contexts. Specifically, this report may be of interest to:

- practitioners working for/with communities and project proponents to gather the best possible information about the potential implications of proposed developments;
- decision makers with a role in evaluating and synthesizing the information received throughout an IA process;
- researchers who are testing, critiquing, and pushing the boundaries of IA processes and methods;
- educators fostering the upcoming generations of IA professionals;
- communities and members of the public who (should) play a role in selecting and implementing the methods that best tell their stories of place, change, and impact.

There is considerable opportunity for the continued integration of qualitative methods in IA, but there are also barriers that often make it difficult to implement these methods in practice. While this report presents a range of conventional, innovative, and participatory qualitative methods (17 methods categories in total), it also discusses the barriers that must be overcome if these methods are to be effective in the context of sustainability-oriented IA.

While qualitative methods are not new to IA, our team—an international group of IA researchers and practitioners—came together around a need for concrete guidance on the range of qualitative methods available for IA.

Part of our purpose was also to bridge the gap between qualitative academic rigour and applied qualitative data collection and analysis in IA. Within this context, this report aims to answer the questions:

- What roles do qualitative methods play in IA?
- What is needed to strengthen the contribution of qualitative methods in IA?
- Which qualitative methods are available for IA?
- What are key considerations for the selection and implementation of these methods?



## Key Terms and Concepts



### Qualitative research

Is used to examine the meaning people ascribe to societal issues (Creswell & Creswell, 2018; Leavy, 2017). It focuses more on the qualities of issues and phenomena, rather than their quantity. In IA, applied qualitative research explores people's perceptions, experiences, and knowledges that contribute to an in-depth understanding of the potential effects of proposed land and resource development projects, plans, and/or policies. Qualitative research draws upon interaction with potentially affected populations, and/or experts, and/or secondary documentation to systematically identify, evaluate, and avoid or mitigate these potential effects.



### Research methods

Are the systematic techniques and procedures used to collect and analyze data (Creswell & Creswell, 2018). This report includes methods that are entirely qualitative or that have a major qualitative component, even if aspects of their data collection or analysis procedures are quantitative.

We distinguish research methods from broader research approaches (e.g., ethnography, participatory action research, grounded theory research), IA processes (e.g., social engagement, participatory development of indicators), and tools that facilitate data collection (e.g., virtual reality, artificial intelligence, digital technology, online conferencing). While such approaches, processes, and tools are highly relevant and worth exploring further, they are beyond the scope of this project.



### Impact assessment (IA)

Is, broadly, the systematic identification of the future implications of an action (International Association for Impact Assessment (IAIA), 2022). In the Canadian context, at the federal level, IA is defined as a “planning and decision-making tool used to assess the potential positive and negative effects of proposed projects” (Impact Assessment Agency of Canada [IAAC], 2022b, n.p.).

## How to Read this Report

We invite you to read the entire report or to focus on sections that are most relevant to you. Links between related sections aim to make the report as easy to navigate as possible.

[Part 2](#) provides a detailed overview of the research methods applied in this study. Because we encourage IA professionals to be rigorous and transparent in the implementation and documentation of their methods, we try to do the same.

[Part 3](#) details six essential roles of qualitative methods in IA identified by participants involved in this study.

[Part 4](#) discusses what needs to happen to strengthen the effectiveness of qualitative methods in IA.

[Part 5](#) provides an overview of the 17 method categories identified through this study and their related IA process steps.

[Part 6](#) then provides a more detailed description of each of the identified methods, including why and when they can be used in IA, tips for their implementation, and case study examples.

[Part 7](#) outlines seven general considerations when selecting qualitative methods for use in IA.

[Part 8](#) summarizes key findings and provides a series of concrete actions that various groups can take to enhance the effectiveness of qualitative methods in IA.

# Part 2: Our Approach



This study was designed and implemented by the core research team, with guidance and feedback from a Best Practice Advisory Committee (BPAC) comprising nine IA and qualitative research experts. We sought to learn from those with international experience in qualitative methods in IA and, therefore, included literature and IA professionals from across the globe. The study received ethics approval from the University of Manitoba's Research Ethics Board ([Appendix A](#)).

## Structured Literature Review

The structured literature review generated a list of qualitative methods that are available for IA, and provided an early sense of how they are—or could be—used in IA. We conducted the literature review in two key stages: an initial structured literature review and a targeted literature review.

### Initial structured literature review

The purpose of the initial structured literature review (SLR) was to generate a preliminary, comprehensive list of the qualitative methods available to IA, which could then be explored in greater depth through the targeted literature review. An initial scoping exercise aided the development of a search strategy that would return a manageable number of relevant references. The SLR included methods currently applied in IA and those applied in related fields that could be usefully applied to IA. Therefore, the search terms encompassed fields of study that are distinct from, but related to IA, such as planning and natural resource management. Terms related to participatory and community-based methods were also included in the search. As a result of the scoping exercise, we used the following search chain as the basis for the SLR:

- ((Qualitative OR subjective OR participat\* OR community) AND (“environmental assessment” OR “impact assessment” OR “natural resource management” OR “spatial planning” OR “land planning” OR “land use planning” OR “regional planning” OR “urban planning” OR “environmental planning”)).

Scopus and Google Scholar were selected as the meta-databases for the SLR. Google Scholar identifies a wider range of sources than Scopus, including conference presentations, grey literature, book chapters, and theses, but does not allow searching on Title + Abstract. Searches were, therefore, conducted by Title to maintain consistency

of approach and to ensure we obtained a manageable number of results. The search returned 423 results; we also included an additional 30 sources the BPAC suggested were potentially relevant. The title and abstract of each source were screened according to the following criteria, whereby the sources should:

- relate to *ex-ante* assessment of policies, plans, programmes and projects (or to related fields as described above);
- discuss the use of a specific method or technique applied in impact assessment or a related field (e.g., as opposed to making general comments about the need for qualitative methods or documenting the conduct of a qualitative study to assess some aspect of IA practice);
- be written in English;
- be accessible.

After removing duplicates and sources that did not meet screening criteria, 135 sources remained for full text review. The purpose of the SLR was to generate an initial list of methods to explore in greater depth through the targeted literature review. Therefore, rather than conducting a comprehensive analysis at this stage, we read the full text of each source and recorded pertinent information in an Excel spreadsheet (e.g., method(s) discussed, application to IA, etc.).

We then clustered the sources by method to generate our preliminary list for the targeted literature review phase. In total, 31 qualitative method categories relevant to IA were identified through the SLR. We chose to include methods with quantitative elements, given they had (or could have) a substantive qualitative component (e.g., Q methodology, multi-criteria analysis).



## Targeted literature review

The targeted literature review gathered further detailed information about each method identified through the SLR and its application—or potential application—to IA. The targeted searches were conducted by:

- searching (METHOD NAME) AND (“environmental assessment” OR “impact assessment” OR “natural resource management” OR “spatial planning” OR “land planning” OR “land use planning” OR “regional planning” OR “urban planning” OR “environmental planning”) in Scopus and Google Scholar by Title;
- following key references from sources identified in the SLR stage;
- searching by method name only, without reference to IA or other fields in cases where the method is tightly prescribed, such as fuzzy sets, Delphi, and Q methodology.

Results returned in Google Scholar and Scopus were screened using the same criteria as in the SLR phase. The total number of results screened, duplicates removed, and sources sent to full text review were recorded. The number of sources sent for full text review varied by method but ranged from one to 38. These sources, along with the sources identified in the SLR phase, were then reviewed in detail and synthesized in a series of method summary templates. The templates provided an overview of:

- the method itself;
- its potential application to IA, including
  - a) whether it is a data collection technique or a data analysis method or both,
  - b) examples of its application in IA,
  - c) to which impacts it is most relevant, and
  - d) to which IA process steps it is most relevant;
- its strengths, limitations, and challenges;
- practical considerations;
- potential case studies for review.

The targeted literature review and information synthesis revealed that some of the identified methods were variations of one another (e.g., modifications of the Delphi method) and others could be grouped together under a broader category (e.g., gaming and scenario analysis could be clustered as “scenario methods”). This process led to a revised list of 22 qualitative method categories to explore in greater depth with IA professionals through the workshop, survey, and semi-structured interviews.

## Workshop

The core research team hosted a 90-minute workshop during the week of the International Association of Impact Assessment (IAIA) annual conference in Vancouver (May 2022), which acted as an opportunity to verify the list of methods that emerged from the literature review and begin to develop a more in-depth understanding of their application in IA. The workshop included 27 IA practitioners, researchers, non-governmental organization representatives, and government/regulatory professionals with demonstrated qualitative research experience in the IA context. They were selected and recruited based on a review of the conference program and participant list.

Each participant was given a deck of methods cards with the names and descriptions of the 22 method categories identified through the structured literature review. After introductions, the participants were asked to individually cluster the methods cards by frequency of use (frequently used in IA work, occasionally used, never used). Blank cards/pens were provided so participants could provide additional notes if desired. A group discussion followed this activity, in which facilitators prompted the discussion with questions such as:

- Are there methods that might be particularly innovative/novel/interesting?
- Were there any key methods missing from the cards?
- How were/are these methods applied in IA cases that you have been involved in?

Two members of the core research team facilitated the discussion, while two others took detailed notes. The notes were later compiled with participants’ additional notes and jottings and analyzed with the qualitative survey and interview data.



## Survey

Many sources gathered through the targeted literature review were IA studies that occurred outside of formal regulatory IA processes. To further understand the applicability of the identified qualitative methods in regulatory IA processes, we designed and implemented an international online survey that asked IA professionals about their engagement with the methods and with qualitative research more broadly.

The core research team collaboratively developed the survey instrument and piloted it with the BPAC prior to dissemination, which led to some refinements. The survey was conducted using a custom online survey platform belonging to a core research team member's consulting firm (The Praxis Group). The survey began with a consent page ([Appendix A](#)) and then, through a combination of closed- and open-ended questions ([Appendix B](#)), asked respondents to:

- indicate to which sector they belong, years of experience, gender, and country;
- indicate the extent to which they use, or engage with, each of the 22 methods (often, sometimes, rarely, or never);
- identify two methods they have used or engaged with that contributed most to the overall IA objectives and answer targeted questions on the application of these methods to IA, which included
  - a) impact area and IA process steps,
  - b) associated data analysis methods,
  - c) the strengths, weaknesses and challenges of the methods, and
  - d) practical considerations and tips;
- identify potential case studies highlighting the use of the method;
- identify additional qualitative methods that could be applied within IA;
- reflect on the use of qualitative methods in IA in general;
- indicate willingness to participate in a follow-up interview.

Table 2.1. Survey participant locations.

Note: A total of 111 participants reported their location, three of whom reported two countries of residence.

Participant Location	Number of Participants
Canada	50
Australia	14
United States	9
United Kingdom	8
Netherlands	6
Brazil	4
Sweden	3
Thailand	2
South Africa	2
Argentina	1
Colombia	1
Egypt	1
Greece	1
Iceland	1
India	1
Italy	1
Japan	1
Kenya	1
New Zealand	1
Nigeria	1
Norway	1
Peru	1
Portugal	1
Tanzania	1
Uganda	1

The total population of IA professionals who work with qualitative methods was unknown, so we relied on a non-random, purposive sampling strategy. The survey was distributed via: 1) 238 emails sent directly to a list of potential participants known to have expertise in qualitative research in IA, as identified by the core research team, BPAC, and the literature review; 2) nine national and international IA professional associations' (e.g., IAIA, IAIA affiliates, SIAHub) newsletters and/or social media platforms; and 3) information

cards distributed at the IAIA annual meeting in May 2022. The survey was available between March 24 and May 25, 2022, and a total of 145 responses were received. Figure 2.1 identifies the number of participants from each survey location. Figure 2.2 presents the IA roles reported by participants, while Figure 2.3 depicts the number of years of experience the participants have with IA.

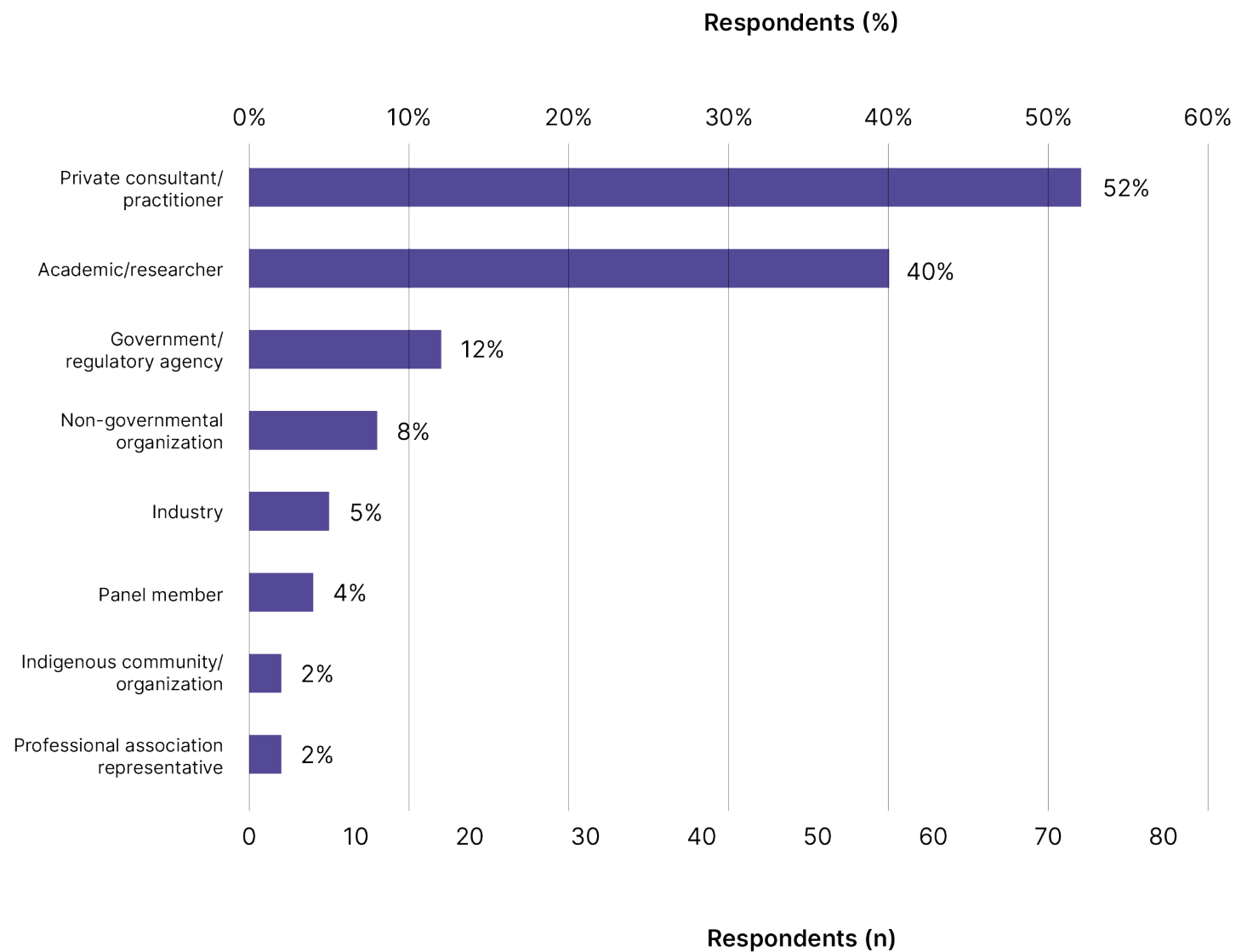


Figure 2.1. IA roles reported by survey participants.

Note: Based on 145 participant responses. Some participants reported multiple roles; thus, the total exceeds 100 percent.

## How long have you been involved in IA?

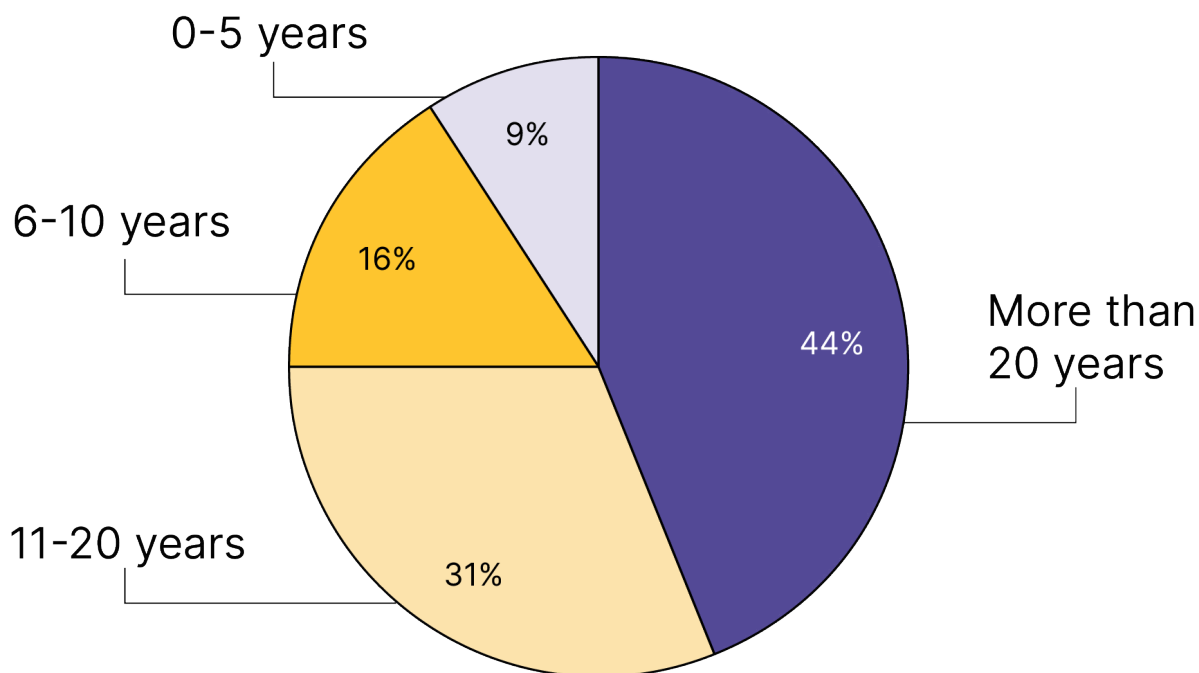


Figure 2.2. Years of IA experience reported by survey participants.  
Note: Based on 131 participant responses.

## Semi-Structured Interviews

The survey was followed by semi-structured interviews to enable an in-depth discussion of the methods and their use in IA, including details of their data collection and analysis procedures, implementation considerations and tips, strengths and challenges, and appropriate contexts for use in IA. The interviews also covered factors participants consider when selecting qualitative methods and needs for strengthening the effectiveness of such methods in IA.

The core research team collaboratively drafted an interview guide. Four core research team members conducted pilot interviews to test the guide and the interview questions were refined and simplified as a result ([Appendix B](#)). Eighty survey respondents expressed interest in participating in a follow-up interview. From this list, 46 respondents, selected to cover experience with the widest possible range of qualitative methods, were invited to participate in a follow-up interview.

Forty invitations were accepted. Eight interviews were also conducted with IA professionals who had not completed the survey, but who were sought out because they had known expertise in otherwise under-represented methods.

The 48 interviews were allocated among seven members of the core research team. These members were responsible for contacting the interviewees, scheduling the interviews, nominating (based on survey responses) the two or three methods to focus on in the interviews, ensuring the consent forms were reviewed and returned, and conducting the interviews. The team conducted the interviews via Zoom or Teams and used the transcription or closed caption functions to create initial transcripts. The quality of these transcripts varied considerably, and the audio recordings were used to verify and refine the transcripts.

## World Café

The core research team hosted a “quick” world café session at the IAIA annual conference in May 2023. The “quick” world café was a method shared with us by one of the survey participants in this study. It is a fast-paced variation of the [deliberative world café method](#), which aims to cross-pollinate ideas and build solutions among a large group of people. Our session brought together practitioners, government officials, and researchers from around the world to develop concrete strategies that address six needs and associated barriers for enhancing the effectiveness of qualitative methods in IA, as identified through the previous phases of our study (see [Part 4](#)). One of the six needs was summarized and presented at each table. The table groups (approximately eight participants per table) rotated through each of the six tables and were given about seven minutes at each table to discuss their responses to the question “What strategies will meet this need and/or overcome the barrier?” During each new rotation, participants either built on previous groups’ discussions or posed new strategies of their own. A designated host remained at each table to update groups on the previous conversations, listen to the discussions, and record key points on large pieces of blank paper covering the tables. Participants were also invited to jot their ideas directly on the paper. At their final table, participants were given an additional eight minutes to work with the table host to review the notes that had been recorded at that table and identify some of the key themes that had emerged. The table notes were collected, transcribed, reviewed, and used to strengthen and fill gaps in the synthesis of our previous findings in [Part 4](#) and the recommendations in [Part 8](#). The world café notes will be analyzed further and likely contribute to a separate publication.

## Data Analysis

The quantitative survey data were analyzed using SPSS. This quantitative analysis was limited to the use of descriptive statistics (frequencies). No correlations were performed due to sample size constraints and the non-random nature of the sample.

The qualitative survey data, interview transcripts, and workshop notes were coded together in NVivo 12 using a hybrid deductive-inductive thematic qualitative analysis approach. Deductive codes were initially established based on specific project objectives. For example, we were interested in the factors participants consider when deciding which qualitative methods are appropriate; therefore, we set “method selection considerations” as a first-level code. Similarly, we were interested in specific aspects of the identified qualitative methods, so deductive codes for each method included “value & strengths,” “challenges & limitations,” “practical considerations,” and “contextual considerations” (i.e., relevant IA process steps and impact categories).

After the data had been coded deductively, an inductive coding process allowed for specific themes to emerge from the data (following the process outlined by Braun & Clarke, 2006). For example, 125 discrete sections of data had been deductively coded to “role of qualitative research in IA.”

These data were reviewed and initial second-level codes were inductively developed to cluster the data into meaningful groups. The content of the codes was reviewed again, and related codes merged into broader themes.



Fig. 2.3 World Café session at the May 2023 IAIA annual conference.

## Validity and Reliability

Multiple strategies were used to establish validity and reliability in the analysis, interpretation, and reporting of the study results.

- **Triangulation** involves addressing a research question through multiple methods or data sources. Triangulating between the structured literature review data and the coded survey, interview, and workshop data provided additional confidence in key characteristics identified for each method category outlined in [Part 6](#).
- **Member-checking.** Interview participants were provided the option to review their transcripts for accuracy. For those who selected this option, we shared a link to the individual's transcript and invited them to make edits within two weeks. When requested by participants, we also shared the draft report to allow them an opportunity to verify that our use of direct quotes accurately reflected their intent.
- **External auditing.** The BPAC—an arm's length expert body—provided feedback throughout the project, including on methodological choices, analysis procedures, and draft reports. The BPAC was not directly involved in the data collection or analysis.
- Several strategies contributed to reliability in coding and analysis. In preparing the analysis, interview transcripts were reviewed against the audio-recordings to verify their accuracy. Regular communication among the research core team on the development of the analysis and coding strategy added confidence to the analysis approach. One member of the team led the coding process, while another conducted spot audits of the completed coding to ensure consistency across the data.
- Our systematic qualitative coding and thematic analysis process enabled the identification of key themes, while avoiding “cherry-picking” of data (i.e., basing findings on the most interesting or noteworthy excerpts). The liberal use of direct quotes in this report provides supporting evidence for, and confidence in, the key themes identified through the qualitative thematic analysis. Effort was made to select quotes that were representative of the coded data.

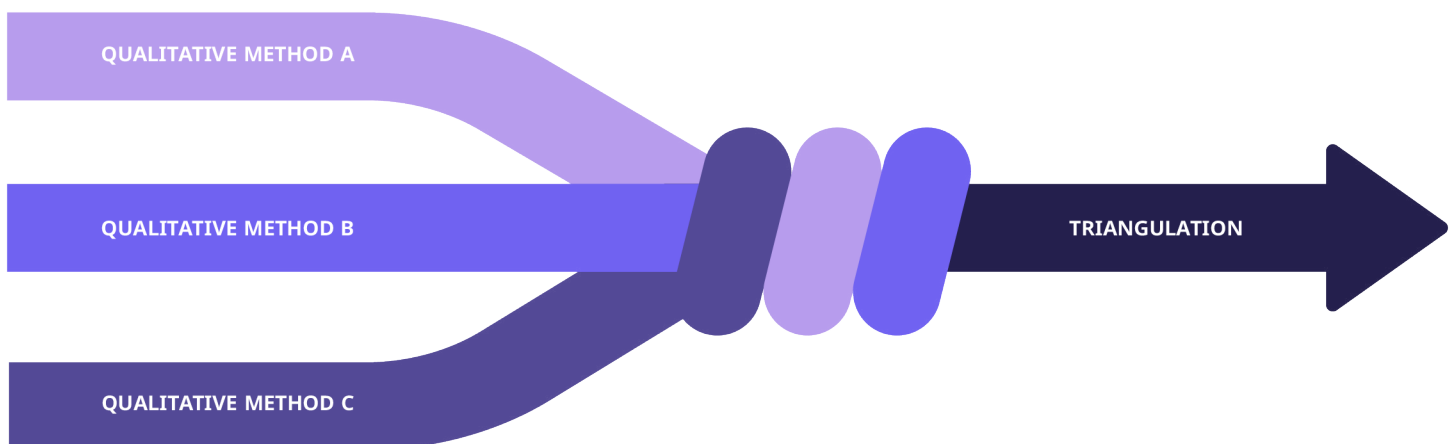


Figure 2.4. Method of triangulation

## Limitations

Limitations in the ability to search IA registry databases (due to their distributed nature and inability to search systematically using Boolean terms) meant that we primarily relied on academic databases for our literature search. The difficulty of establishing appropriate search strings and the choice to search by Title only, mean that the SLR may have missed relevant sources. However, since the main purpose of the SLR was to develop a list of methods rather than to identify every possible source on the subject for meta-analysis, this was not a significant limitation. In addition, many sources identified in the structured literature review reported experimental/academic IA studies, so their applicability to formal regulatory IA processes was not always apparent. Moreover, many of the studies were not methodologically focused; rather, they presented findings from IA case studies that applied various methods but did not necessarily provide a great deal of critical reflection about the methods' strengths, weaknesses, or good practice considerations for their application. Therefore, we relied on the survey and interviews for additional detail about the application of the methods in regulatory IA processes.

The initial intent of the IAIA workshop was to host several simultaneous focus group discussions with IA professionals. However, we had a larger turnout than expected and the space we booked—sight unseen due to the conference being outside our home location—was unfortunately more cramped than anticipated, making it impossible to effectively hold small group discussions as intended. We adjusted by facilitating discussion in a single large group, which meant less opportunity for contribution by each individual participant. To somewhat counteract this limitation, we invited participants to record additional notes on their worksheets, which a number of participants did, and which were later compiled and included in the workshop notes for analysis.

The survey sample size (n=145) is sufficient for analysis at the macro-level, but as the sample is non-random, caution should be used in extending the findings more broadly. Most of the quantitative analysis of survey data focused on results with a large response base, since the sample provided inadequate information for statistical analysis for many of the lesser used methods.

There was considerable variation in expertise, knowledge, and use of methods among interviewees, even among those who indicated in the survey that they used a particular method “often,” making it challenging in some cases to extract meaningful data from the interviews. Triangulation between survey/interview and literature review data helped to overcome this limitation.

## Compilation of Findings

Through the qualitative analysis, themes related to the role of qualitative methods in IA, barriers to and enablers for strengthening such methods and considerations for selecting the methods were identified. The structured literature review synthesis templates were triangulated, and subsequently supplemented and refined with the survey and interview data. This process also led to the further refining of our list of qualitative methods. Some methods from the original list of 22 were eliminated due to a lack of clarity or lack of evidence of their use—or potential use—in IA. In other cases, methods were clustered together because of similarities between them (e.g., systems analysis and network analysis). The final list of 17 methods categories resulting from the research is elaborated in Parts 5 and 6 of this report.

Throughout the report, representative quotes are used to illustrate the themes identified through the qualitative analysis. To maintain participant confidentiality, we do not use participant names; rather, we use an assigned participant code, the participant's professional role (e.g., IA practitioner, researcher, government/regulatory agency staff, etc.), and indicate whether the quote is from a survey response or interview.



# Part 3: Why Are Qualitative Methods Essential in Impact Assessment?



Through the thematic analysis described in Part 2, this research revealed what study participants consider essential roles of qualitative methods in IA. These include:

- integrating values and subjective perspectives;
- providing rich, contextual information/data;
- embracing complexity;
- supporting the broadening scope of IA;
- complementing quantitative research.

These themes are presented in order of relative frequency as reported by participants.

## Qualitative Methods Enable the Integration of Values and Subjective Perspectives

Integrating values and subjective perspectives into IA processes was a commonly cited role for qualitative methods in IA. The core idea of this theme is that IA is an inherently qualitative, values-based process, and what constitutes acceptable or significant impacts largely depends on the values of those who experience and define them. Qualitative methods play an important role in making these values explicit and in bringing together diverse perspectives to understand the subjective components of IA.

Participants noted that IA is inherently a qualitative, values-based process and that “showing the many ways in which [qualitative information] runs through everything that we do is very important” (Interview, P66, IA practitioner). Another participant who was asked about the role of qualitative methods responded:

*It's an eminent role, and impact assessment is by nature qualitative. People don't know that. I mean, because we use quantitative information, some people think that it's a technical quantitative technique, but it's a qualitative tool that is informed by many types of quantitative methods. In the end, judgment of acceptability is extremely qualitative. We have been concerned about the quantitative techniques that can be used to predict particular impacts, but we have dozens of impacts that in the end will be understood through qualitative value-laden reasoning. (Interview, P74, IA practitioner and researcher)*

Several participants raised that impact “acceptability,” at least in part, is subjective and values-based. Quantitative indicators do not always align with the values and thresholds set by affected communities, which vary across place and time. Participants noted that establishing these values and

thresholds is an important part of IA, particularly in cases where Indigenous communities and their rights may be affected. Using contaminant levels in the environment as an example, a participant shared:

*Even if they're not beyond human health thresholds, they are beyond the levels of acceptability for the community. We may not be impacting the human health threshold, which is a quantitative threshold set by the province, but we are affecting the land use and avoidance threshold that is set by the community. (Interview, P77, IA practitioner)*

Going further, participants not only drew attention to the values-based qualitative nature of IA, but also to how appropriate data can be gathered and analyzed to adequately integrate these subjective values. Identifying values by which impacts can be assessed, they argued, is largely the domain of qualitative methods:

*I think so many people forget or don't realize that impact assessment is values-based. There's an objective side to it, but ultimately comes back to values—whether impacts [are] acceptable or not, or what matters, what are we assessing anyway. I suppose you can quantify people's values. You can do a questionnaire and ask what people care about and then you can quantify that, but the qualitative methods are more the way to understand people's values, [be]cause it's usually a nuanced discussion and one that is not possible in a survey [...] I think in some cases when people maybe are using the term qualitative, what we really need to use is the term value, people's values, they're subjective values and that's what we're trying to understand. That's how we should be defining our [valued components] and you know even the baseline impact*



assessment should be shaped towards what really matters to people and of course the interpretation of the meaning of these effects is all about people's values. (Interview, P25, IA practitioner)

...from a value perspective, values are qualitative. That's the function of them, so you can't do EIAs without qualitative approaches, I don't believe. (Interview, P47, IA practitioner)

**Qualitative methods can aid in identifying the diversity of values and perspectives related to a project and its potential impacts and also provide public confidence that their values and perspectives are meaningfully considered in the IA.** This is, in part, because “[q]ualitative methods allow the participant to speak their mind and not limit to a numerical question” (Survey, P23, IA practitioner) and because it better allows people to recognize how their concerns were addressed in final products:

*What I find was in the practice side on qualitative methods is public confidence in EIA. And when you're going out to public, you're talking to them. It's trying to understand from their perspective what's their take on the issue [...] But what I find is the real public issues are they feel EIA is not working because their opinions are not being considered in relation to the data that they're reading in the EIA. You didn't listen to me. You didn't hear what I say, or my concern wasn't incorporated. (Interview, P52, IA practitioner)*

**The same participant also mentioned that understanding the range of public perspectives through qualitative methods can contribute to the determination of whether a project is in the public interest.**

*At the end of the day you're still making an opinion on what you think is the public interest as a decision maker. So that's where I think these [qualitative] tools can be very useful to help the decision maker understand the multiplicity of opinions out there. (Interview, P52, IA practitioner)*

**The utility of qualitative methods for integrating values and subjective perspectives into IA, however, is dependent on the degree to which it is conducted systematically and is integrated with other components of the IA:**

*...the way I see it is that outcomes from community engagement activities should form an input as primary research to the SIA, and often that's not the case. Often, I'll read in an SIA that there has been community engagement undertaken and been looking for the outcomes from that and they're not there. And they'll say go look for those in a different chapter, and that automatically tells me that they haven't integrated the two things. So, to my mind the connection between [community engagement and social research] is very much that a well conducted community engagement program should produce outcomes that form primary research for the SIA, and therefore the community engagement, in order to enable that to happen, the techniques of community engagement should be chosen such as to enable that. In other words, you should be looking to design a community engagement so that it will produce documented outcomes, which will tell you something about how people expect to experience a project, how they imagine, or expect the impacts to affect them. (Interview, P110, government/regulatory agency staff)*

**Despite the promise of qualitative methods for meaningfully integrating values and subjective perspectives in IA, a possible pitfall of their use is the ability to manipulate findings to suit specific needs:**

*It's good that qualitative knowledge is recognized in these regulatory processes. That Indigenous knowledge is explicitly recognized. There's a lot of leeway for that to be misused and abused, especially by proponents who are trying to project an understanding of qualitative information and an understanding of Indigenous knowledge in ways that suit their means. And there's been a number of cases where qualitative methods have, I think, pretty clearly been abused and misrepresented in order to put forward a particular argument that is in favor of an industrial development and is actually completely contrary to what a community-based impact assessment would actually look like. (Interview, P77, IA practitioner)*

**This concern highlights the importance of transparency in the presentation of qualitative methodologies, measures that verify the interpretation of results with those who have contributed their knowledge, and the role of decision makers in interrogating the adequacy of qualitative research presented in IAs. Such considerations are elaborated further in the “methodological rigour” section of Part 4.**

## Qualitative Methods Provide Rich, Contextual Information

IA professionals involved in this study considered the provision of rich, in-depth, and contextual information as an important role of qualitative methods in IA. As one participant mentioned, “qualitative data paints a much richer, deeper picture than only quantitative data” (Interview, P56, IA practitioner). Another suggested there is simply no other way of understanding the core issues in IA: “Without a qualitative approach, you really don’t understand anything [...] you can’t get to the heart of the matter without a qualitative element to the research. I truly believe that” (Interview, P148, IA practitioner and researcher). Participants also spoke more specifically about the points within the IA at which qualitative methods can provide valuable, in-depth, contextual information:

*I think qualitative evidence can fill in the gaps and can help make sense of a picture about why a community is saying something or why the impacts... how they’re going to appear, how they’re going to manifest themselves. (Interview, P54, government/regulatory agency staff)*

Another lamented that the social science data that is often collected and analyzed to understand baseline conditions and potential impacts still often relies primarily on quantitative statistical information, such as “how many people live in this region? What does the average person earn? What is the average age? What proportion of the population has diabetes? What percentage of people are active harvesters? The stuff that you can pull from census data or health authorities...” (Interview, P149, IA practitioner). While such information is useful, the same participant noted that qualitative methods can more effectively tell the story of relationships within social-environmental systems: “...but [there’s] not a lot about how people interact with their surroundings and each other, which you have to dig a little bit deeper into the qualitative to get at that.” In addition to providing contextual information about how people interact with each other and the environment, qualitative methods can also provide historical context to the evaluation of potential impacts:

*That elements of qualitative research should be more widely recognized in impact analysis, especially for social impacts. Statistics don’t necessarily tell the story. Qualitative research also allows for a historical view to impacts rather than a point in time for most impact assessments. (Survey, P137, government/regulatory agency staff)*

The ability for qualitative methods to provide rich, in-depth information, however, is not automatic; it requires thoughtful development and application. One participant, for example, alluded to the necessity of strong analysis to achieve effective, in-depth understandings of IA issues through qualitative methods:

*We need to consider our bias towards qualitative analysis and recognize that there’s so much we can do with qualitative data, with good analysis [that] can really help us better understand... and understand the data with a lot more depth than we would otherwise. (Interview, P8, IA practitioner)*

In a similar vein, others warned against the quantification of qualitative data, feeling that such attempts “flatten” the potential of qualitative methods to contribute richness and depth to our understanding of potential impacts:

*Sometimes we work with companies and they give you their matrix of all their interviews and it’s just dot points. Whereas when you talk to people they bring alive the subject, which reflects the values but it’s [also] more persuasive. (Interview, P36, IA practitioner)*

*I’m going to collect all this qualitative data and then it just kind of disappears and gets all flattened out into nothing because they decide to measure it all. They turn it all into measures! A certain amount of quantification is fine, but not if it gets in the way of the story of what’s actually emerging from the data. (Interview, P123, researcher/academic)*

Retaining the richness of the qualitative data through qualitative data analysis and presentation is vital if qualitative methods are to effectively fulfill their role of providing in-depth, contextual information in IA. These participants’ sentiments also reflect good practice qualitative data collection and analysis, for which the intent is generally to make sense of data by organizing segments of textual or image data into themes (e.g., Creswell & Creswell, 2018).

## Qualitative Methods Embrace Complexity

Another role of qualitative methods is their ability to approach the inherent complexity and uncertainty involved in predicting and evaluating potential future impacts in IA. Participants noted that an emphasis on quantitative measurement can lead to reductionist, siloed approaches that belie the “messiness” of assessing potential impacts within complex systems:

*...my perception is that our profession, our community of professionals and practitioners and theoreticians see impact assessment as this very probabilistic, quantitative, technically sophisticated exercise. When the reality is that it's super messy. (Interview, P25, IA practitioner)*

According to some participants, qualitative methods can facilitate a more holistic understanding of the complex interactions among environmental valued components and potential impacts on these systems.

*Well, I think in the EIA you have two different things. One is the environmental aspects and within the aspects there are many, many different methods used—quantitative and qualitative methods—and that's fine. And they are tried out for a long time and some certain methods work for certain aspects or need to be done for certain aspects to get the result. But then when you want to get an overall picture and get away from these silos, you definitely, I think, need a qualitative method to have a full understanding of the entire system. I just can't get away from it and I can't find anything else. I have thought about it a lot, but I can't find anything else that does it justice. (Interview, P118, researcher/academic)*

As jurisdictions continue shifting towards next-generation, sustainability-oriented IA, qualitative methods also play an important role in understanding complex interactions within and across social and ecological systems. Participants drew attention to the value of qualitative methods for understanding the connections among biophysical, social, cultural, and health impacts. For instance, one interviewee noted:

*And if you make the connection between the biophysical and social impacts, for example using the idea, the concept of ecosystem services, that's one context, one situation where qualitative data is very important to really understand how the communities use the resource[s] of the place where they live, or where they work. (Interview, P71, researcher/academic)*

Complex projects occur within complex systems. While quantitative approaches have long been a staple of IA, qualitative methods are essential for providing a comprehensive foundation for decision-making around complex issues and interactions:

*Qualitative research is such a broad tool that is essential to most impact assessment work. Impact assessment can rely on a lot of quantitative work but these types of human decisions on complex projects can't be figured easily into a purely quantitative approach. Both will be needed in the continuing future. (Survey, P75, IA practitioner)*

*Certainly you want the best evidence available for the decision making process, and so I can't see how you wouldn't use qualitative methodologies to provide that evidence. As a decision maker, you absolutely want to see that kind of work being included in an impact assessment. And there [are] always debates about methodologies and so on, but really, I think it just really contributes to the evidentiary base that you're using. For some pretty complex and difficult issues I would say. (Interview, P150, researcher/academic)*

## Qualitative Methods Support the Broadening Scope of IA

Next-generation, sustainability-oriented IA is resulting in a transition from a primary emphasis on biophysical impacts to increasing requirements for a broader suite of social, cultural, health and well-being, economic, and equity and rights-based considerations. Such considerations have not always had a prominent role in IA, as one participant observed:

*...socio-economic/cultural/social/human health effects have largely been the lost child of EA, left wandering in the wilderness relative to the attention-grabbing biophysical effects (nothing like those stirring data tables and colourful GIS maps). And yet, in my view it is the human effects that should get top billing, from which all else flows (versus the current reverse). (Survey, P92, IA practitioner)*

**Participants indicated that as the scope of IA continues to broaden, new and innovative methods—including qualitative methods—will be necessary to meet the challenges of assessing potential social, economic, cultural, and health impacts.**

*...we assume the issues are biophysical, but in reality it's the social issues, the economic issues, health issues that are just massive in those cases [referring to large-scale projects] that are really challenging to deal with.*

*And hard to quantify.*

*Exactly, exactly. So how do decision makers deal with that? It's easier if you can say yes, these are the impacts on fisheries, we have data here to tell us this, and analysis is done appropriately. But mental health impacts, what's a good approach to doing that? So it's all going to be new. (Interview, P150, researcher/academic)*

**Qualitative methods may be particularly important in the assessment of intangible values and impacts, such as associations to place in cultural impact assessment:**

*...qualitative methods are absolutely the foundation of cultural impact assessment here. It's all about using methods to really capture people's association to place, and once you've got that association to place and what's most important, then starting to look at what the impact of the proposed activity could be and again using a range of different qualitative methods. (Interview, P57, IA practitioner & researcher)*

In some jurisdictions, including under Canada's federal IA framework, requirements for assessing this wider range of potential impacts are now enshrined in legislation. Participants suggested that qualitative methods will play an important role in meeting the expectations of these regulatory IA requirements, such as the application of gender-based analysis plus (GBA+) and the mandatory consideration of Indigenous knowledge:

*Some of the requirements of the new Act, let's say gender analysis, for my understanding predominantly it requires a qualitative approach. If you are requiring that legally now, that requires a qualitative approach. Maybe gathering Indigenous knowledge, some of that requires a qualitative approach. Some of it should be driven by recent reforms, I think, in legislation and guidance as well. I'm thinking high level, what might drive qualitative approaches and then increasingly demonstrate a good practice for sure. Just this, you know it's required demonstrated good practice of participation and methods of participation for it to become a kind of dominant stream in all environmental assessments—it wasn't always the case. (Interview, P53, IA practitioner and researcher)*

**Another participant spoke about how a commitment to the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) in some IA frameworks (for example, see Government of British Columbia, n.d.; IAAC, 2021b) is resulting in greater requirements for partnerships with Indigenous rights-holders and for Indigenous-led IA. These opportunities, in turn, create new prospects for the integration of qualitative information in IA processes and decision-making:**

*I think the thing that I would share is just to let everyone know that impact assessment is changing. The Declaration on the Rights of Indigenous Peoples—legislation in [British Columbia is] upholding that. The expectations of the new Acts that reference UNDRIP. Things are changing so that our work—when we do good qualitative research for impact assessment—is being considered by decision makers that are not just provincial decision makers or federal decision makers. It's being considered by Indigenous decision makers that have equal or greater authority. That's happening right now on the ground. (Interview, P77, IA practitioner)*



Indigenous rights, culture, knowledge, and health and well-being is playing, and will continue to play, an increasing role in Canada and particularly within federal IA processes. Indigenous-led IAs tend to have a much higher qualitative component than western scientific inputs, as they focus on “tell[ing] a story of change” (Interview, P77, IA practitioner) and better reflect values and relationships associated with land (Joly et al., 2018). Indigenous-led IA, therefore, should be seen as leading examples of how qualitative methods can effectively support the broadening scope of IA.

## Qualitative Methods Complement Quantitative Approaches

Some participants described the role of qualitative methods in terms of its relationship with quantitative approaches in IA. Generally, there was agreement that both types of methods are necessary:

*The one notion that keeps coming to mind concerns combining qualitative methods with [quantitative] social and economic and, for that matter, environmental data. They are all part of the story. As someone said, “numbers are symbols that people use to make arguments”—and so are words. (Survey, P98, researcher/academic)*

However, there was some diversity in perceptions about the roles of qualitative and quantitative methods in relation to each other. One perspective was that qualitative methods are most useful for supplementing, supporting, or filling gaps in quantitative findings. One participant, for example, noted that “[q]ualitative research is, in my view, a companion to the quantitative. It is best used as a means to supplement or explore quantitative data that is limited in scope or deficient in some way” (Survey, P96, IA practitioner & researcher). Another argued that “quantitative research has some great features, but unless it is matched with qualitative, it is often hard to really understand results” (Survey, P113, multiple roles). Qualitative methods were also described as a valuable precursor to further quantitative research, particularly useful as an exploratory tool to identify pertinent IA issues:

*Results from qualitative research can be an indicator of previously unidentified issues and lead to quantitative research that further enhances EIA and the long-term follow-up actions. (Survey, P137, government/regulatory agency staff)*

More often, however, participants acknowledged that qualitative and quantitative methods produce different, but complementary types of information:

*...they fill the gaps in in each other, but they do both bring different things and sometimes they do give a different picture. Unfortunately, I think that often the qualitative results only get used to serve the quantitative, rather than considering whether the qualitative data are telling you something different—that it is actually being presented as an authentic, different interpretation of what’s happening. If it is only selectively used to support what the quant[itative] is showing, then that’s problematic. (Interview, P123, researcher/academic)*

Therefore, qualitative methods should not just serve quantitative approaches (or vice versa), but they should be equal partners in contemporary IA processes. There is likely a need, however, for resources and guidance on harmonizing qualitative and quantitative and data to ensure qualitative findings become an integral component of IA reporting, rather than be tacked on in appendices.

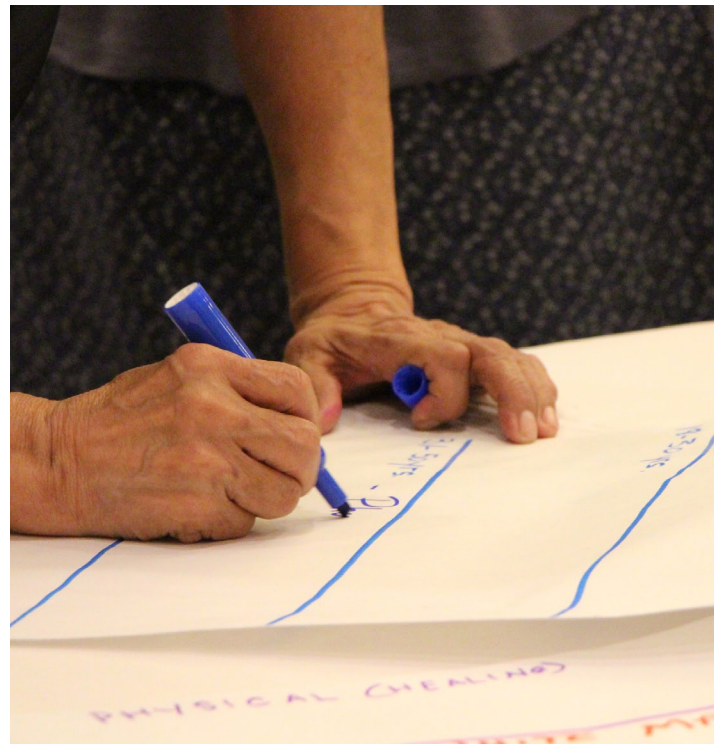


Photo source: Narratives Inc.

# Part 4: Strengthening the Effectiveness of Qualitative Methods in Impact Assessment



Although there was broad consensus among participants that qualitative methods play an important role in IA, there remain barriers to their consistent and effective use.

Practitioners, researchers, and decision makers involved in this study raised specific needs for strengthening the effectiveness of qualitative methods in IA, along with related barriers to, and strategies for, meeting these needs in practice. These needs, barriers, and strategies are summarized in Table 4.1 and elaborated below.

Need for strengthening the effectiveness of qualitative methods in IA	Barrier(s) to effective use of qualitative methods in IA	Suggested strategies for enabling qualitative methods in IA
<p><u>Need 1</u>: Elevated perceived value of qualitative methods in IA</p>	<p>An enduring bias against qualitative social science methods in IA. IA is still largely dominated by a biophysical, quantitative “culture” and qualitative methods are often perceived as less valid or scientific than quantitative approaches.</p>	<ul style="list-style-type: none"> <li>• Continually promoting the value of qualitative insights in IA</li> <li>• This core need has a “chicken-and-egg” relationship with the other needs, barriers, and enablers listed in this table. Enhancing qualitative skills and training, establishing measures that enable the meaningful influence of qualitative methods in IA, consistently implementing standards for methodological rigour, making space for community and Indigenous knowledges, and adequate attention to ethical considerations will also increase the perceived value of qualitative methods in IA</li> </ul>
<p><u>Need 2</u>: Enhanced qualitative skills and training in IA</p>	<p>Insufficient qualitative methods expertise to meet the broadening scope of sustainability-oriented IA</p>	<ul style="list-style-type: none"> <li>• Training for students and new IA professionals</li> <li>• Training for IA practitioners and decision makers</li> <li>• Hiring people with the right skills and training</li> <li>• Public education</li> </ul>
<p><u>Need 3</u>: Measures that enable qualitative methods to meaningfully influence IA processes and outcomes</p>	<p>Qualitative methods and their findings are not always meaningfully integrated into IA. Current IA practice and constraints (e.g., cost-competitiveness, IA timelines, “boilerplate” terms of reference) can disincentivize innovation and experimentation with qualitative methods in IA. When qualitative methods are used, they are not always implemented in ways that effectively contribute to the end goals of IAs.</p>	<ul style="list-style-type: none"> <li>• Reimagining IA terms of reference</li> <li>• Producing guidance and good practice examples</li> <li>• Making clear connections between qualitative methods and IA purpose and objectives</li> <li>• Creating user-friendly outputs</li> </ul>

Need for strengthening the effectiveness of qualitative methods in IA	Barrier(s) to effective use of qualitative methods in IA	Suggested strategies for enabling qualitative methods in IA
<p><u>Need 4</u>: Consistent implementation of standards for qualitative methodological rigour in IA</p>	<p>Lack of recognition of, or inattention to, established standards of methodological rigour in qualitative research in IA. An enduring notion that results must be quantified to be valid.</p>	<p>Promoting, encouraging, and implementing well-established strategies for ensuring validity and reliability in qualitative research in IA, such as:</p> <ul style="list-style-type: none"> <li>• Establishing methodological coherence</li> <li>• Rich description of findings</li> <li>• External auditing</li> <li>• Member-checking</li> <li>• Triangulation</li> <li>• Bias and reflexivity</li> <li>• Clearly documenting procedures</li> <li>• Establishing reliability in coding and analysis</li> </ul>
<p><u>Need 5</u>: Greater community and Indigenous inclusion, leadership, and control over information gathering processes</p>	<p>Current IA structures mean that certain players (e.g., government agencies, proponents, major consulting firms) often have the greatest power in decisions about IA processes and methods, which commonly leads to an emphasis on biophysical impacts and quantitative data.</p>	<ul style="list-style-type: none"> <li>• Enhancing opportunities for community-led IA</li> <li>• Centering Indigenous worldviews and values through Indigenous-led IA</li> <li>• Selecting methods and implementing them in ways that enable wide inclusion of diverse perspectives, values, and backgrounds</li> <li>• Selecting methods that promote active and early engagement in IA</li> <li>• Building community qualitative methodological capacity</li> </ul>
<p><u>Need 6</u>: Adequate attention to ethical considerations when using qualitative methods to involve people in IA</p>	<p>A lack of clear ethical standards and protocols when using qualitative methods in IA practice risks harm to individuals and communities who contribute information, knowledge, and concerns to these processes.</p>	<ul style="list-style-type: none"> <li>• Developing ethical approval mechanisms</li> <li>• Qualitative research ethics training for IA practitioners and decision makers</li> <li>• Ensuring people with experience and training in qualitative research ethics are conducting the work</li> </ul>

Table 4.1. Summary of the needs, barriers to, and enablers for, the effective use of qualitative methods in IA.

For the specific qualitative methods described in [Parts 5](#) and [6](#) to be truly valuable, it is important to address these barriers and enabling factors for strengthening qualitative methods in IA. Each of the following subsections identify a core requirement for strengthening the effectiveness of qualitative methods in IA and then elaborates on the barriers and enablers for meeting these requirements. These themes were identified through the primarily inductive [thematic qualitative analysis procedure](#) outlined in [Part 2](#).



## NEED 1

## Elevating the Perceived Value of Qualitative Methods

The undervaluing of qualitative methods was a frequently cited barrier to their effective integration in IA. This barrier has a “chicken-and-egg” relationship with the other themes discussed in Part 4. Implementing the suggestions for strengthening qualitative methods in IA (e.g., skills and training, methodological rigour, making space for community and Indigenous knowledge, etc.), to some extent, depends on the degree to which qualitative methods are valued in IA. Simultaneously, elevating the perceived value of qualitative methods in IA depends on the implementation of these suggestions. Thus, these multiple barriers and solutions must be addressed together.

While IA is slowly changing, several participants noted that the field is still largely dominated by a biophysical, quantitative “culture”:

*And I really found the system is so...it's a cultural thing. It's so biophysical. The people who commissioned the work, who do the work, read the work—it's a biophysical culture. (Interview, P36, IA practitioner)*

*You've got to understand that the whole EIA culture was largely developed by biologists and engineers. I argue that the socioeconomic side is like an appendix. It functions quietly in the background and if it becomes inflamed, you cut it out... (Interview, P32, IA practitioner)*

This biophysical “culture” has meant that quantitative approaches and tools are often perceived more valid or “scientific,” resulting in an undervaluing of qualitative social science approaches—a frustration expressed by many participants. For example:

*I feel the biggest challenge is mindset—bias against qualitative methods. Practitioners feel the need to quantify the outcomes to make IAs valid. (Survey, P8, IA practitioner)*

*There's a sense that the quantitative stuff has more value simply because it purports to be more “scientific.” It's got very specific numbers associated with it. And if you can't believe in numbers, what can you believe in, right? Well, we know that's a wrong answer. (Interview, P149, researcher and practitioner)*

*The contribution of qualitative research to impact assessment can be hindered by the dominance of quantitative measures, which can look more “scientific.” (Survey, P98, researcher/academic)*

Building greater acceptance for qualitative methods is essential for next-generation, sustainability-oriented IA. Importantly, all IA actors—practitioners, regulators, proponents, decision makers, academics, and communities and the public—have a role to play:

*Regulators and proponents should take qualitative research and its inputs seriously. Attaching quantitative values to analysis does not necessarily mean the analysis is more valid. (Survey, P72, IA practitioner)*

*All research needs credibility if it is to lead to change, so qualitative research needs to be accepted by decision makers (or equivalent) as being credible in terms of their justification of decision. It is not a trivial issue. (Survey, P126, researcher/academic)*

*Anything we can learn from the academic world more broadly about how qualitative researchers gain that credibility over the years, or where it struggled to do so, could probably help us to understand how it can be appreciated more in impact assessment. (Interview, P31, government/regulatory staff)*

*Change requires community control, mandatory obligations to consult early and well [...] and community and industry pressure to take qualitative research more seriously. (Survey, P36, IA practitioner)*

Shifting these deeply entrenched assumptions about qualitative social science methods in IA will be neither quick nor easy. As one participant noted, “I think we probably just need to be continually pressing the message that qualitative insights are just as important as quantitative data. But I don't know, is that enough? I've been saying that for years...” (Interview, P31, government/regulatory agency staff). While it is important to continue pushing this message, several additional ways to enhance the contribution of qualitative methods in IA have been suggested. These suggestions are summarized in thematic categories (Needs #2–6) and listed in the order of relative frequency as discussed by participants.

## NEED 2

## Enhancing Qualitative Methods Skills and Training

Many participants cited appropriate skills and training as an important requirement for strengthening the contribution of qualitative methods in IA. As the scope of IA continues to widen beyond primarily biophysical considerations, there is a need for expanded skillsets—and the inclusion of professionals with the appropriate training and skills—to ensure that the qualitative aspects of assessment are conducted in a rigorous and ethical manner:

*There are currently not enough qualified practitioners to meet the demand created by the new IAA. Practitioners with a foundation in qualitative data collection and analysis techniques are not necessarily a given, and it reduces the rigour that should be applied to analysis and outcomes. (Survey, P117, IA practitioner)*

Participants offered a range of suggestions for enhancing qualitative methodological skillsets in IA, including training opportunities for students, practitioners, decision makers, and the public, as well as ensuring the people with the right skillsets are brought into IA processes.

### Train students and new IA professionals

Several participants noted that the traditionally biophysical nature of IA has meant that university IA courses and, subsequently, the IA field has tended to attract students and new professionals with training primarily in the natural sciences:

*...many of my [IA] students are science students or engineering students [...] So they have either a degree of science or in engineering, and almost never in social science. (Interview, P22, researcher/academic)*

This points toward a need to expand IA courses and, more broadly, environmental science programs to include training in qualitative social science methods. It also means finding ways to ensure that those with social sciences training see the IA field—and IA courses—as relevant to their skillsets:

*But I think that sort of broadening the scope of how we teach environmental impact assessment or impact assessment is really important. So that at least there's some understanding of [the qualitative aspects of IA], but also bringing in social science students as well to kind of broaden that understanding. (Interview, P150, researcher/academic)*

*...we need to find more people that we can train from the social side to get into our processes. They know the methods, but they don't know impact assessment. (Interview, P119, researcher/academic)*

### Train IA practitioners and decision makers

Participants drew attention to a range of aspects of qualitative research that require specific training in the IA context, including the philosophical underpinnings of qualitative methods, ethics procedures and protocols, the array of qualitative methods available, how to implement them and analyze the resulting data, and what rigour entails in qualitative research:

*I think there are too many deep philosophical considerations to understand in qualitative research to learn it just by doing. (Interview, P110, government/regulatory staff)*

*Entering a community that is dealing with colonialism, for instance, and asking sensitive questions of members, can result in a lot of trauma and harm—not every consultant should be able to do this without having had specific training, experience, ethics clearance, and the ability to provide support services. (Survey, P9, government/regulatory staff)*

*Training practitioner[s] on proper use, sampling, analysis, and interpretation of qualitative methods/data. If this is weak or absent, nothing much else matters in terms of the integrity, value, and influence of the results. (Survey, P68, researcher/academic)*

While most of these participants spoke about these skills in reference to IA practitioners, others also noted the importance of IA decision makers having the appropriate skills to critically review IA reports, results, and conclusions that include qualitative information:

*And I think it would be like a really great opportunity to also be—I don't want to say training or educating—but raising awareness of those methods with regulators and decision makers so that when they receive reports they understand [...] what they're looking at and what it means. (Interview, P106, IA practitioner and researcher)*

Besides integrating qualitative methodological training in IA-related university courses and programs, participants also noted that professional associations and government bodies should play an important role in providing training for IA professionals who apply or review qualitative methods in their work. This can come in a variety of forms, such as certification (e.g., Environmental Institute of Australia and New Zealand's Certified Environmental Practitioner Scheme or ECO Canada's Environmental Practitioner designations) or micro-credentialing, informal courses and presentations, and the creation of guidance materials.

## Hire the right people

Several participants noted that while training is important, it is often even more critical to ensure people with the right skillsets are brought into IA processes and decision-making bodies:

*It also has to be something more than a consulting firm bringing in an expert to do a little workshop on qualitative methods or something like that. I think you need a staff person. I think you need a rigorous trained social scientist on staff who can train others up, someone who can really be there through the whole process to provide guidance and advice. Provide expertise on an on-going basis. (Interview, P123, academic/researcher)*

*I think it involves getting more people from the social sciences actually working higher up in the existing three areas of control, which is government, industry, and consulting. I think that's absolutely critical. And I think it involves getting Indigenous people, in particular, interested in doing this type of work so that they can be, as they say, strong like two people and start to meld the qualitative and quantitative in a way that is more innovative. So those are some of the things that I think are absolutely critical. (Interview, P149, IA practitioner)*

As previously noted, however, trained qualitative social science researchers have often not been exposed to impact assessment as a potential career path and may also require additional training on how their skillsets can meaningfully contribute to IA.

## Public education

Since qualitative methods in IA often involve public stakeholders and potentially affected communities, public education initiatives were also cited as a mechanism to enhance the effectiveness—and extent of use—of qualitative methods in IA:

*Educating practitioners in the first instance so they use more formal methods and explicitly note these. Flowing on from this would come community familiarity with methods and expectations that they be used more (as appropriate to context of course). (Survey, P124, role unknown)*

*The other that's important is that we can get creative about... I'm going to call them public education campaigns that really make qualitative research more accessible to people. (Interview, P8, IA practitioner)*

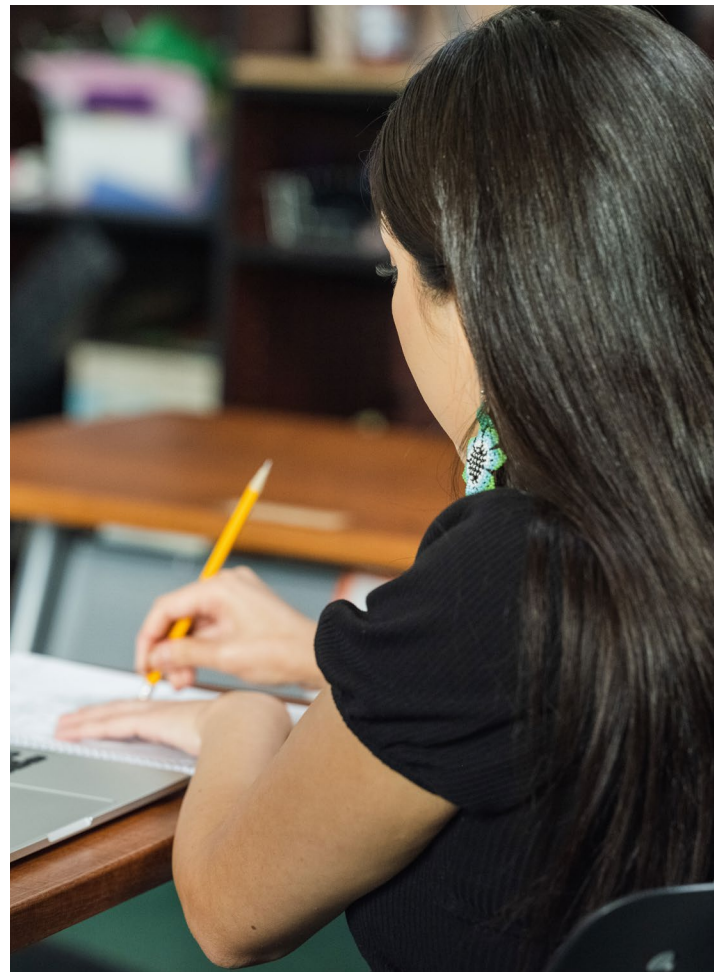


Photo source: Adobe Stock.

## NEED 3

## Ensuring that Qualitative Methods Influence IA Processes and Outcomes

A significant barrier noted by participants is the widening gap between the expanding demands of next-generation, sustainability-oriented IA and the inertia of current IA practice, which means it can be challenging to ensure qualitative methods meaningfully influence IA processes and outcomes. Though legislation and academic literature is “inviting a much deeper methodology to be used in terms of qualitative research or the social impact side” (Interview, P38, researcher/academic), this invitation may be at odds with the cost-competitive and time-constrained environment of IA practice that incentivizes “cookie cutter” (Interview, P147, IA practitioner and IA agency representative) or “boilerplate” (Interview, P123, researcher/academic) approaches:

*The bottom line is that in a cost-competitive situation, you wind up trying to do it as cost effectively as possible and that leaves absolutely no room for experimentation [...] And you've got this huge, huge inertia that's keeping the system going the way it is and doing a research project on new qualitative methods isn't really going to have any effect on that until such time as things like terms of reference change, budgets change. And that there's recognition within the whole EIA process that there is a role for socioeconomics. (Interview, P7, IA practitioner)*

Ensuring qualitative methods can meaningfully influence IA requires alterations to IA practice. As the above participant mentioned, such changes include reimagining how IA terms of reference are developed and, as described earlier in this section, elevating the value of qualitative approaches in IA. Other participants noted that when qualitative methods are applied in IA, “sometimes it’s not thought through with who is the endpoint, who is the decision maker, who is the policymaker, who is the user” (Interview, P54, government/regulatory agency staff) and so it is vital for those doing this work to “us[e] the research purposively to meet the aims at relevant stages of impact assessment” (Survey, P17, government/regulatory agency staff). Practical strategies to ensure qualitative methods meaningfully influence IA include developing guidance and good practice examples, establishing clear objectives and timelines that align with IA decision-making processes, and developing user-friendly outputs.

## Reimagine terms of reference

Terms of Reference (ToR) documents frame the scope of IAs. These documents are typically developed through consultative processes between project applicants and decision-making agencies, with input from rights-holders, stakeholders, and the public. Several participants noted that ToRs in many jurisdictions have not significantly evolved over time and continue to rely primarily on indicators that facilitate quantitative analysis. ToRs will need to be reimagined if important subjective valued components are to be included and rigorously evaluated using qualitative approaches:

*Because [the terms of reference is] the starting point, right? That's your cookbook. What if they're wrong? If you haven't asked the right questions from the beginning and it's not reflected in your terms of reference, well then nothing is ever going to change [...] if all the indicators are quantitative in nature, then there is no room for qualitative analysis. So, the only way of creating a need for qualitative analysis is to go back and look at those terms of reference and see if they can't be reworked in such a way that those questions of community, sustainability, and everything else are dealt with as a mandatory requirement. (Interview, P7, IA practitioner)*

*So, I think it's just a matter of greater education and awareness, and a better definition. If you're doing terms of reference for EIS, making sure that they support achieving a broad analysis of what the actual impacts will be. I think it's from a bit of both sides, the practitioner but also from a regulator side, making sure that terms of reference actually support that... Enable qualitative assessment. (Interview, P47, IA practitioner)*

Enabling qualitative assessment through ToRs is beginning to occur in some cases. For example, the Tailored Impact Statement Guidelines (essentially the terms of reference) for the Heartland Complex Expansion Project under the IAA require the applicant to analyze the extent to which the project contributes to sustainability (IAAC, 2021a). The sub-requirement to consider project interactions with sustainability and well-being as defined by potentially affected Indigenous rights-holders, for instance, would lend itself to a qualitative approach. Another brief example is provided in case study 4.1.



## Case Study 4.1.

### Pine Point Mine Project Terms of Reference

The Pine Point Mine Project is a proposed open pit and underground zinc and lead mine located on the south side of Great Slave Lake in the Northwest Territories, Canada. The Terms of Reference (ToR) for the environmental assessment were prepared by the Mackenzie Valley Environmental Impact Review Board<sup>1</sup>—the governing body for environmental assessment in the Northwest Territories. As with other ToR, the document requires the proponent to assess project impacts on individual valued components, including specific indicators related to air and land, the biophysical environment, and people and communities. The ToR indicate that the description of baseline conditions and impact assessment should rely on both quantitative and qualitative information as necessary. While many of the specific required valued component assessments (e.g., surface water quality and quantity, night-time light levels, sound levels, employment opportunities) lend themselves to quantitative analysis, many others (e.g., changes to perception and connection to the land, sense of place on the landscape, social cohesion, psychosocial impacts) are not easily quantified and are likely better evaluated qualitatively. Beyond the assessment of individual valued components, the ToR also innovatively require the application of systems thinking to holistically assess interconnections among individual valued components in three key areas of inquiry: keeping water safe and clean; lasting well-being; and sustainable boreal caribou protection and harvest (p. 7). In the case of well-being, for example, the proponent is required to work directly with each potentially affected community and Indigenous group to systematically determine what lasting well-being means to them and how it may be affected by the interconnections among social, economic, health, cultural, and biophysical impacts caused by the project. A systems method with a qualitative component and case study example that enables such an analysis are described further in section 7 of this report.



1 Mackenzie Valley Review Board (2021, November). *Terms of reference: EA2021-01, Pine Point Mining Limited, Pine Point Mine Project*. [https://reviewboard.ca/upload/project\\_document/EA2021-01%20Terms%20of%20Reference%20Final%20\(2\).pdf](https://reviewboard.ca/upload/project_document/EA2021-01%20Terms%20of%20Reference%20Final%20(2).pdf)



## Provide guidance and good practice examples

An identified strategy to enhance the ability of qualitative research to meaningfully influence IA is the development of additional guidance that elaborate on the “basket of qualitative methods that are available to us and how they can be used” (Interview, P57, researcher and practitioner) as well as “their risks and benefits and advice on where and when they have been or could be effectively applied” (Survey, P61, IA practitioner). Participants were clear that guidance should demonstrate how the qualitative methods are specifically relevant to IA practice:

*Understanding of how to effectively use evidence gathered in this way alongside or instead of quantified data to deliver a compelling justification to conclusions you seek to make in your IA work. (Survey, P61, IA practitioner)*

Participants also indicated that a repository of case study examples of instances when qualitative methods successfully influenced and added value to IA would be valuable.

## Establish clear purpose and timelines

Establishing clear research objectives and timelines that align with community needs and decision-making processes enables qualitative methods to meaningfully influence IA processes and outcomes. This includes having a very clear picture of what the qualitative methods are trying to achieve and “designing the right kind of questions for [the] research” (Survey, P139, role unknown). Participants also noted that qualitative methods are often perceived as too time consuming to easily fit within the defined timelines of IA. This does not mean that qualitative methods shouldn’t be applied, but that they need to be designed in ways that align with the timelines and needs of clients (including communities in the case of community-led assessment) and decision makers:

*There [are] ways of skillfully being able to approach research so that it is done in a matter of weeks and the community feels that the results are reasonable in a matter of weeks. And there are ways of presenting that research in ways that can influence decision makers. (Interview, P77, IA practitioner)*

At the same time, however, flexible timelines and suitable budgets from regulators, decision makers, and proponents are required to allow sufficient time for genuine relationship building and rigorous application of qualitative methods. From the IA practitioner’s perspective, therefore, designing efficient qualitative methods requires good communication—and negotiation, in some cases—with clients and decision makers about process timelines and planning from the earliest stages of IA. It can also be valuable to explicitly map research activities to key IA process and decision-making steps, ensuring the activities all meaningfully contribute to the determination of what are significant effects in a specific context—the *raison d’être* of IA.

## Produce user-friendly outputs

Qualitative methods that effectively influence IA decision-making require user-friendly outputs. A challenge with qualitative methods in IA “is that qualitative researchers are not often used to conveying their research in a very brief, very succinct, very easy to understand way” (Interview, P86, IA practitioner). Participants recommended qualitative researchers and practitioners consider how findings might be presented in ways that are engaging, visual, and tailored to the intended audience (e.g., clients, communities, public, decision makers):

*And so that’s been the struggle with qualitative information. I think on the quantitative side everybody has dashboards, everybody has graphics and things. I felt like we’ve effectively kind of transitioned to effective communication on that side, but this qualitative piece I find a lot more challenging. Perhaps that’s why I think of it—because we can do all this work analyzing and then nothing happens if we don’t present it well. (Interview, P26, IA practitioner)*

Several of the methods outlined in [Part 6](#), such as systems analysis, spatial methods, and visual methods, may quite naturally lend themselves to engaging, visual outputs. For other methods that produce a great deal of narrative data, such as interviews and focus groups, careful consideration must be given to how the results can be presented in impactful ways. This may include the skillful use of quotes, engaging narratives, summary tables, infographics, and flow charts, for example. In addition, participants spoke about the problematic tendency to relegate qualitative information to IA report appendices. For qualitative information to be impactful, it must be integrated with other findings that make up the core of IA reports.

## NEED 4

## Consistent Implementation of Standards for Methodological Rigour

Recognizing and enhancing methodological rigour (or quality) was often cited as necessary for strengthening the effectiveness of qualitative methods in IA. In some cases, logistical barriers such as short IA timelines, financial resources, and an overall lack of guidance on elements of rigour were mentioned as factors that can hinder the application of robust data collection and analysis:

*And I do think it's essential and I do think impact assessments are weak on it, for a couple of reasons—the teams either not having the training in social research methods and also the time and budget not being allocated to it. (Interview, P146, IA practitioner and professional association representative)*

Barriers also related to previous themes in this section, including the enduring idea that results must be quantified to be valid and the general undervaluing of qualitative methods in IA. For example, one participant noted “I think there [are] some built in prejudices around the rigours of social science” (Interview, P150, researcher/academic), while another spoke about “a fear that qualitative data are associated with terms like anecdotal, individual, perceptions” (Interview, P149, IA practitioner). As some participants argued, there are well-established standards for rigour in qualitative research, but they are *different*—yet just as important—as those in quantitative research:

*...qualitative data is as rigorous and as reliable as quantitative data as long as you follow the rules, as long as you do what is expected of you as a qualitative researcher. There are different rules, they are different methods, but there should be an equal amount of rigour in the research. It's not as apparent in qualitative work, but it is there. (Interview, P49, IA practitioner)*

I think there is a deficit of esteem in qualitative work among the “numbers” people who make the decisions. In part this is from a lack of recognition of the methodological underpinnings and norms/markers of quality in such work. Incomparability and lack of “units” is also a challenge, from that more quantitative perspective. Qualitative researchers may need to be more transparent, methodologically, in turn. (Survey, P123, researcher/academic)

As with quantitative methods, the rigour of qualitative data collection and analysis can be established through attention to validity and reliability (the terms “trustworthiness” and “credibility” may also be used) (Creswell & Creswell, 2018; Leavy, 2017; Lincoln & Guba, 1985; Savin-Baden & Major, 2013). Importantly, however, the indicators of qualitative validity and reliability differ from those used in quantitative methods. Qualitative validity refers to whether the findings of a study are deemed accurate or trustworthy from the perspective of the researchers, participants, and readers (Creswell & Creswell, 2018). Participants suggested strategies for enhancing rigour when using qualitative methods in IA, many of which align with established best practices. These strategies include methodological coherence, rich description, external auditing, member checking, triangulation, and researcher reflexivity (Creswell & Creswell, 2018; Savin-Baden & Major, 2013). Qualitative reliability refers to the consistency of procedures across researchers and projects (Creswell & Creswell, 2018). Participants also suggested strategies for establishing reliability, such as the detailed documentation of methodological procedures and mechanisms for consistent analysis and interpretation across researchers.

Importantly, as the push to centre Indigenous worldviews and knowledge in IA continues, the arbiters of what constitutes rigour in Indigenous-led IA must be Indigenous peoples themselves. Centering these knowledges and worldviews through Indigenous-led IA requires establishing and honouring Indigenous definitions and criteria of rigour.

### Establish methodological coherence

Methodological coherence refers to research design that ensures logical flow among the questions that are being addressed, the chosen methods and their implementation, and the analysis procedures (Savin-Baden & Major, 2013). Much of this work is done up-front and requires careful planning:

*...that's very important, as you know, the work that goes into trying to action the approach in the field for impact assessment. [Be]cause there's a lot of work you have to do to action that approach. It's not just going out doing interviews and putting them in an excel spreadsheet. (Interview, P8, IA practitioner)*

Other participants mentioned the importance of getting the initial questions right, designing methods to follow

established good practice, and acknowledgement that “qualitative methods are tools well suited to particular tasks—not well suited to others” (Survey, P77, IA practitioner). Because qualitative research is somewhat iterative, questions and methods may need to be adjusted to fit the realities of the IA context. Reporting these adjustments and the rationale for the adjustment can be important for demonstrating methodological coherence is maintained throughout a study (Savin-Baden & Major, 2013).

## Provide rich description of findings

Participants noted that a challenge in IA is that there is often a significant geographical gap between the project location and the decision makers:

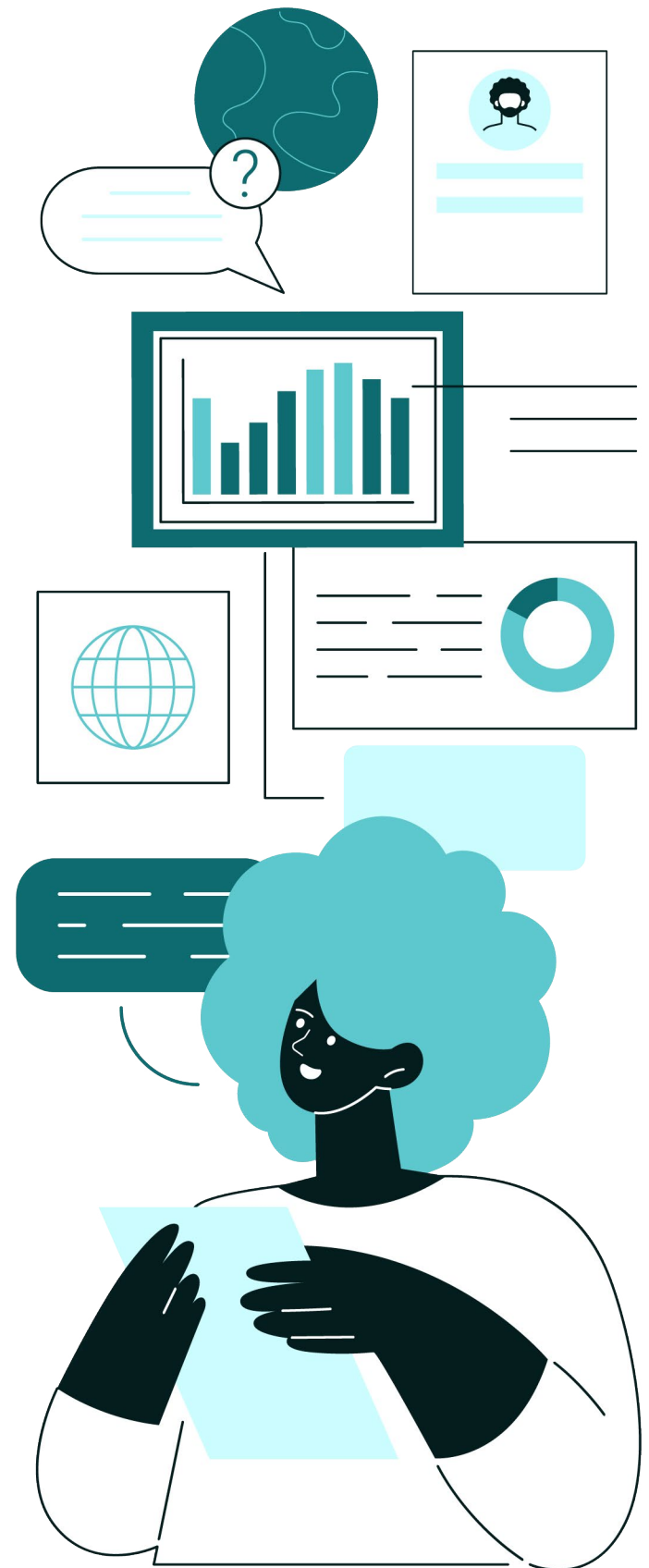
*Too many times have I tried to have a nuanced place-based conversation over the phone with someone who lives across the country. The recipient has a responsibility in terms of the context of the data as well [...] In this context, specifically decision makers—like when you’re talking about something as subjective and experience-specific as significance. Like what is significance to a person who can’t catch fish versus a person who lives 5000 kilometers away and has never stood at that river. (Interview, P106, IA practitioner and researcher)*

This participant’s particular suggestion was to have decision makers physically visit places of significance. However, rich description of the setting and qualitative findings can also help transport the reader in this way, as it makes the results more realistic and relatable to its readers (Creswell & Creswell, 2018). Successful presentation of qualitative results may also require “changing the tone of some of the reports to make them more accessible and less technical” (Interview, P8, IA practitioner).

Also important to rich description is grounding the results and identified themes in the words of participants—which usually are the data in qualitative research (Leavy, 2017). An important consideration is to select quotations that are representative:

*I will put in direct quotes, unattributed, to give the flavor and the depth and the character of the comment. I would need to be cautious against cherry picking information without a solid base because it points people in the wrong direction. (Interview, P63, IA practitioner)*

Grounding the data in direct quotations can make readers more confident in the interpretation of the data and summary themes provided by the researchers. It will, however, also be necessary to normalize the use of such narrative-style reports in IA.





## Seek out external audits

External auditing involves a close review of the entire study, including methodological choices, analysis, and interpretation of the data, by someone outside the project team (Creswell & Creswell, 2018). Participants suggested that such reviews may be particularly important in a system like IA, where many of the studies are commissioned and submitted by project proponents. IA decision-making agencies play a key role in reviewing the quality of studies in IA, though other external experts and groups may also contribute:

*I think in any kind of analysis in impact assessment, you always have to be forthcoming about whether it's adequate or not, and I just find that a fundamental flaw in all aspects of impact assessment. We're often overconfident...massively overconfident in some cases [...] And so it falls back to groups doing the analysis or opposing the project or decision makers to be able to pull that apart or to be more rigorous in their analysis. But often that's difficult. (Interview, P150, researcher/academic)*

A representative of an IA decision-making body mentioned that “the most useful way we’ve done that [reviewed the quality of IA studies]—we have the option of getting external experts or internal experts, so we can hire as we need to for different things” (Interview, P147). The participant elaborated that this could include subject matter, methodological, and community experts. The value of expert reviewers also reinforces the need for IA decision-making agencies to build internal expertise for evaluating qualitative studies in IAs, as discussed in the “skills and training” section.

## Member-check information and interpretation

Participants mentioned the importance of verifying qualitative findings and interpretations with those who participated in the study as a way of enhancing the perceived credibility of the study and identifying any areas where researchers unintentionally misinterpreted participants’ inputs:

*...you have to synthesize and create a story. But then more important to that, you then have to take that back [to participants] and consult on it and then have a second round that then would get modified [...] they say “oh, no, I really said this—this is important.” (Interview, P52, IA practitioner)*

This type of verification is generally referred to as “member-checking”, which involves inviting feedback on the accuracy

of data interpretations from the perspective of those who participated in the study (Creswell & Creswell, 2018; Savin-Baden & Major, 2013). One participant who primarily works with community- and Indigenous-led IA also shared the importance of ensuring that the research is not only viewed as credible and accurate in the eyes of decision makers but also communities:

*I don't think that rigour is only on one side. I don't think the rigour is only on the external side. There's a level of rigour that has to be demonstrated to community members and to Elders and knowledge holders. If you end up with a data set and a set of information that holds water and it's really strong in front of a court, but the Elders and the community members do not recognize it and do not see it as their own and do not see it as legitimate based on their perspectives, you've got a real problem. (Interview, P77, IA practitioner)*

## Triangulate information

Triangulation involves cross-examining evidence from multiple methods and/or data sources to build confidence in the themes identified through qualitative analysis (e.g., checking the analyzed literature review and interview/survey data against each other for the methods write-up in part 6 of this report). Several participants recommended “us[ing] multiple techniques [...] not just us[ing] a single approach” (Survey, P129, IA practitioner & researcher) and others noted that they use triangulation to “confirm results from multiple sources” (Survey, P1, IA practitioner) in IA. However, cautions about this technique were also raised. A workshop participant, for example, stated that information in IA does not always neatly triangulate—differences across data sources may simply mean that various stakeholder groups are affected or perceive impacts differently. Savin-Baden and Major (2013) agree that focusing on themes that appear across multiple data sources poses the risk of sidelining data that does not fit, so researchers must be mindful and discerning when using triangulation.

## Embrace reflexivity

Some participants referred to the concept of bias and advocated, for example, that IA “researchers adhere to standards of qualitative research to reduce the degree of researcher bias” (Survey, P49, IA practitioner). Strategies of achieving rigour mentioned elsewhere in this section, such as member-checking and avoiding cherry-picking quotes, can help ensure that the findings are not unduly influenced by researchers’ personal agendas.

Whereas eliminating bias is often a goal in quantitative research, the concept of reflexivity is typically considered more pertinent when using qualitative methods (Galdas, 2017). Qualitative methods explore how people ascribe meaning to their experiences and recognize that this meaning is shaped by personal and social values and backgrounds (e.g., culture, worldviews, gender, ethnicity, education, socioeconomic status, etc.). Reflexivity is the process of reflecting on and articulating how researchers/practitioners' own values and backgrounds influence methodological choices, interactions with participants, and interpretations of findings (Savin-Baden & Major, 2013). These reflections are often written into qualitative research reports through "positionality statements":

*...especially when you jump into how bias and positionality is affecting your results. Someone might read that and think, oh my god, that means these results are invalid. And you're like, well, no [...] I think it would be especially positive for people to understand that bias—like who's writing this? Is it a white person who's coding Indigenous input? And it's just that is important information for you as a reader to know—and not [that] it's not valid. (Interview, P106, IA practitioner and researcher)*

Reflexivity in qualitative research, therefore, is meant to bring an element of awareness and transparency about the lenses through which the research is being developed and interpreted.

## Document procedures

A lack of methodological transparency was a concern raised by multiple participants. For example:

*...if you get a fish and fish habitat study, there's a methods section. But if you get qualitative data, usually it's just a presentation of qualitative data with no explanation of where it came from, how bias and positionality play into the collecting of that data, and what it means for the outcomes. (Interview, P106, IA practitioner and researcher)*

Thorough documentation of methodological procedures and validity considerations is one strategy that can enhance the perceived value of qualitative studies in IA and also ensure decision makers and other readers are able to evaluate the quality of the studies. Others noted that there is often also little transparency around the methods decision makers

use to analyze and synthesize the information received throughout IA processes, which can reduce stakeholder, rights-holder, and public confidence in decisions:

*The end of the line methods are qualitative and, at least in Brazil and in Canada, they are opaque, they are in the brains of the senior decision makers. And that's a big problem we should be trying to address—this black box in the end of the line of the prediction process, because it's a paradox. (Interview, P74, IA practitioner and researcher)*

While many cited the lack of methodological documentation of qualitative information in IA as problematic, considerations were also shared regarding the potential negative implications of methodological transparency. For example, in community-led IA, those tasked with writing the reports may have important in-depth knowledge of the community that lends rigour to the account but may not have the background to write a detailed method section (Interview, P106). Another practitioner raised a concern that transparent documentation could result in the co-option of innovative methods for uses outside of their original purpose or intent or by competing consulting companies (Interview, P8).

## Ensure reliability in coding and analysis

In addition to the transparent documentation of procedures, measures such as reviewing transcripts for accuracy, consistency in coding of qualitative data, having multiple data coders, and regular communication among the research team about analysis can lend reliability to a qualitative study (Creswell & Creswell, 2018):

*There's going to be some multi-coding we can have more than one person look at the data, particularly for those who are uncomfortable with subjectivity. I think that would be critical. And we're going to have these stages where we come together and talk about what we found and then we're going to go back to the data. (Interview, P123, researcher/academic)*

Further information and implementation tips for [qualitative data analysis](#) can be found in Part 6 of this report.

Presented in this subsection are some elements of qualitative validity and reliability that were specifically discussed as important in the context of IA. A qualitative study quality checklist is provided in [Appendix C](#).

## NEED 5

## Greater Community and Indigenous Inclusion, Leadership, and Control

Participants expressed concern that certain players have greater power in IA, which can limit the extent to which community and Indigenous values, knowledges, and perspectives are meaningfully included through qualitative methods and IA more broadly. For example:

*One of the battles is when Corporate Affairs people try and control what you do. They've put a very positive version of a project forward and one of the reasons why they can be very nervous about you going out and doing interviews independently is that you're actually challenging their narrative. And one of the very challenging issues about doing independent social impact assessment is you are rarely really independent. The client has to approve what we do and not all clients are brave enough. (Interview, P36, IA practitioner)*

*I think for me for years what I've been saying is that we have to change the power structure of how impact assessment is done. Right now, you have three big circles and a couple of smaller circles off to the side. The three big circles are the government agencies responsible, the proponents, and big consulting firms. Each of them has a formula for how they do what they do, and it tends to focus on the things that the people running the show are comfortable with, which is about physical environment and quantitative data. On the outside looking in are Indigenous people and any other interested Canadians and they're in the small circles. And those circles...that focus of power really needs to shift. So, you're seeing it with things like Indigenous-led impact assessment. (Interview, P149, IA practitioner)*

As discussed in Part 3, qualitative methods can more effectively integrate a broader range of values and perspectives than quantitative methods. Therefore, a more prominent role for qualitative methods in IA may help shift this locus of control held by the “three big circles” in IA. This can occur through a continued shift towards greater community control over IA processes, such as in Indigenous-led impact assessment—as noted in the last interview quotation. Others also argued, for example, for “more acknowledgement that qualitative methods should be culturally appropriate and led by Indigenous peoples” (Survey, P41, IA practitioner) and for

“empowering impacted parties themselves to conduct this research, rather than having them be the subjects of research by a third party” (Survey, P122, IA practitioner).

## Centre Indigenous worldviews and values

Related to community control in IA, participants noted the importance of making space for Indigenous worldviews and values, and the methodologies that flow from these:

*Values and worldviews of the people involved are often missing in IA. Especially in the case of Indigenous peoples, worldviews are important. (Survey, P12, researcher/academic)*

*Make sure Indigenous peoples and their decision-making methods are part of next-generation IA. (Survey, P112, multiple roles)*

The following participant, however, noted that centering Indigenous frameworks can be challenging within the current IA landscape:

*...our [cultural impact assessments] are this really cool hybrid of responding and being quite strategic about what decision makers need while at the same time really developing cause. What we're missing in terms of methods I think is really strong Māori frameworks and ways of promoting or portraying information [...] But we are limited from doing that because the way we write [cultural impact statements] and the methods we use are very geared towards getting information in a certain format. (Interview, P57, IA practitioner and researcher)*

As this participant suggests, ensuring that Indigenous-led assessment rooted in Indigenous worldviews are viewed as legitimate requires a structural shift in IA more broadly. Where possible, delegate parts of IA processes—including decisions about how data are collected, analyzed, and interpreted—to communities.

Participants also proposed actions that can be taken within existing IA structures required to ensure that qualitative methods are conducted in ways that respectfully and effectively makes space for community and Indigenous knowledges. As noted above in Need #2, this includes ensuring Indigenous people are hired into high-level, decision-making positions. Other conditions include ensuring a wide range of voices are included, early and active engagement, and capacity building.

## Ensure wide inclusion

Participants promoted designing qualitative methods and “obtaining data that is representative of the entire community” (Survey, P37, IA practitioner), including those who are in favour and opposed to the proposed project, those directly and indirectly affected, and those from various language, literacy, and cultural backgrounds:

*Ensuring representation of all those affected, including those who are not directly affected. (Survey, P83, IA practitioner and government/regulatory agency staff)*

*I think that research techniques that allow for a stepwise process of proposal information dissemination and then assessment participation, that can take into consideration different levels of literacy capacity, language, and cultural contexts, and that allows for meaningful and understandable participation would be particularly important in future qualitative research in impact assessments. (Survey, P89, IA practitioner)*

Another participant encouraged careful consideration of who may be particularly vulnerable or whose voices may be hidden, which varies across contexts, and to ensure these voices are included in IA processes:

*We strongly recommend disaggregation down to the smallest reasonable unit of analysis, whether it's a small community, small Indigenous community, or in some cases it's cohorts within those communities that might be subject to a higher risk. [...] there is a cohort of primary land users, single moms, and Elders, that will be hidden in the mass. And to our mind, that's one of the reasons why we've taken to interpreting this new concept of Gender-based [Analysis] Plus as being the important element of that—gender-based is obviously important, but we really key in on the Plus. Because Plus for us means any potential vulnerable subpopulation. And it might not be women. It might not be people that don't assign to a certain gender. It might include youth. It might include Elders. It might include people that prefer to make their living off the land. (Interview, P149, IA practitioner)*

## Enable early and active engagement

When asked about ways to strengthen the use of qualitative methods in IA, several participants noted the importance of “participatory approach[es]” (Survey, P76, IA practitioner), as well as active and “early engagement” (Survey, P6, multiple roles), particularly with potentially affected communities.

One participant, for example, distinguished between passive public consultation processes and active engagement through qualitative data collection to inform the early development of IAs:

*And then I think for some of the development projects that you see, particularly in EIA for example, that kind of qualitative element sometimes only comes as part of consultation when it's a done deal and it's a draft report. So, from my perspective, I think what we're talking about is sort of active participation and involvement of stakeholders and decision makers rather than that passive form that's later down the line. Then you get the [consultative] information and the feedback rather than actively going out and ask people as part of your qualitative methods in IA. So, you do sort of see that in quite a lot of impact assessments I think, and I see it as part of some [health] IAs too. (Interview, P54, government/regulatory staff)*

Early and active engagement can also mean co-developing methodologies with those who contribute knowledge and information to IA processes. Another participant highlighted the important of active engagement through innovative qualitative methods in IA, which can be enjoyable, lead to authentic information sharing, and generate positive learning outcomes.

*So, the consultant [for an environmental assessment of a small irrigation project], he shows up once, and all he does is comes with twenty questionnaires, and he says to [my student], “Would you hand out these and get them done and get them back to me.” That was his level of participation. It doesn't engage, you don't get authentic information. It's a formality. It's bureaucratic. So this idea of a high-level engagement and fun, if you can figure that out, I think you're getting good information, authentic information. (Interview, P5, researcher and IA practitioner)*

## Build capacity

A small number of participants cited the need for building community capacity for IA. For some this means building capacity and knowledge of assessment and methods in the public sphere, including “informing the public and politicians about impact assessment: what is feasible, how it fits with plan/project development, legal requirements etc.” (Survey, P88, IA practitioner). For others, it means empowering communities to build research capacity as part of the structural shift towards more community-controlled IA:

*More community capacity to facilitate community member involvement in developing and implementing quantitative research. The rush often leads to consultants doing the work instead of capacity building within a community to provide sustainable employment to community members and ensure that community members are driving the research. Community in this context is Indigenous community. (Survey, P41, IA practitioner)*

Several participants indicated that community capacity building is likely most effective when it is done strategically and outside the scope of individual project IAs.

## NEED 6

# Adequate Attention to Ethical Considerations

Strong ethical protocols are imperative when using qualitative methods to ensure no harm is done to the individuals and communities involved. Many participants spoke about ways they integrate ethical protocols in their own IA work. They also expressed concern that there are no formal processes for seeking ethical approvals in many jurisdictions where IA is practiced:

*Ethics!! It is so important to ensure that those conducting qualitative research participate in some sort of ethics approval or have an ethical requirement to ensure that the data is collected and used in an ethical matter (and aligned with OCAP principles for Indigenous communities: <https://fnigc.ca/ocap-training/>). In [British Columbia], this is not a requirement and I foresee many issues as the need and interest in conducting more social/health qualitative research arises. (Survey, P9, government/regulatory agency staff)*

*I have never seen any social baseline getting any type of ethical approval. Never, ever, and that's where I always struggle. We don't want to provide health questions to household surveys for social baseline that don't have any form of ethical approval. (Interview, P121, IA practitioner)*

Suggestions for ensuring qualitative methods are conducted in an ethical manner include the development of ethical approvals mechanisms, ethics training for practitioners and decision makers, and ensuring people with experience and training in qualitative research ethics are conducting the work:

*Training practitioners and ethics—impact assessment practitioners may not have any experience applying qualitative methods to the IA process. Without oversight, these practitioners can harm people and communities. (Survey, P30, multiple roles)*

*The need for ethics and/or ethics approval and for a registrant body to oversee the professionals. (Survey, P9, government/regulatory agency staff)*

One participant also noted that practitioners must be ready to communicate the importance of ethics procedures to proponents, who may not be familiar with ethical standards in qualitative research:

*Also just explaining to clients what the process is and why aspects of the process are important. Sometimes going through ethics and consent and data ownership can feel like a drag for clients who really want to get the work done. But it's a pretty critical part of the process. (Interview, P106, IA practitioner & researcher)*

Resources related to ethical qualitative research in Canada include the [Tri-Council Policy Statement \(Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, and Social Sciences and Humanities Research Council, 2022\)](#), [ownership, control, access, and possession \(OCAP™\) principles \(The First Nations Information Governance Centre, 2014\)](#), and the [CORE-2022 online course \(Panel on Research Ethics, 2022\)](#). Others noted the importance of trauma-informed approaches to IA and working within the “Ethical Space for Engagement” (Ermine, 2007).



# Part 5:

## Qualitative Methods for Impact Assessment—An Overview





## Qualitative Methods Available for IA

A key goal of our study was to identify qualitative methods that are widely applicable across a range of IA contexts. As described in [Part 2](#), this research followed a staged process of establishing and refining the list of qualitative methods for this purpose. The final list includes 17 methods categories, which are described in Table 5.1 and further detailed in [Part 6](#). The methods are listed in alphabetical order. We acknowledge that our list of methods is not exhaustive, as it represents a snapshot of the available literature and participant experience during the period of this study. Qualitative methods and how they are applied in IA will continue to evolve as will the important enablers and barriers we discuss in [Part 4](#).

We also acknowledge that most proposed projects in Canada and other colonized lands are located on the traditional territories of Indigenous Peoples. IA must make space for [Indigenous leadership, control, and use of methods and methodologies that align with Indigenous worldviews](#). While several applications of the qualitative methods identified in this report have been designed and applied by, or in collaboration with, Indigenous communities (e.g., [interviews](#),

[narrative methods](#), [spatial methods](#), [systems and network analysis](#), and [visual methods](#)), the methods described were Western in orientation, their implementation being adjusted to be more culturally sensitive. In proposing this research, we clearly stated that “qualitative methods” are inherently a Western construct and that a separate project with a wider array of researchers would be needed to consider fully, and respectfully, Indigenous approaches to collecting and interpreting what we are calling qualitative data. We therefore strongly advocate for further work related to Indigenous methods for IA that is led by Indigenous practitioners, researchers, and communities involved in IA.

Finally, we recognize that there are many [considerations that must precede the selection of specific methods](#). These include, for example, developing relationships with those involved (to collaboratively determine the methods that best align with local preferences, needs, cultural norms, values, and practices), establishing a clear picture of the core issues that must be addressed, and gaining a deep understanding of the social context (e.g., local engagement dynamics, risk perceptions, engagement capacity, potential for elite capture, etc.).



Method category	Description
<b><u>Deliberative Methods</u></b>	Rely on discussion-based approaches to engage the public in collaborative problem solving and decision-making. These methods aim for representativeness, including people with diverse backgrounds, viewpoints, and values. Examples of deliberative methods include deliberative polling, world café, community forums, citizens' juries, and open-space technologies.
<b><u>Delphi method</u></b>	A technique for systematically eliciting advice, and ultimately consensus, from a panel of anonymous experts through iterative rounds of questionnaires.
<b><u>Document analysis</u></b>	The systematic analysis of various types of documentation, such as news articles, archival documents, official reports, policy documents, and academic literature.
<b><u>Focus groups</u></b>	Involve facilitator-moderated group discussion that explores experiences, perspectives, and opinions about a specific topic. Data are generated through interaction among participants (typically 6–8).
<b><u>Fuzzy sets</u></b>	Fuzzy sets can be considered as “computing with words.” It involves transforming qualitative, descriptive data into a form that can be mathematically described and manipulated in a rigorous way that accounts for the subjective nature of the descriptors.
<b><u>Interviews</u></b>	A one-on-one exploration of individuals' experiences, perspectives, and opinions about a specific topic. Interviews can take place face-to-face, online, or via telephone.
<b><u>Matrices</u></b>	A grid that links systems components with project activities. We are interested in matrix approaches that use qualitative data, analysis, and/or reporting.
<b><u>Multi-criteria analysis</u></b>	Multi-criteria analysis (MCA), also known as multi-criteria decision analysis (MCDA), is a family of mathematical techniques that support decision-making by assessing and aggregating performance of options (such as alternative development proposals) against multiple, often conflicting, criteria. Participatory or qualitative approaches may be used to collect and integrate qualitative data into the analysis.
<b><u>Narrative methods</u></b>	Involves engaging with and interpreting people's experiences through storytelling. Narrative research can collect data through a variety of methods and techniques, such as oral histories, interviews, journal entries, and digital recordings.
<b><u>Q methodology</u></b>	Uses statistical analysis to identify dominant perspectives/discourses around a specific issue by having participants sort and rank a set of qualitative statements representing a full range of opinions.
<b><u>Qualitative data analysis</u></b>	The systematic analysis of non-numerical information gathered through a variety of qualitative data collection methods, often managed using computer-assisted data analysis software (e.g., NVivo).

Method category	Description
<b><u>Scenario-based methods</u></b>	Integrate qualitative future-oriented scenarios (i.e., plausible pathways by which the future could unfold) into IA analysis. Examples of scenario-based methods include participatory scenario analysis and simulation gaming.
<b><u>Participatory spatial methods</u></b>	Participatory mapping techniques that integrate qualitative data collection and/or analysis (e.g., community mapping, land use and occupancy mapping, participatory geographical information systems [PGIS]).
<b><u>Surveys</u></b>	Questionnaires that explore individuals' experiences, perspectives, and opinions about a specific topic. Survey can include open-ended qualitative components.
<b><u>Systems/network analysis</u></b>	Involve the representation and analysis of the relationships between systems components relevant to an Impact Assessment. The analysis may include one or more systems (e.g., ecological, social, economic, institutional). Network analysis is closely related and maps the relationships among stakeholders and/or impact chains relevant to the IA.
<b><u>Visual methods</u></b>	Collect and analyze visual or audio-visual images as data. Visual methods include, for example, photo-elicitation, photovoice, video narratives, social media image analysis, and seasonal calendars.
<b><u>Workshops</u></b>	Facilitated participatory sessions in which participants discuss, brainstorm, and identify solutions for a specific problem. Workshops typically run longer and include more participants than a focus group discussion.

Table 5.1. Final list of 17 qualitative methods categories with brief descriptions.

Twenty-two method categories were initially identified through the structured literature review phase of the research. Upon deeper investigation of these 22 methods through the international survey and follow-up semi-structured interviews, the list was revised further, resulting in the final list of 17 qualitative methods categories identified as appropriate for IA. The reasons for revising the list from 22 methods to 17 are as follows:

- Systems analysis and network analysis were considered as distinct methods in the initial list. However, because they share many similarities, including their use and application in IA, these were clustered together in a single method category in the final list.
- Qualitative GIS (geographical information systems) was included as a methods category in the initial list but did not adequately capture participatory mapping methods that do not necessarily rely on GIS technology. Therefore, this category was expanded and labelled “participatory spatial methods” in the final list.
- Participatory rural appraisal was included as a method category in the initial list. However, it became clear that participants viewed participatory rural appraisal as a research approach rather than a methods category. Participants were more likely to classify specific methods originally clustered under participatory rural appraisal as spatial methods (e.g., participatory community mapping) or visual methods (e.g., seasonal calendars). Therefore, we chose to exclude participatory rural appraisal as a distinct method category in the final methods list, and instead included these specific methods to the categories with which participants most closely identified them.

- Values mapping was included as a method category in the initial list; however, there was no consensus among survey and interview participants that values mapping was a distinct method. Instead, participants described the use of various types of data collection techniques (e.g., interviews, GIS tools, focus groups, workshops) and analyses (e.g., content analysis, discourse analysis, matrices) to ascertain peoples’ values in relation to places and projects. Therefore, values mapping appeared to be perceived more as an IA process than a method. For this reason, it was excluded from the final methods list.
- Checklists are simple or descriptive lists that use qualitative data, findings, and/or reporting to identify likely impacts. Very few data were obtained relating to the innovative use of checklists in contemporary IA and, therefore, we opted to exclude it from the final methods list.
- Similarly, there was a lack of quality data from the literature review, surveys, and interviews about the use of modelling with a qualitative component in IA. Therefore, we excluded this method from the final list.
- Social media image analysis was initially categorized as a “document analysis” technique. Survey and interview data, however, indicated it is likely more accurately classified as a “visual method.”

The remaining 17 method categories are diverse, encompassing a range of conventional qualitative social science methods, innovative participatory methods, and mixed methods that rely on a blend of qualitative and quantitative data collection and analysis techniques. Perhaps unsurprisingly, some of the more conventional qualitative social science methods and techniques, such as document analysis, interviews, workshops, qualitative data analysis, and focus groups, were among the most frequently applied by survey respondents (Figure 5.1). Innovative participatory methods included, for example, certain visual methods (e.g., photography methods, seasonal calendars), narrative methods (e.g., storytelling, digital storytelling), deliberative methods, participatory spatial methods, and scenario methods. Mixed methods with both qualitative and quantitative components included, for example, multi-criteria analysis, surveys, Q methodology, and Delphi method. While many of these methods were not as frequently applied by survey respondents as some of the conventional qualitative methods (Figure 5.1), each has demonstrated applicability to IA practice. The following subsections provide an overview of the IA process steps to which each method is most relevant, as well as pertinent attributes and possible uses. Further considerations for the selection of qualitative methods in IA are elaborated in [Part 7](#) of this report.

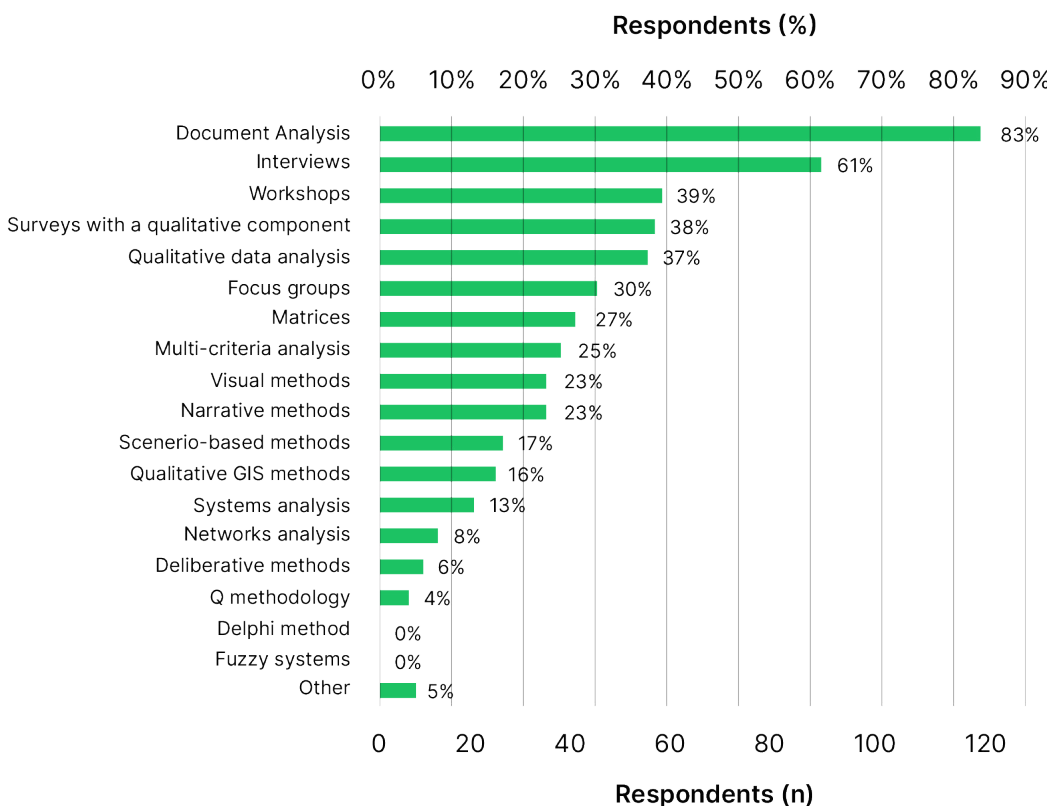


Figure 5.1. Survey respondents who “often” apply the indicated methods in IA.

Note: Systems analysis and network analysis are listed separately, since the decision to cluster them together was made after the survey was complete. Likewise, qualitative GIS methods do not account for non-GIS methods that were later clustered with participatory GIS methods to create the “participatory spatial methods” category in our final analysis.



## Methods by IA Process Step

Qualitative methods can inform the assessment of a wide range of impacts in various IA process steps. Our research included qualitative methods that can contribute to key IA process steps of project-level IA, including those that fall under the IAA (Figure 5.2). The IA process steps for which each method category is most relevant are summarized in Table 5.2. Figure 5.2, however, does not fully represent the iterative nature of IA; for example, alternatives evaluation in practice may occur during early planning (or even before), thus informing activities in subsequent IA process steps. We also included some methods especially relevant to strategic-level assessments, though specific process steps are not distinguished for these higher-level assessments.

Our focus was on IA process steps that typically involve data collection and analysis, so most of the identified methods contribute to planning, impact statement (i.e., outlines and evaluates project impacts), impact assessment, and post-decision phases. Systematic methods used by decision-making bodies, such as review panels and boards, to analyze and synthesize information received from various sources (e.g., proponent, government agencies, Indigenous groups, the public, etc.) contribute to “additional information gathering and analysis,” which IAAC considers part of the “impact assessment” phase. Public participation was not included as a distinct IA process step, as it occurs at multiple phases throughout an IA. However, the methods described in this report may be used for public participation activities to contribute to various IA process steps as well as to ensure such participation is meaningful. The ministerial decision-making process (as described by IAAC, 2019a) typically does not involve data collection or analysis.

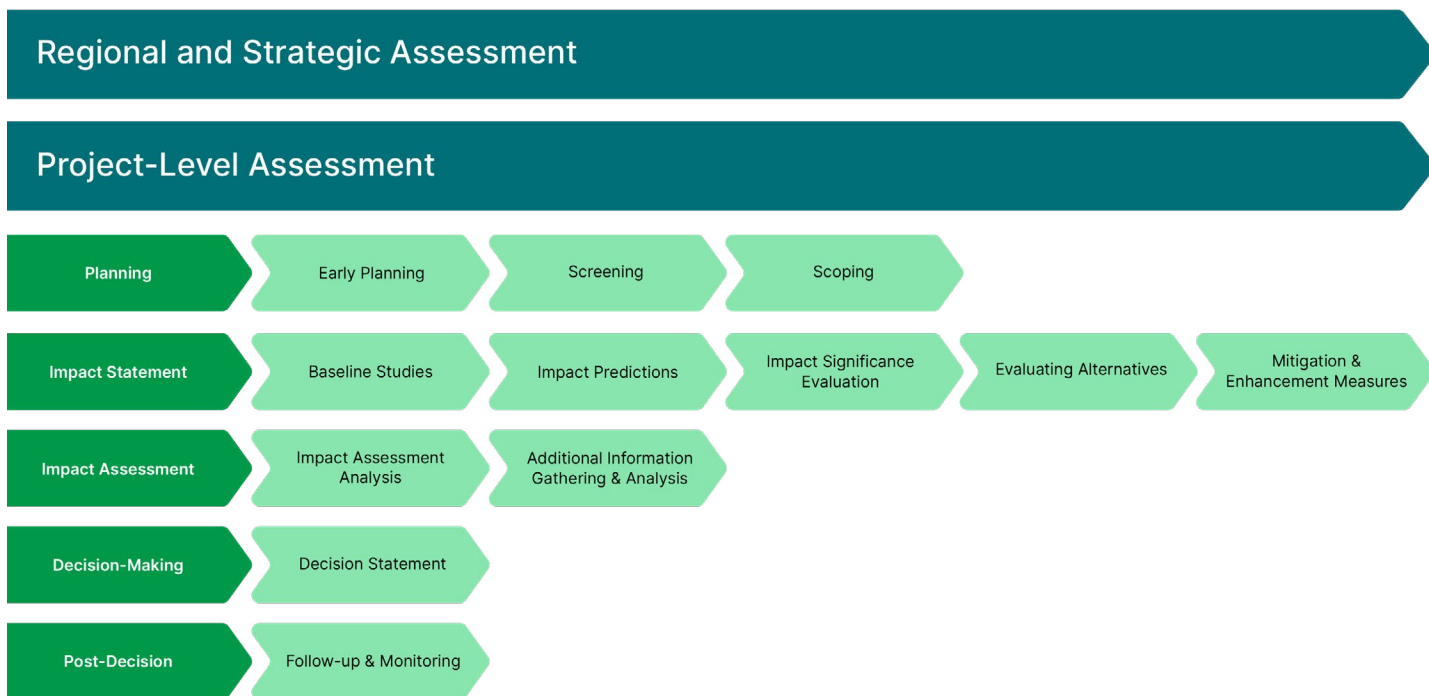


Figure 5.2. IA process steps under the Canadian federal Impact Assessment Act.

Note: Process steps as outlined by IAAC (2022a). While the specific IA process steps (light green) reflect standard IA practice, the clustering of these steps under the five IA process phases (dark green) may be unfamiliar to readers who conduct IA within other jurisdictions.

Method category	Strategic/Regional Assessment	Project-Level Assessment								
		Early planning		Impact statement					Impact assessment	Post-decision
		Screening	Scoping	Baseline studies	Impact prediction	Impact evaluation	Alternatives evaluation	Mitigation & enhancement	Information gathering/analysis (decision makers)	Follow-up & monitoring
Deliberative Methods	X			X	X	X	X	X		
Delphi method	X		X							X
Document analysis	X	X	X	X	X	X		X	X	X
Focus groups			X	X	X	X		X		X
Fuzzy sets						X	X			
Interviews			X	X	X			X		X
Matrices	X	X	X		X	X	X			
Multi-criteria analysis	X						X			
Narrative methods	X		X	X	X			X	X	X
Q-methodology	X					X			X	
Qualitative data analysis	X	X	X	X	X	X	X	X	X	X
Scenario methods	X				X	X		X		
Spatial methods	X		X	X	X	X		X		X
Surveys with qualitative component				X	X					X
Systems/ network analysis			X		X	X	X			X
Visual methods	X		X	X	X		X	X		X
Workshops	X		X	X	X	X	X	X		X

Table 5.2. IA process steps for which qualitative methods are applied.

Note: The IA process steps included in this table are based on the Canadian federal Impact Assessment Act, as outlined by IAAC (2022a) (see also Figure 5.1). The “decision-making” phase is not included, as it does not typically involve additional information gathering and analysis. An “X” denotes a process step where that method is applied; a blank cell denotes a lack of evidence for application.



## Method Attributes

Survey participants were asked to select two qualitative methods with which they have significant experience and rate their level of agreement with several attribute statements. We triangulated those findings with additional information about the methods gathered through the literature review and interviews to provide a relative rating of each method against

these attributes, which are summarized in Table 5.3. Table 5.4 describes several IA-related scenarios and suggests the methods that may be most applicable to those situations. Additional method-specific attributes are discussed in [Part 6](#) of this report.

Method category	Highly participatory	Promotes critical reflection and dialogue	Cost-effective	Time-efficient	Facilitates the collection/analysis of rich, in-depth data	Confidentiality can be easily maintained	Technically simple (e.g., does not require special software, equipment)	Able to explicitly deal with uncertainties
Deliberative Methods	+++	+++	++	+ / ++	++	+	++ / +++	--
Delphi method	++	++	++	++	++	+++	++	--
Document analysis	--	--	+++	+++	++	+++	+++	--
Focus groups	+++	+++	++	++	+++	+	+++	--
Fuzzy sets	+	+	+	++	++	++	+	+++
Interviews	++	+++	++	++	+++	++	+++	--
Matrices	+ / ++	+ / ++	++ / +++	++ / +++	+	++	+++	+
Multi-criteria analysis	+ / ++	+ / ++	++	++	+	++	+	++
Narrative methods	++	+++	++	+ / ++	+++	++	+++	--
Q-methodology	++	++	++	++	++	++	++	--
Qualitative data analysis	+	--	++	++	+++	++	++	--
Scenario methods	++	++ / +++	++	++	++	++	++	+++
Spatial methods	+++	++	+ / ++	+ / ++	++ / +++	+	+	--
Surveys with qualitative component	++	+	++	++	+	++ / +++	++	--
Systems/ network analysis	+ / ++	++ / +++	++	+ / ++	++	++	++	++
Visual methods	+ / +++	+ / +++	++	+ / ++	++ / +++	+	++	--
Workshops	+++	+++	++	++	++	+	+++	--

Table 5.3. Method attributes

Note: The ratings in the table are comparative within this group of methods. A rating of “+” means that the attribute describes the method to a lesser degree than average within this group of methods, while a “+++” rating means that the attribute describes the method to a greater degree. More than one rating (e.g., + / ++ ) indicates that the degree to which the attribute characterizes the method depends on either the variation of the method used or how it is applied (see Part 6 for more details). The rating “--” means the attribute is not applicable.

If an IA seeks to...	Possible methods include...
<b>Gather external expert knowledge on a specific topic</b>	<u>document analysis</u> (particularly academic literature, organizational reports), <u>fuzzy sets</u> , <u>Delphi method</u> , <u>interviews</u> , <u>matrices</u> , <u>multi-criteria analysis</u>
<b>Understand the broad range of public perspectives, concerns, or opinion related to an IA</b>	<u>deliberative methods</u> , <u>document analysis</u> (particularly news media analysis), <u>fuzzy sets</u> , <u>surveys</u> , <u>Q methodology</u> , <u>visual methods</u> (particularly photo preference surveys, photo visioning, and social media image analysis), <u>workshops</u>
<b>Understand local values associated with place and land</b>	<u>document analysis</u> , <u>focus groups</u> , <u>interviews</u> , (participatory) <u>matrices</u> , <u>narrative methods</u> , <u>participatory spatial methods</u> , <u>visual methods</u>
<b>Understand perspectives of specific demographic groups related to specific topics (e.g., such as for gender-based analysis plus [GBA+] processes)</b>	<u>focus groups</u> , (participatory) <u>matrices</u> , <u>scenario methods</u> , <u>visual methods</u> , <u>workshops</u>
<b>Gather information to inform community-led IAs</b>	<u>focus groups</u> , <u>narrative methods</u> , <u>participatory spatial methods</u> , <u>surveys</u> , <u>visual methods</u> , <u>workshops</u>
<b>Integrate qualitative and quantitative indicators/ assessment criteria and related data</b>	<u>matrices</u> , <u>multi-criteria analysis</u> , <u>fuzzy sets</u>
<b>Identify impact pathways and relationships among impacts and valued components in complex systems</b>	<u>matrices</u> , <u>multi-criteria analysis</u> , <u>systems/network analysis</u>
<b>Understand potential impacts on intangible social, cultural, spiritual, environmental values (e.g., connection to place, social cohesion, mental and emotional well-being, spirituality)</b>	<u>interviews</u> , <u>narrative methods</u> , <u>participatory spatial methods</u> , <u>visual methods</u>
<b>Understand the historical, environmental, social, cultural, economic, and political contexts in which a proposed project is located</b>	<u>document analysis</u> , <u>focus groups</u> , <u>narrative methods</u> , <u>scenario methods</u> , <u>visual methods</u>

Table 5.4. IA-related scenarios and relevant methods.

# Part 6: Methods Toolkit



This section provides detailed overviews of the method categories presented in [Part 5](#). The method descriptions are not meant to provide definitive, step-by-step procedures for implementation. Rather, they provide an overview of each method, how it is—or could be—applied in IA, tips for implementing the methods in the IA context, case study examples, and resources for further learning. Readers should also consider the enablers and barriers to implementing these methods in IA, as outlined in [Part 4](#).

## Deliberative Methods

### What are deliberative methods?

Deliberative methods are techniques for public participation that involve participants “carefully examining a problem and seeking a well-reasoned solution through a period of informed, inclusive and respectful consideration of diverse viewpoints” (Gastil, 2009, p. 16). Deliberative methods require that participants have access to high quality information and time and space to discuss and debate this information and its implications with other participants (holding different views, values, and perspectives) to reach an informed opinion, either individually or collectively. Since deliberative methods are grounded in the theory of deliberative democracy in which power is shared between policymakers and ordinary citizens, some literature also emphasizes the importance of representativeness of participation and empowerment in directly influencing decision-making (Johnson, 2015). Deliberative methods are founded on the understanding that ordinary citizens provided with appropriate information and led through a process of deliberation can make sound, well-informed decisions (Wiklund & Viklund, 2006). Some common examples of deliberative methods that have potential applications in IA include deliberative polls, world cafés, and citizens’ juries.

**Deliberative polling** involves polling a random representative sample of the community on the target issue to collect baseline data on the participants’ views. A subset of this group is then given briefing materials and invited to participate in a two-day deliberative discussion. During the deliberative process, the participants engage in small group discussions supervised by a facilitator and generate questions for a panel of experts and political leaders. After the process of deliberation, the participants are polled a second time with an identical poll. If the public is well

informed and has had time to deliberate on the topics presented, the change in opinion between the baseline poll and the second poll represents public opinion (Fishkin, 2021).

**World cafés** involve small groups of participants (ideally no more than five or six) engaging in conversations guided by specific questions related to the topic at hand, taking notes as they do so. At the end of a designated period, the participants (except the table host) move to another table. The host briefs the new group members, and the discussion builds on the preceding conversations. New questions may be posed by the facilitator at each round. The method is an efficient way of cross-pollinating ideas amongst a potentially large group of people. At the conclusion, the whole group comes together to synthesize outcomes (Schieffer et al., 2004).

A **citizens’ jury** applies the model of jury deliberation within the legal system to questions of public policy. Jurors are selected at random to be representative of a community and are provided with briefing materials relating to the decision at hand. They then deliberate over several days under the

*What are deliberative methods? Because you can contrast them with non deliberative, it's not like either/ or. It's more like a continuum. So if we think about non-deliberative methods on one side of the continuum, that would be forms of one way communication—consulting reports, information sharing, this kind of thing—all the way over to something that has a strong focus on rich conversations between people who may often have competing interests or different points of view, and an invitation to learn [...] The invitation or the opportunity to revise preferences I think is a key part of deliberation.*

*(Interview, P38, researcher/academic)*



*I think all the participants walk in there with their little bag of issues and things they need to get, but if you can create the space in which they listen to the perspectives of others and we begin to resolve some of these minor issues [...] And now I'm getting into the deliberative stuff where you have these long-standing relationships where you're actually engaged with people in terms of finding solutions based on accommodating their interests.*

*(Interview, P49, IA practitioner)*

guidance of a facilitator, calling expert witnesses to provide further information as required. The aim of the citizens' jury is to reach a common view and for the jury to report back to decision makers (Crosby, 1995).

## Why select deliberative methods?

- Compared with more commonly applied public participation methods, deliberative methods offer a more empowering and meaningful way for ordinary citizens to become involved in decisions that affect them.
- It is also argued that through the social learning that takes place, both amongst citizens participating in the process and amongst decision makers, the outcomes (in the form of knowledge and informed opinions) are richer and more useful than what could be obtained by engaging with participants individually (Hartz-Karp & Pope, 2011). As a result, deliberative methods are particularly useful in situations in which solutions are not clear and include costly trade-offs (Mitchell & Parkins, 2005).
- Deliberative processes enhance the legitimacy of public decision-making.
- These methods can also give meaning to previously gathered descriptive data, for example to explore how a community might be affected by predicted social change processes resulting from a proposed development (Hartz-Karp & Pope, 2011).

## When can deliberative methods be used in IA?

- Baseline studies.
- Impact prediction.
- Impact significance evaluation.

- Evaluation of alternatives (particularly citizens' juries).
- Mitigation and enhancement measures.

### Impact categories:

- Deliberative methods are relevant to many impact categories, including environmental, social, and health. They are most often applied to social considerations.

### Other contextual considerations:

- Deliberative methods may be particularly useful in the early stages of project planning, before the commencement of the formal IA when broad options are considered.
- Citizens' juries may be particularly suited to strategic assessments and land use planning, since they ideally deliver a consensus view on the best way forward (Rauschmayer & Risse, 2005).

## Who is involved?

- Members of the public are ideally randomly selected to form a demographically representative sample.
- Facilitators and subject-matter experts are also needed.
- Some authors suggest that deliberative processes may also be conducted involving representatives of key stakeholder groups or targeted experts, though modifications to the process may be required (Mitchell & Parkins, 2005). Analytic-deliberative approaches are a hybrid whereby experts input technical knowledge to facilitate informed debate amongst the public (Burgess et al., 2007).

## How much time is needed?

- Some methods are time-consuming, e.g., weekend deliberations in deliberative polls or four or five days for a citizens' jury.
- There is also significant time involved in preparing briefing materials for participants, especially when the required data are not easily accessible.

## What costs may be involved?

- Remuneration of facilitators and subject matter experts involved in preparing briefing materials.
- Payments made to participants for their time and travel/accommodation expenses, if necessary.

## Deliberative methods in practice

- How the how deliberative methods are conducted depends on the specific method being applied (see above); however, there are basic principles common to all methods.

### Defining the purpose

- The purpose of the deliberative process, the topic of discussion, and the question to be addressed must be clearly defined and articulated prior to participant recruitment.
- The extent to which the outcomes of the deliberative process will be accepted (or considered) by decision makers should be agreed on in advance.

### Selecting participants

- If members of the public are to be recruited, ideally this is done randomly with the aim of obtaining a demographically representative sample. Recruiting firms may be employed for this task.
- In deliberative polls, participants are randomly selected from respondents to an initial survey.

### Preparing briefing materials

- The appropriate amount of information needs to be determined and will vary depending on the method being applied (for example, participants in citizens' juries and deliberative polls can request further expert input during the process). Too much information can bog the process down, while too few risks render it meaningless. However, some have suggested that it is better to err on the side of too much information (Mitchell & Parkins, 2005).
- It is important that briefing materials are written so that participants can readily understand them.
- Peer review of the briefing materials may help to ensure they are balanced and unbiased (Johnson, 2015).

### Establishing ground rules

- Ground rules include the need to be respectful of each other and to listen to others' arguments.

### Addressing participants' needs

- It is important that participants' physical (e.g., breaks, refreshments) and emotional needs are taken care of during the deliberations.

### Ensuring good facilitation

- The facilitator is responsible for running the process according to the schedule, keeping the discussion appropriately focused, adhering to the ground rules, and giving everyone an opportunity to speak.

## Providing opportunities for deliberation

- Participants should give reasons and arguments for their views (Gastil, 2009).
- Areas of profound disagreement are normal and to be expected during the deliberations.

## Conducting analysis

- Depending on the deliberative methods adopted, there may be further analysis required at the end of the process, for example analyzing notes made at the conclusion of a Word Café or after the outcomes of a deliberative poll.

## Providing feedback and follow-up

- Participants should be provided with a summary of the outcomes of the process and information about how these outcomes influenced decision-making in practice (Mitchell & Parkins, 2005).

## Limitations

- Ideally, deliberative processes should directly inform decision-making processes, but in practice this opportunity is rarely provided.

## Related Methods

- Deliberative methods are special examples of methods such as focus groups and workshops.
- Deliberative polls are a specific example of a survey.

*It's got to be like many of these processes early where decisions are still open and issues being identified and discussed maybe in the scoping phase, but even in the phase where you're actually contending with alternatives. That would be perfect because one of the biggest problems with these assessments is that it's either this or nothing. It's on or off. Where in reality, it's either this or that or the other thing [...] it could be what size should it be or here are a dozen different potential impact areas. What are the key impact areas that we need to really focus in on. So, it could be deliberation around these issues where stakeholders come together, they each have their own pet rocks, but they could potentially get together and decide what are the top five pet rocks that we all agree on.*

*(Interview, P38, researcher/academic)*





## Case Study 6.1.

### Evaluating the Deliberative Potential of Impact Assessment in the McKenzie Valley Resource Management Act (MVRMA)

While there are numerous conceptual articles discussing the potential for deliberative methods to be applied within IA, there are very few documented examples of real-life applications. A practical contribution to the theoretical literature is provided by Fitzpatrick et al. (2008), who evaluated the extent to which the MVRMA could enable deliberative methods within environmental impact assessment. They adopted Wiklund (2005)'s four principles of deliberative EIA (generality, autonomy, power neutrality,

and ideal role taking) as the basis for the study and applied these principles to the IA of the Snap Lake diamond project. They concluded that this IA reflected all four principles to some degree, since there were opportunities for dialogue, access to different perspectives, and evidence of learning outcomes. These findings suggest that deliberation in IA can occur outside formally structured deliberative methods, and, conversely, that there may be unrealized opportunities to use the more structured methods within regulatory IA processes.

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## Delphi Method

### What is the Delphi method?

The Delphi method is a technique used to systematically elicit advice and consensus from a panel of experts through iterative rounds of questionnaires (Richey, 1985a; Egan & Jones, 1997). It is particularly useful where an evaluation is required but only incomplete information is available or where the experts are geographically distributed or have diverse expertise in relation to the problem. The technique begins with identifying and recruiting an expert panel; these panel members usually remain anonymous to one another throughout the process (the anonymity ensuring strength of argument leads to consensus rather than consensus being influenced by deference to those participants perceived more senior or powerful). After each questionnaire round, the research team provides the panelists with a summary of the results from the previous round and an opportunity to modify their answers based on the group response. Eventually, the range of responses narrows, and consensus emerges. A minimum of two rounds are conducted in Delphi studies, with additional rounds of questionnaires developed if consensus is not yet reached. Delphi studies can be either qualitative or quantitative or a blend of both. Questionnaires can include both open-ended and closed-ended questions.

*So the idea behind Delphi is to interact with a group of people without them interacting among themselves*

*(Interview, P65, researcher/academic)*



*.. so it is recommended when you want to collect the opinion of more than one person but want to ensure that there are no issues such as power or shyness or whatever you feel may interfere with having people sit in the same in a table at the same time*

*(Interview, P65, researcher/academic)*

### Why select the Delphi method?

- The method provides a systematic means of gathering expert knowledge.
- It minimizes personality effects because panelists are typically anonymous to each other, reducing the dominance of influential or assertive individuals.
- It may be useful when expert panel members have no history of communication, the group is too large, or time/cost make face-to-face meetings impractical.

### When can Delphi be used in IA?

- Strategic or project-level IA.
- Scoping, particularly identifying key areas for further investigation and developing assessment criteria.
- Selection of key components for a follow-up and monitoring plan.

### Impact categories:

- Delphi is relevant to many impact categories. It is often used to identify environmental, economic, and technical assessment criteria but may also include social, health and well-being, and cultural considerations.

### Who is involved?

- A monitoring team works on compiling questionnaires and summaries of feedback.
- An expert panel is also involved with experts from a variety of sectors, such as industry, academia (multidisciplinary), the public sector, regulatory agencies, private consultancies, relevant interest groups, non-governmental organizations, and professional associations.

## How much time is needed?

- Each Delphi round requires time to distribute the questionnaire and for panel members to respond to and process and summarize the results for the subsequent round. Approximately two to three weeks per round should be expected.
- IA-related Delphi studies typically involve two to four rounds of questionnaires (de Carvalho et al., 2017; Hayati et al., 2013; Kamaruzzaman et al., 2018; Richey, 1985a). A maximum of four rounds of questionnaires is recommended to maintain participation.

*...you always need maybe at least two or three weeks between each round. Because some actually will be late and you have to wait for them. Then we need some time to process the results. We send it back. We need to leave at least a week or two.*

*(Interview, P65, researcher/academic)*



## What costs may be involved?

- Staff time for planning, distributing questionnaires, summarizing, and analyzing responses.
- Qualitative and/or quantitative data analysis software.
- Participant honoraria to help maintain participation over several questionnaire rounds.

## Delphi method in practice

### Question design

- The types of questions that meet the study objectives should be considered. The first Delphi round often involves open-ended questions to gather initial input relevant to the study topic (e.g., Egan & Jones, 1997; Hayati et al., 2013). This step may be modified by developing the first questionnaire based on a synthesis of information from literature reviews or previous studies (Ahkanova et al., 2019; Noble, 2002; Salgado et al., 2020). Closed-ended questions, including Likert scale questions and other rating/ranking techniques, are common in subsequent rounds. Opportunities for explaining or justifying responses are provided.

- Relevant qualitative research expertise should be available to formulate the questions.
- The questionnaires should be test-piloted to ensure flow, clarity, and length prior to distribution.

### Participant selection and retention

- Since the effectiveness of the Delphi technique is largely dependent on the makeup of the panel, a set of inclusion/exclusion criteria should be established for panel selection. Suggested criteria include professional qualifications in the field of study, a certain number of years of relevant experience, willingness to work towards consensus, and a commitment to participating in multiple rounds.
- Representation should come from a variety of backgrounds/sectors related to the study topic.
- Although there is no established guideline for panel size, eight to 12 members is a common range.
- Ideally, potential panel participants should be engaged before the process begins. Clearly articulating the purpose and time requirements of the study and gauging potential panel member fit and commitment can facilitate higher participant retention over time.

### Data collection

- To maintain panel anonymity, the questionnaires are typically implemented online or via mail.
- Following receipt of the first questionnaire round, the responses and feedback are systematically summarized by the monitor team. The summaries can include areas of agreement and disagreement, along with panel members' rationale for their responses.
- In subsequent rounds, the questionnaire may be revised slightly based on panel feedback and then re-distributed to the panel members, along with the summary of feedback from the previous round.
- After several iterations of this reflection and adjustment process, convergence toward consensus occurs among panelists.

*By saying things like most of the panel agreed that this and that was right. However, one panellist felt that due to this reason, the statement is not correct.*

*(Interview, P65, researcher/academic)*





*The idea is that very often this iteration lead to more consensus among the panelists because they are able to reflect on the same subjects using also the opinions of the other experts so they can come up with things like oh yeah, that's okay, that's true, I didn't really think about that in the first place. Now that I see that pointed out, I agree that my answer should be a bit different. So after maybe 3 iterations you see this sort of convergence toward more consensus.*

*(Interview, P65, researcher/academic)*

## Analysis

- Whether qualitative data analysis or quantitative statistical analysis is applied depends on the purpose of the study and the types of questions used. Qualitative data analysis is common when open-ended questions are used in the first Delphi round to gather initial opinions and insights. Consensus on responses to closed-ended questions can be determined in a variety of ways, for example, when a specific percentage of the responses falls within a prescribed range.

## Limitations

- The Delphi method does not provide an opportunity for discussion among panelists as they are anonymous to one another.
- The method is time-intensive due to the need to develop and distribute the questionnaire, wait for responses, and analyze the data for each round. Maintaining participant engagement over time is a challenge, and attrition can occur between rounds.
- The utility of the Delphi method depends on the abilities of the monitor team and selected panel members.

## Related Methods

- Document analysis or other qualitative methods (e.g., interviews) may inform the development of the initial Delphi questionnaire.
- Various multi-criteria analysis (MCA) approaches can be used to develop criteria weighting from data gathered through Delphi (e.g., de Carvalho et al., 2017; Hayati et al., 2013; van Schrouboeck et al., 2019). The Delphi method has also been applied to gain consensus on scores or weights identified through MCA.

## Case Study 6.2.

### Identifying Subjective Well-Being Indicators for Strategic Urban Planning (Delphi Method)

Musa and colleagues (2019) conducted a Delphi study to identify a set of subjective well-being assessment indicators for strategic urban planning initiatives in Malaysia. Expert panel participants were selected based on two criteria: 1) relevant urban sustainability research publications or 2) at least five years of professional experience in the topic area. Through a literature review, the researchers identified 50 environmental well-being, social well-being, economic well-being, and urban governance indicators that could be relevant to strategic urban planning. These indicators were used to develop the initial Delphi questionnaire. It was unclear, however, how the literature search or analysis of the resulting documents were conducted. The first Delphi round asked the expert panel to rate the importance of each

indicator on a 5-point Likert scale (where five indicated high importance) and provided a free-text space for panelists to provide context to their responses or suggest new indicators. For the second Delphi round, the questionnaire was revised and returned to the panelists with a summary of the first-round results. Panelists used the same Likert scale to rate the revised list of indicators. Consensus was considered achieved when 75% of participants provided a score of four or more on the Likert scale. Of the 45 experts who expressed initial interest in participating on the expert panel, 34 returned the email questionnaire after the first Delphi round and 31 after the second round. For each round, the panelists were asked to respond within two weeks. Consensus on 37 indicators was achieved after two Delphi rounds.

## Recommended method guides

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Van Schoubroeck, S., Springael, J., Van Dael, M., Malina, R., & Van Passel, S. (2019). Sustainability indicators for biobased chemicals: A Delphi study using multi-criteria decision analysis. *Resources, Conservation and Recycling*, 144, 198-208. <https://doi.org/10.1016/j.resconrec.2018.12.024>



## Document Analysis

### What is document analysis?

Document analysis is a systematic process for identifying, selecting, evaluating, analyzing, and synthesizing information about a specific topic from print and electronic documents (Bowen, 2009; Savin-Baden & Major, 2013). In document analysis, text and images are organized into major themes, categories, and case examples through qualitative thematic analysis or content analysis (Bowen, 2009). Five common types of document analysis include literature reviews, systematic reviews and meta-analyses, secondary data analysis, archival and historical research, and policy research (Tight, 2019). Literature reviews typically focus on academic texts (e.g., published journal articles, theses/dissertations) and aim to synthesize the status of research related to a particular field or topic of study. Systematic reviews and meta-analyses are closely related to literature reviews but are more comprehensive and seek to synthesize all available research on a topic and identify any outstanding gaps in knowledge. Secondary data analysis involves the analysis of large, pre-existing quantitative and/or qualitative data sets (e.g., census data, datasets from institutional or public repositories, and previously gathered datasets that are re-analyzed for new purposes). Archival and historical research provides contextual background to a topic of interest by analyzing and synthesizing information from a wide range of sources, including newspapers, official reports (e.g., company, government, and organization reports), legal texts, social media posts, photographs, oral histories, maps, and other public texts. Policy research is the critical examination of policy documents at various levels of social organization, from local to international. These genres of document analysis are not entirely distinct and may be combined—and used alongside other methods—to achieve study aims and objectives.

### Why conduct document analysis?

- In IA, documents provide background information and historical insights into the environmental, social, cultural, economic, and political contexts in which proposed projects are situated.
- Document analysis is highly versatile and flexible.
- It can be perceived as reliable and credible, since the data are often traceable and findings can be checked for accuracy.
- Many documents are available in the public domain and are easily accessible. It is an unobtrusive way to collect information and minimizes researcher effects on the data.
- Document analysis can provide insight into the evolution of policy contexts, concerns, and attitudes over time (Pimental da Silva et al., 2021).

*The types of document we would be looking at would be policy documents, it would be academic research for scientific evidence of the type of health effect you might expect, it would be looking through policy regulation [...] it's basically trying to look at the question of who's going to be affected or what's the project going to do, who's going to be affected and what can be done about it?*

*(Interview, P66, IA practitioner)*

### When can document analysis be used in IA?

- Both strategic and project-level IA.
- Screening (e.g., Aboagye et al., 2019).
- Scoping key issues; document analysis is often a first step in identifying key assessment issues, which can then be validated and explored in greater depth through other methods.
- Baseline studies.
- Identifying and evaluating the significance of potential impacts.
- Information gathering and analysis by decision makers, such as IA agencies and review panels, for example, document analysis of public hearing transcripts and public submissions to identify key thematic areas of concern (e.g., Dokshin, 2021; Keith Storey Consulting, 2015).
- Follow-up and monitoring (Anaf et al., 2019; Pimental da Silva et al., 2021).

### Impact categories:

- Document analysis is relevant to all impact categories such as environmental, economic, social, health, cultural, psychosocial, and gender and equity.

### Other contextual considerations:

- Often considered an important precursor to other forms of primary qualitative information gathering involving affected communities or other stakeholders. It can lessen the burden for those sharing their knowledge and perspectives.



*Document analysis should be the first step of working with a community, to build knowledge and guide initial approaches. Sometimes there is a very rich set of existing documents that provides insights, from media coverage to community plans, other impact assessment reports, reports the client may have commissioned, treasure troves in libraries and academic research, First Nations documents that describe their culture and stories. These are particularly valuable at the scoping and screening stage but can be drawn on to validate interviews or explore emergent themes.*

*(Survey, P36, IA practitioner)*

*One of our principles is exhaust your secondary data first. So, if we can scope some issues based on case studies based on prior inputs by this community on a similar project we'll deal with that, but we also want to get the community perspective.*

*(Interview, P149, IA practitioner)*



### Who is involved?

- An analyst is needed to coordinate data collection, coding, and analysis.
- Depending on the type of document analysis, archivists or knowledge keepers (e.g., librarians or data custodians) are helpful resources.

### How much time is needed?

- The time needed for document analysis varies depending on the scope or size of the documents at hand and the analyst's familiarity with the literature and the materials. It involves meticulous review of the data. Generally, it is considered cost-effective and time-efficient (Bowen, 2009).

### What costs may be involved?

- qualitative data analysis software (e.g., Nvivo, ATLAS.ti) for coding, organizing, analyzing, and interpreting data;
- appropriate expertise to coordinate data collection, review, coding, and analysis.

### Document analysis in practice

#### Selecting documents

- Consideration must be given to the protocols for selecting documents; otherwise, a "biased selectivity" may result (Bowen, 2009). For example, where can relevant documents be accessed and which tools will be used (e.g., online databases and search engines, archives, IA registries, libraries, etc.)? What strategies will be used to conduct the searches (e.g., keywords for online searches, date ranges, etc.)? Researchers should be able to justify their methodological choices.
- Only documents relevant to the topic at hand should be retained. To aid in determining relevance, it is a good idea to define criteria for including and excluding documents.

#### Evaluating documents

- Analysts must look at documents with a critical eye and be cautious in selecting and using documents. Documents should be evaluated in terms of authenticity, credibility, accuracy, and representativeness (Bowen, 2009; Savin-Baden & Major, 2013). Questions to consider include the following:
  - Is the document original and genuine?
  - Is the document free from major errors and style inconsistencies?
  - Who created the document? Do the authors have appropriate credentials? Is the source credible?
  - Does the information appear to be accurate and unbiased?
  - What was the document's original purpose and for what audience was it intended?
  - What information is reported in the document? What may have been left out?

#### Analysis

- The analysis of documents can include qualitative or quantitative approaches or a blend of both. Qualitative analysis categorizes data and enables the identification of themes relevant to the project (for further details, see the qualitative data analysis section of this report).



*The value [is] however, highly dependant on the documents in question—who conducted the research or survey and for what purpose. Documents available are not all carried out in an academic setting, but a large bulk of documents are carried out for a particular purpose. Even though they may be carried out by an independent actor, they may be paid by a local authority of a developer, which has vested interests. A major issue is that of objectivity. It is therefore crucial for EIA practitioners to critically review their sources when using documents as sources for the qualitative review.*

*(Survey, P40, IA practitioner & government/regulatory agency staff)*

*There may not be previous documents readily available, none in a similar area/province/country, none of a similar type of project.*

*(Survey, P80, IA Practitioner)*

- The analysis of large volumes of documentary information can be facilitated using a qualitative data analysis software package (e.g., NVivo, ATLAS.ti). Such software can also enable the analysis of images.

## Limitations

- In the IA context, the availability and accessibility of relevant documents can be limited.
- There may be variability in the quality of accessible documentation.
- Certain document sources, such as news media, may contain limited representation of diverse local perspectives (Pimental da Silva et al., 2021).

## Related methods

- Other qualitative methods (e.g., interviews or focus groups) can be used to triangulate or fill gaps in information from documents.
- Document analysis can be used to inform the initial phases of the Delphi method and Q methodology.

### Case Study 6.3.

#### Document Analysis of the Newfoundland and Labrador Hydraulic Fracturing Review Panel Public Submissions

In 2014, the Newfoundland and Labrador Hydraulic Fracturing Review Panel (NLHFRP) was appointed to evaluate potential socio-economic and environmental effects of hydraulic fracturing in Western Newfoundland. This process involved inviting written submissions from individuals, community groups, and industry about potential impacts of hydraulic fracturing (fracking) on specific topic areas such as water quality, land, waste management, public safety, and community engagement. On behalf of NLHFRP, Keith Storey Consulting (2015) conducted a document analysis of the 530 submissions received. No judgements were made about the accuracy or validity of the arguments and concerns contained within the submissions, as the purpose of the study was to gain an understanding of the public's subjective perspectives about fracking in the region. The analysis was accomplished through a hybrid deductive-inductive thematic qualitative analysis that involved "review[ing] each submission, cod[ing] and record[ing] the areas of concern/statements of values" (Keith Storey Consulting, 2015, p. 2). The submissions were

first coded deductively (i.e., using predetermined codes) based on the topic areas within NLHFRP's mandate. The data within each topic area was then coded inductively (i.e., new codes were created based on the content of the data) to identify subthemes within each topic area. For each thematic area of concern, the proportion of submissions related to each theme were reported, along with a qualitative summary of the nature of those concerns. As noted in the report, the thematic analysis necessarily simplified the views, concerns, and tones expressed by individual voices. Although representative quotes or excerpts for each theme/subtheme were not widely used here, they could both provide supporting evidence for the identified themes and help maintain a certain degree of voice during reporting. Moreover, while in this case the document analysis was accomplished using spreadsheets, qualitative data analysis software could facilitate efficient document analyses with similar or larger data sets.

## Recommended method guides

Tight, M. (2019). *Documentary research in the social sciences*. SAGE Publications.

## References and additional resources

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## Focus Groups

### What are focus groups?

Focus groups are facilitator-moderated group discussions that explore participant experiences, perspectives, and opinions about a specific topic (Morgan, 1996; Toth, 2001). In contrast to research interviews, which elicit individually held knowledge, focus groups are used to understand shared and collectively held knowledge, and the range of perspectives held by certain groups or communities (Creswell, 1998). Although a moderator guides the discussion, knowledge is generated through the conversation among focus group participants rather than through interaction directly between the moderator and individual participants. Focus groups are smaller than workshops, typically involving between six and no more than 12 participants (Savin-Baden & Major, 2013). The questions that guide focus group discussions are open-ended and semi-structured (i.e., relevant topics and/or questions may be predetermined but not fixed). This gives the moderator the ability to cover key topics of interest and the flexibility to follow the flow and direction of conversation.



*[Focus groups] is actually a very interesting qualitative method where you're very explicitly calling people together and you're asking them to have a conversation about particular things or particular places. And out of that conversation comes this new thing, which is a documentation of social or collective knowledge held by the group that you've called together.*

*(Interview, P77, IA practitioner)*

*I'm planning focus groups, because I want to take the temperature of certain groups; it's a very polarized project.*

*(Interview, P36, IA practitioner)*



### Why select focus groups?

- Focus groups are relatively simple to design and implement.
- In IA, focus groups commonly involve residents from potentially affected communities and are valuable for understanding the place—and how that place is used—in the proposed project location.
- Focus groups are often used to provide insights into diverse social groups' valued components, perspectives about proposed projects, and perceptions about projects' potential or actual effects. The method is, therefore, particularly valuable for including voices that may otherwise go unheard in an IA process. Certain groups, for example, may find focus groups more comfortable and accessible than workshops or other larger forums. Focus groups may also be valuable for understanding various groups' perspectives in contentious situations.

### When can focus groups be used in IA?

- Scoping, particularly identifying assessment issues important to potentially affected communities.
- Baseline studies.
- Identifying and evaluating potential impacts, especially perceptions of impact across diverse social groups.
- Identifying mitigation & enhancement measures.
- Follow-up and monitoring activities, such as identifying indicators for monitoring plans and post-development examination and discussion of impacts.

#### Impact categories:

- Focus groups are relevant to many impact categories, including environmental, social, and health.
- They contribute to gender and equity analyses (e.g., GBA+) by drawing attention to the range of values across diverse sub-populations and the distribution of impacts across these groups.



## Who is involved?

- Who is involved largely depends on the project and community context. Focus group participants typically share common interests (e.g., local business community, harvesters, farmers, environmental interest groups) or characteristics (e.g., gender, age, education, cultural background, geographical location). These commonalities facilitate comfortable and open dialogue.

## How much time is needed?

- Planning time varies. The time required to select and recruit participants, develop a facilitator's guide, and secure a venue and materials must be accounted for.
- Focus groups typically require 1.5 to two hours. The number of focus groups required depends on the topic of interest and the range of voices that need to be included.
- Transcribing typically takes three to four hours for every hour of recorded audio (manual). Digital transcribing programs can substantially reduce time required.
- It is recommended that researchers plan for three to four hours of data coding per focus group, as well as time to synthesize and report findings.

## What costs may be involved?

- Staff time for planning, conducting, and analyzing focus groups.
- Equipment and materials (e.g., audio recorder, notebooks, flipcharts, etc.).
- Venue rental and refreshments.
- Participant honoraria.
- Qualitative data analysis software.

## Focus groups in practice

### Defining the focus group topic

- Explicitly articulating a purpose statement or research question will help guide the focus group design, so the information gathered meaningfully contributes to the needs of the assessment. Some IA practitioners have found that focus groups are most valuable when they cover specific topics identified as important to potentially affected communities (through previous focus groups or other methods).



*And you have to have some defined understanding of what you're talking about. And often spatial is not enough. You can't say we want to talk about this area. You can do scoping work in a focus group that's focused on area, but you have to very quickly move from that scoping work to, okay, you talked about how hunting, water, migratory birds, ducks and geese are impacted by these projects. Let's do a focus group on that. You also talked about how these projects are affecting your confidence in water quality. Let's have a focus group about that*

*(Interview, P77, IA practitioner)*

### Participant selection

- When selecting the participants, the researchers must consider the diversity of knowledge about a topic. Holding multiple focus groups with various segments of the population can both enable an open discussion environment and ensure that diverse knowledges and perspectives contribute to the understanding of an assessment topic.
- IA practitioners external to the communities should seek to understand local knowledge contexts and power dynamics, and work with community partners to determine who should be invited to participate.

### Facilitator selection

- Moderators should have strong interpersonal and facilitation skills. In some circumstances, it may be valuable to have co-facilitators to fill various tasks and roles during the discussions.

*You need somebody in charge of the social science, which is the facilitator, somebody in charge of the information management -- that's your note taker and sort of the backup and also probably managing the audio record -- and you've got to have ideally a third person in that room who's their job is a cultural one. [...] I need somebody else who knows the language, who knows the people in the room to have that eye contact to you be able to make sure that they're still feeling heard.*

*(Interview, P77, IA practitioner)*



## Venue selection

- The researcher must carefully consider where the focus groups will be held. Other key considerations are to select locations that are comfortable and accessible for the groups involved and that are conducive to the specific discussion topic.

## Ethical considerations

- As part of the informed consent process, the facilitator must be clear about how the data will be protected but also about the limits to confidentiality. The moderator should ask that participants not share what they hear beyond the focus group discussion.

## Good facilitation

- As in other group settings, certain individuals may dominate the conversation. The moderator should watch for and have a plan to curb such behaviour.
- A pre-prepared focus group guide with open-ended questions and prompts is used to ensure key topics are covered. However, conversation among participants should flow as naturally as possible.



*Focus group questions must follow a certain process, starting with building rapport, and then ending with most sensitive questions. People sometimes need to be debriefed afterwards, which can be problematic if the person conducting the group is not skilled, or does not pick up on the need for debriefing. A facilitator must be flexible and be able to jump round in between questions, because in the discussions some questions may be answered.*

*(Survey, P56, IA practitioner)*

## Data collection

- Focus group discussions are typically captured using audio or video recordings (with participant consent) and/or note-taking (e.g., facilitator notes, flip chart notes).

## Analysis

- For a rigorous analysis, recordings and notes are typically transcribed. However, overlapping voices in focus group recordings can make transcription challenging.
- Qualitative data analysis is typically used for analyzing focus group data (see the qualitative data analysis section of this report for more information).

## Limitations

- Due to the nature of focus group discussion, confidentiality cannot be guaranteed. This can both limit people's willingness to share and create social risks for participants, especially in small communities or where sensitive issues are discussed.
- Focus groups can be time consuming for participants, which can make recruitment challenging. Researchers must therefore allow plenty of time for the participant recruitment process.
- When discussing sensitive topics, participants may be hesitant to share their honest opinion and instead opt for safe or socially acceptable responses.

## Related methods

- Focus groups are usually applied alongside other methods in IA. While focus groups are used to engage with community stakeholders, surveys or interviews may be used to gather information from experts and key stakeholders (e.g., Aboagye et al., 2019; Farnham et al., 2020; Terrapon-Pfaff et al., 2017). Focus groups may be used once core issues have been identified through other means, such as workshops (Linzalone et al., 2017) or interviews.
- In some cases, focus groups may also be integrated with—or support—other methods, such as seasonal calendars, scenario-based methods, fuzzy systems, or matrix approaches. For example, Terrapon-Pfaff et al. (2017) engaged priority participant groups (e.g., women, youth, farmers, and unemployed residents) in an individual ranking and scoring matrix exercise to evaluate impact significance, followed by focus group discussions to determine the rationale for divergence across individual scoring.

## Case Study 6.4.

### Health and Well-Being Impacts of Mining in Sub-Saharan Africa (Focus Groups)

Several articles identified through the structured literature review demonstrated the use of focus groups to examine the distribution of impacts from mining developments across diverse sub-populations (e.g., Farnham et al., 2020; Lahiri-Dutt & Ahmad, 2011; Leuenberger, 2021a,c). This was typically accomplished by using a segmented sampling strategy, in which focus groups were composed of relatively homogenous groups of participants (e.g., by gender, age, geographic location, etc.). Leuenberger et al. (2021a), for example, analyzed the distribution of impacts on health and well-being resulting from major mine developments in Burkina Faso, Tanzania, and Mozambique. They conducted 83 focus groups with approximately eight to 11 participants per group. The focus groups were separated by gender to minimize gendered power relations within the discussions. The focus groups were recorded, transcribed, and analyzed using a thematic approach. The analysis identified differential impacts based on intersecting personal attributes (age, gender, place of residence/origin), community level factors, and broader power relationships and structural conditions that interacted with the mining developments. Although these studies took place outside of regulatory IA processes, they point toward the potential value of focus groups in follow-up and monitoring activities.



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# Fuzzy Set Theory

## What is fuzzy set theory?

Fuzzy set theory enables the quantitative processing of imprecise qualitative data represented by linguistic variables. Despite limited evidence of use in IA to date, fuzzy set theory is a potentially powerful tool for IA because linguistic variables that are open to different interpretations (e.g., high/medium/low or severe/major/minor/negligible) are often used to describe the significance of impacts. The views of experts or other stakeholders on significance using such qualitative descriptors may be obtained during an IA process by many methods, including interviews, surveys, polls, and workshops.

The term “fuzzy set” was coined by Zadeh (1965) to describe a set of data that is open to interpretation and therefore does not have a sharply defined boundary or when a sharply defined boundary between categories might be largely arbitrary. Fuzzy sets soften the transition between categories of linguistic variables and enable “shades of grey” reflecting uncertainty, ambiguity, and subjectivity. Figure 6.1 provides an illustrative example of how linguistic variables describing terrain slope might be represented using fuzzy sets. In this example, a slope of 7 degrees (x-axis) might be described as having a medium membership of the “Slight” fuzzy set and a low membership of the “Moderate” fuzzy set, whereas a slope of 23 degrees has a low membership of both the “Moderate” and “Steep” fuzzy sets. These descriptions provide a more nuanced description



*It just seems bizarre to me that you have thresholds and it's used all the time in environmental management. You know, I mean things like air quality targets and whatnot, you know, you get a hard threshold. If you're above 40 micrograms per cubic meter of nitrogen dioxide in in an annual average then you're breaching some EU air quality directive, you know, and it's like, what about if you're 39.9?*

*(Interview, P152, researcher/academic)*

than the alternative, more common approach whereby the linguistic variables may have been crisply defined as Slight = 0-7; Moderate = 8-22; Steep = 23-32.

Fuzzy set theory enables the processing of imprecise qualitative data represented by linguistic variables (such as high, medium, and low). The term “fuzzy set” was coined by Zadeh (1965) to describe a set of data that is open to interpretation and therefore does not have a sharply defined boundary or when a sharply defined boundary between categories might be largely arbitrary. Fuzzy sets soften the transition between categories of linguistic variables and enable “shades of grey” reflecting uncertainty, ambiguity, and subjectivity.

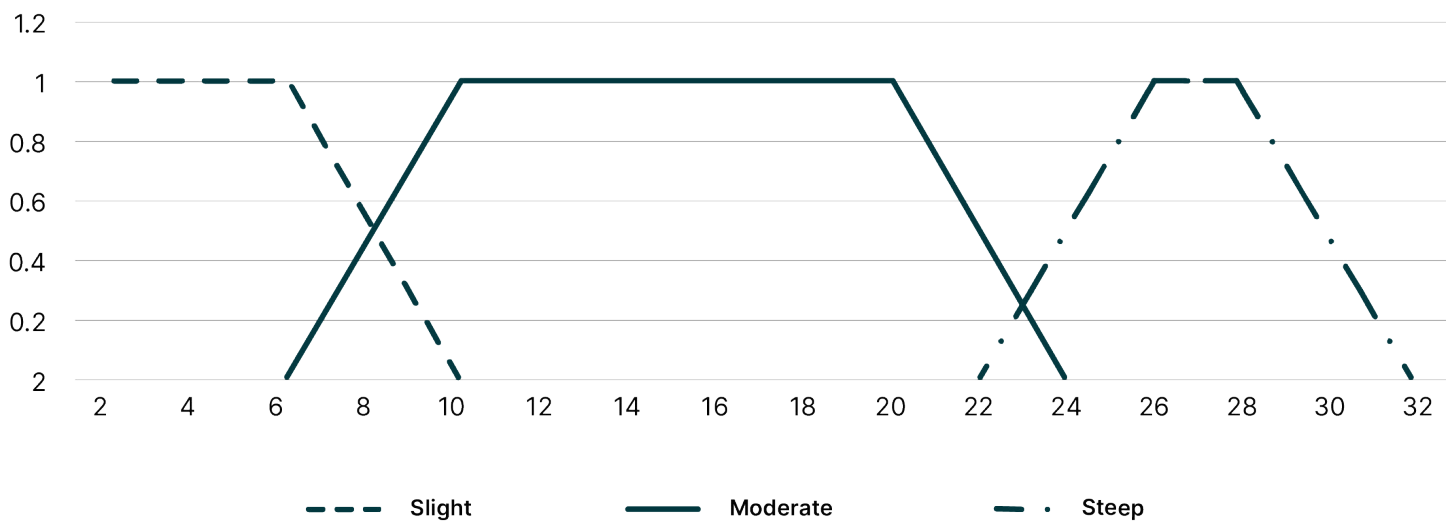


Figure 6.1. Fuzzy sets for terrain slope linguistic variables.



Membership functions of fuzzy sets can be described mathematically, often based upon assumed standard curve shapes such as trapezoidal (as shown in Figure 6.1) or triangular. The articulation of these membership functions enables subsequent mathematical manipulation and analysis using various fuzzy analytical techniques. For example, fuzzy logic, or fuzzy reasoning, involves the application of if—then logical statements to fuzzy data and enables the possibility of degrees of truth. It has been described as a methodology for “computing with words” (Zadeh, 1996). Numerous analytical methods have been “rewritten in fuzzy terms” (Wood et al., 2007, p. 813) to incorporate fuzzy set theory, such as fuzzy modelling, fuzzy analytic network process (ANP), fuzzy statistics, fuzzy cognitive maps, fuzzy qualitative comparative analysis (QCA), and the like, many of which are potentially applicable to IA. Software is available to support these methods.

Fuzzy set theory has been applied in many fields, including areas of environmental management such as surface water and ground water remediation, soil amendment, air pollution management, ecological impact classification, and design of environmental indicators (Peche & Rodriguez, 2009). Wood et al. (2007) use fuzzy set theory within IA to define degrees of significance of noise impacts on a wind farm development by combining data obtained from a range of stakeholders (see Case Study 6.5). Other applications of fuzzy set theory in IA are provided by Smith (1996), Liu et al. (2007), Peche & Rodriguez (2009), and Liu and Yu (2009).

## Why select fuzzy set theory?

- Fuzzy set theory is useful when data are too imprecise to be definitively represented with absolute numbers but when some computation or mathematical manipulation of the data are desirable (Zahdeh, 1996). Fuzzy set theory enables more nuanced, sophisticated, and mathematically robust ways of analyzing qualitative data than applying a crisp set where categories are arbitrarily demarcated.

## When can fuzzy set theory be used in IA?

- Impact significance evaluation.
- Evaluation of alternatives (as component of multi-criteria analysis).

## Impact categories:

- Fuzzy set theories are particularly useful for impacts whose interpretation is subjective, such as noise, visual impacts, and many social impacts such as quality of life or sense of place, for which broad stakeholder engagement is sought.
- They can also be applied to impacts that are more quantitatively measurable (e.g., air or water quality) where there is disagreement amongst experts on the significance of relevant quality indicators; in this case, technical experts would be polled rather than the public.

*I always think with noise impacts people get carried away with the quantification—and particularly experts. You can get quite low noise levels [that] might be 38 decibels, which is nothing on a scale, but you can hear that. So the classic one is traffic. If it's a bit wet on the roads, you can hear that from miles away, and if that wasn't there before, it's quite a change, it's annoying [...] So you know 36 decibels they they're saying, oh well, that's not much louder than the bedroom at night. You know when everyone's asleep. Well, yes. But you can still hear it, and the quality of the noise is different from the baseline. So to hide behind numeric things is not the whole story...*

*(Interview, P152, researcher/academic)*

## Other contextual considerations:

- Fuzzy set analysis requires significant mathematical expertise so is not an appropriate choice unless this expertise is available.
- The use of these techniques in IA is rare and relatively complicated, and it may be challenging to obtain agreement (e.g., from project proponents) for their use in IA.

## Who is involved?

- An analyst coordinates the data collection and undertakes the fuzzy set analysis.
- Data from a wide range of stakeholders can be incorporated and analyzed, a benefit of the method.

## How much time is needed?

- The data collection phase for fuzzy set analysis is similar to that of other methods in which data are obtained from stakeholders.
- The fuzzy set analysis itself is an additional step and may be complex depending on the level of expertise available and exactly what form of analysis is being conducted.

## What costs may be involved?

- Software to support fuzzy set analysis.
- The engagement of an appropriate expert in fuzzy set theory to coordinate the data collection and conduct the analysis.

## Fuzzy set theory in practice

### Application

- The greatest value of fuzzy set theory in IA probably lies in evaluating impacts that are directly experienced, can be simulated, and are highly subjective.
- There are many potential applications of fuzzy set theory in IA, from evaluating impact significance (as per Wood et al., 2007) to fuzzy versions of established analytical methods, such as fuzzy ANP or fuzzy QCA. The need for, and value of, a potential fuzzy method should be identified early and incorporated into the design of the IA (and not attempted as an add-on).

### Participant selection

- Participant selection will depend upon the nature of the impacts and the purpose of the exercise.
- If the aim is to analyze the significance of highly subjective impacts, then broad engagement of diverse stakeholders and communities is important as different communities will likely have different perceptions depending on history, proximity, and context.
- If the aim is to analyze the variability of the opinions in relation to a more measurable impact, then only technical experts may be required.

## Data collection

- There are different methods to elicit the data for fuzzy set analysis. Wood et al. (2007) describe two of these: direct estimation, where a stakeholder group is represented by a single individual; and polling in a workshop involving members of the public (see Case Study 6.5).

## Analysis

- The approach to analysis, and the tools employed, will depend on the aim of the fuzzy set analysis and the specific method selected. Appropriate expertise will be required.

## Limitations

- A lack both of expertise and awareness of the potential value of fuzzy set theory for IA has contributed to a slow uptake of this method.
- This method is more difficult than other methods to apply broadly to impacts that cannot be simulated and experienced.

## Related Methods

- A range of methods can be used to obtain the qualitative input data (e.g., interviews, focus groups, or workshops) depending on the impact being assessed. For example, various visual methods can be applied to extract data on visual impacts.
- The Delphi method can be used to develop membership functions of fuzzy sets (Peche & Rodriguez, 2009).
- Fuzzy versions of various multi-criteria analysis (MCA) methods have been developed, for example the Fuzzy Analytic Network Process (Lui & Lai, 2007; Mikhailov & Singh, 2003), as well as Fuzzy QCA.

## Case Study 6.5.

### Use of Fuzzy Set Theory to Evaluate and Communicate the Significance of Noise and Visual Impacts of a Windfarm

Wood et al. (2007) describe the application of fuzzy set theory within the IA of a proposed windfarm in the UK. The purpose of the exercise was to develop the membership functions of the fuzzy sets related to noise and visual impacts (as an alternative to applying a pre-defined curve shape) by combining the perceptions of different stakeholders. Individual stakeholders (such as the developer) were provided with simulations (in the form of sound recordings or photomontages, respectively) and asked to identify the range of impacts that could be considered as belonging to the following categories: “negligible,” “slight,” “moderate,” “substantial,” and “very substantial” (direct estimation). Community members were polled in a workshop in which individuals were randomly asked questions such as, “Do you agree that the noise (for example) impact is substantial?” while being played a recording of the noise. The proportion of participants agreeing with the statement was the degree of membership of the fuzzy set. The basic characteristics (shape, slope, and cross-over point) of the fuzzy sets for each impact category were determined for each stakeholder group, and the degree of overlap or “fuzziness” was assessed. The fuzzy set membership functions were found to vary considerably between stakeholder groups. The application of fuzzy set union and intersection analysis enabled the researchers to determine the maximum and minimum ranges of “acceptable” impacts to be determined across all stakeholder groups. They concluded that the fuzzy sets analysis provided decision makers with important and concrete information on impact significance in a particular context that transparently reflected the variability of stakeholder perceptions.



## Recommended method guides

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## Interviews

Interviewing is a common qualitative research method that allows for the in-depth exploration of individuals' experiences, perspectives, and opinions through conversation. Interviews can have varying degrees of structure, including unstructured, semi-structured, and highly structured. Interviews in IA are most often semi-structured, combining structure with flexibility by using an established set of questions to guide the conversation around topics of interest, but also allowing for follow-up and deeper exploration of new topics, ideas, and experiences raised by the interviewees. These interviews take a conversational, free-flowing approach where the participant shares their knowledge and experiences in their own words and the interviewer probes and re-directs the discussion as needed (Morris, 2015).

### Why select interviews?

- Interviews with key knowledge holders and subject matter experts can fill information gaps in specific areas of interest.
- They can inform or follow-up on the information gathered through other group methods, such as focus groups and workshops.
- Interviews provide rich, in-depth information.
- One-on-one interaction with interviewees can help build positive relationships, as well as enhance trust and perceived legitimacy in the process.
- Interviews are flexible, both in terms of the ability to adapt them to various circumstances and to follow-up on interviewee responses to gain a more nuanced understanding of the topic at hand.

*You typically cannot get sufficient information or sufficient detail from secondary sources [...] you have to go to the knowledge holders to be able to get at the detail you need relative to your information needs.*

*(Interview, P117, IA practitioner)*

*Works well alongside group methods, can delve deeper into topics raised in wider group meetings, or identify topics to delve more deeply into in a group setting.*

*(Survey, P57, IA practitioner & researcher)*

*One thing that stands out is just the ability to pivot and respond to what the person saying and dig a little deeper and hopefully get a bit more nuance as a result of that conversation.*

*(Interview, P26, IA practitioner)*

### When can interviews be used in IA?

- Scoping, particularly to identify local needs, values, and priorities that could contribute to the development of assessment criteria indicators. Interviews may also help to triangulate key issues identified in initial document reviews.
- Baseline studies, to gather information about past, present, and future environmental, cultural, and socioeconomic conditions of a place. Baseline is among the most common IA process step at which interviews are applied.
- Impact prediction, to directly seek views about perceived impacts of a proposed project. However, practitioners noted that interviews are often most effective when they focus on local valued components and what entails "healthy" valued components in the future. This information is then analyzed against the proposed project plans. Interviews may also be used to identify cumulative effects pathways.
- Monitoring and evaluation, specifically in post-hoc evaluations of impacts resulting from development projects. For example, interviews have contributed to evaluations of the environmental impacts of a landfill (Sánchez-Arias et al., 2019), impacts on determinants of health and equity from extractive operations (Anaf et al., 2019), the social impacts of cultural heritage programs (Gallou & Fouseki, 2019), and the effectiveness of equity-based employment programs (Cox & Mills, 2015).

### Impact categories:

- Interviews are relevant to many impact categories, including environmental, economic, social, health, cultural, psychosocial, and gender and equity.





*I feel that the key informant interviews are more informative on the baseline side. [Be]cause when you move to talking about future impacts [...] those concerns can also be a bit all over the place. And then you're diving into real versus perceived risk and all of these pieces [...] Similarly with the future looking pieces, the community I was working with and lots of the other projects I've worked on recently, the focus on the future looking pieces was more like if you were to imagine yourself five or ten years in the future in this place and you see it as healthy or you see things as having had a good outcome. What does that look like to you? [...] When we're talking about the significance of impacts and we have a proponent who's saying when the site is done, it will look like a X. It gives us a comparative to say like well, you know, for this community a successful remediation or a successful outcome looks like Y. And how significant is the difference between those two outcomes?*

*(Interview, P106, IA practitioner & researcher)*

## Who is involved?

- Most often, interviews in IA are conducted with “key informants” or “key persons”—those with deep knowledge about a specific topic. These may include key community leaders and knowledge holders, as well as other subject matter experts (e.g., government officials, health and social service providers, NGO representatives, union leaders, and scientists).
- Interviews may also be conducted with local residents, sometimes including specific sub-groups within communities (e.g., fishers, farmers, mine workers, women, or youth).

*I use key informant interviews [...] for two reasons. One is that in practice there's usually limited budget, limited time, and limited access [...] I think the other piece is that, especially in First Nations communities, you get directed to specific people as knowledge holders. And so you might say [to] someone, is this impacting any traditional uses? And they might tell you, oh, well you have to talk to [name]. [He] is the person to talk to about this area. So interviewing six people is not an efficient way to approach it when everyone's telling you just go do one interview with [him].*

*(Interview, P106, IA practitioner & researcher)*



## How much time is needed?

- Planning time varies, but the time required to select and recruit participants and to develop and test an interview guide must be accounted for.
- Interview length somewhat varies depending on the questions asked, engagement of the participant, and interviewer skill. Typically, interviews run for about one hour. The number of interviews required depends on the topic of interest.
- Transcribing typically takes three to four hours for every hour of recorded audio (manual). Digital transcribing programs can substantially reduce the time required.
- Data coding per interview typically takes three to four hours, plus time to synthesize and report findings.

## What costs may be involved?

- Staff hours for planning, conducting, and analyzing interviews.
- Cost depends on how the interviews are conducted (e.g., if there are travel costs for in-person interviews vs. online/phone interviews).
- Participant honoraria, if applicable.
- Materials and equipment (e.g., audio recorders).
- Qualitative data analysis software.

## Interviews in Practice

### Developing the interview guide

- A set of questions is typically developed before the interviews are conducted. Semi-structured interview guides contain a set of questions to guide the conversation, but there is flexibility in the order in which the questions are asked and freedom to ask additional questions to clarify or dig into interviewee responses in greater depth.
- Questions are typically open-ended (rather than closed-ended, yes/no questions) to encourage discussion.
- Care should be taken to avoid “leading” questions (i.e., questions that steer the interviewee towards a desired answer) and “double-barreled” questions (i.e., asking two questions at the same time).

- Pre-testing the interview guide is highly recommended. This is an opportunity to check question clarity, order, quality, and adjust as needed.
- For community interviews, questions and recruitment strategies should be determined in collaboration with local advisors (Cox & Mills, 2015; McDowell & Ford, 2014)



*It's a series of open-ended questions and as I ask the questions one-by-one, they may lead to spontaneous or on the spot further questions that open up an interesting piece of information, and I may want to go down that rabbit trail and explore it. The semi-structured open-ended questionnaire gives me that flexibility to continue to pursue questions of a respondent if I need clarification, or they've said something of interest.*

*(Interview, P53, IA practitioner & researcher)*

*... we also try to run tests before applying the interview itself. We talk to someone who's more familiar with the topic, or an acquaintance of us, some person we have some kind of friendly relationship or professional relationship--doesn't matter—run a test and then we make adjustments if necessary to the interview script...*

*(Interview, P71, researcher/academic)*

## Participant selection

- In IA, interviews often use a combination of purposeful and snowball sampling to identify appropriate interviewees. Purposeful sampling involves selecting interviewees based on specific characteristics, knowledge, or other criteria. Snowball sampling occurs when initial interviewees suggest additional participants who meet the criteria.
- Awareness of local protocols is important. In some contexts, consent from local leadership is required before the interviews begin. This process can also contribute to appropriate interviewee selection.

## Selecting an interview time and location

- Interview locations should be safe, comfortable, and convenient for the interviewees. Researchers need to be aware of the surroundings. A noisy environment can make it difficult for the recorder to pick up interviewee responses.

- Researchers should respect interviewees' time and request participation as far in advance as possible.
- Although using online platforms for interviewing is increasingly common (and often more cost effective), in-person interviews are often favoured because they allow greater ability to read body language, more easily establish rapport, and engage in a more natural discussion.

## Ethical considerations

- Free, prior, and informed consent must be established at the beginning of every interview. These discussions should clarify the purpose of the interviews, confidentiality considerations, risks, benefits, and how the information will be used.
- Interviewees are typically given the option of reviewing and revising their transcripts if desired. This can contribute to interviewee confidence that their confidentiality and privacy are adequately protected.

*I find a lot of people in bureaucratic organizations are not allowed to talk to you unless you go through the right channels and then they're really afraid they'll say the wrong thing [...] I always send transcripts back to people for checking. And even though that can be a very frustrating process where people want to rewrite their transcript. But I think that's important in giving people comfort.*

*(Interview, P36, IA practitioner)*



## Creating safe spaces

- Measures should be taken to create a culturally and personally safe environment. This can include considering who is an appropriate interviewer in various contexts and whether they have the experience, background, and/or training to conduct interviews in a culturally safe manner.

## Effective interviewing

- Interviewer skill is important to gathering quality data through interviews. Effective interviewing relies on the ability to:
  - establish rapport with the interviewee;
  - actively listen and respond accordingly;

- maintain a conversational style;
- politely probe to encourage the participant to elaborate on an idea or example;
- adapt the interview to participant time constraints;
- reduce interviewer effect on participant responses by maintaining neutral body language and expressions to avoid encouraging responses in a particular direction.

### Collecting the data

- Interview data are ideally captured using audio recordings (with interviewee consent). If an interviewee declines to be recorded, thorough notes can be taken and returned to the interviewee to verify accuracy.

### Analyzing the data

- For a rigorous analysis, it is customary to transcribe recordings and notes. A computer-assisted qualitative data software package like NVivo or ATLAS.ti is typically used for analyzing transcribed interview data (see the “qualitative data analysis” section of this report for more information). The absence of a systematic analysis risks producing unreliable or untrustworthy results.
- Occasionally, a systematic qualitative data analysis process may not be relevant, such as when an interview’s purpose is to fill very specific, fact-based information gaps.
- When conducting analysis in team environments, measures should be taken to ensure consistency across team members.

### Reporting the findings

- Themes identified through the systematic analysis of interview data are ideally supported with representative quotes from the data.
- Measures should be taken to ensure that confidentiality is maintained (e.g., by removing identifying information or attributing quotes to a participant code or pseudonym). In some cases, participants prefer to be identified by name. This request is generally honoured, but the interviewees should be fully informed about how and where the information will be shared.
- Sharing draft reports with interviewees can be an important mechanism for ensuring confidentiality and accurate use of their quotations.

### Limitations

- It can be challenging to engage potential participants due to engagement fatigue, distrust, or their professional role.
- Interviews take considerable time to plan, conduct, and analyze.
- A critique of key informant interviewing is that it may prioritize certain knowledges or assume that key informant perspectives are representative of a broader group, thus potentially reinforcing vested interests and existing power relations (Loket, 2021).

### Related Methods

- Interviews may be conducted alongside other methods, such as a literature review, focus groups, and/or surveys. For example, findings from interviews may be validated through focus groups.
- Interviews are often used in narrative and storytelling approaches (see “narrative methods”).
- Interviews may also be integrated with other methods, such as multi-criteria analysis, fuzzy sets, and community mapping (see “spatial methods”).

## Case Study 6.6.

### Rook 1 Project Socio-Economic Baseline Study (Interviews)

A series of “key person” interviews informed the socio-economic baseline IA study for the Rook 1 Project—a proposed uranium mine in northwestern Saskatchewan, Canada (Golder Associates, 2022). The interviews were “undertaken to confirm trends observed in quantitative data, address gaps that could not be readily filled by secondary sources and provide context and perspectives on community interests and concerns” (p. 15). A total of 73 interviews were conducted with organization representatives, community members, and local leadership in several First Nations, towns, villages, and hamlets. Community coordinators, established through a funding agreement with the proponent (NextGen), assisted in identifying interviewees with specific knowledge on health and well-being, economic development, education, and social services. Informed consent was obtained prior to each interview and an interview guide provided structure for the interviews. Due to COVID-19 and wildfires in the

region, the interviews were primarily conducted online or by telephone. Community meetings, information sessions, and workshops were also conducted in parallel to the interview program. The socio-economic baseline report indicates that the interview data were collected through written notes by the interviewer(s). No information about the analysis strategy was provided, other than that “the information that was collected through interviews was categorized based on the topics included in the existing conditions and incorporated where possible to either provide additional detail or validate secondary data” (p. 15). The report also noted that, where possible, the interview data were triangulated with information collected through secondary information sources (e.g., census data, government reports, and media articles). Interview findings were summarized throughout the report but were generally not supported with direct quotes from participants.

## Case Study 6.7.

### Sagkeeng Anicinabe Psychosocial Impact Assessment (Interviews)

The Sagkeeng Anicinabe Psychosocial Impact Assessment provided an evaluation of the psychosocial baseline conditions and impacts related to the Canadian Nuclear Laboratories’ proposed decommissioning of the Whiteshell Reactor 1 (WR-1) in Manitoba (Narratives Inc., 2020). Developed to complement other Sagkeeng Anicinabe-led studies and assessments, the psychosocial impact assessment (“the IA”) relied on interviews to examine “experienced past, present, and potential future social, psychological, cultural, and spiritual impacts of WR-1, the proposed in-situ decommissioning, and other decommissioning alternatives” (p. 1). Semi-structured interviews, guided by a flexible interview schedule with suggested prompting and probing questions, were conducted with 26 members of Sagkeeng First Nation. A prior systematic documentary analysis informed the development of the interview schedule, and the resulting questions focused on individuals’ experiences and relationship with the local environment, perspectives about cultural continuity, and perceived and actual impacts associated with the WR-1

facility and its proposed decommissioning. Informed consent was obtained prior to each interview. The interviews were recorded, transcribed, coded, and analyzed using the qualitative data software package MaxQDA. The IA took an inductive approach to coding and analysis, which allowed the key themes to emerge from the data rather than fitting the data into predetermined categories. This approach “intended to prioritize the lived experience of participants by permitting and integrating unanticipated patterns in the data” (p. 9). The findings formed the psychosocial baseline, which included valued components, historical impacts, impacts from broader industry presence, and impacts from the WR-1 site. Specific themes and sub-themes were summarized and supported through the liberal use of interviewee quotes. This information facilitated the assessment of psychosocial impacts and the generation of proposed mitigation measures. IA report appendices included the informed consent script, interview guide, and the qualitative codebook that guided the analysis, which demonstrated methodological rigour.

## Recommended method guides

Morris, A. (2015). *A practical guide to in-depth interviewing*. SAGE Publications.

Seidman, I. (2019). *Interviewing as qualitative research: A guide for researchers in education and the social sciences* (5th ed.). Teachers College Press.

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Golder Associates. (2022). *Rook I Project: Environmental impact assessment. Annex X: Socio-economic baseline report*. <https://iaac-aeic.gc.ca/050/documents/p80171/144548E.PDF>

Lokot, M. (2021). Whose Voices? Whose Knowledge? A feminist analysis of the value of key informant interviews. *International Journal of Qualitative Methods*, 20, 1-8. <https://doi.org/10.1177/1609406920948775>

Mathur, H. M. (2011). Social impact assessment: A tool for planning better resettlement. *Social Change*, 41(1), 97-120.

McDowell, G., & Ford, J. D. (2014). The socio-ecological dimensions of hydrocarbon development in the Disko Bay region of Greenland: Opportunities, risks, and tradeoffs, *Applied Geography*, 46, 98-110. <https://doi.org/10.1016/j.apgeog.2013.11.006>

Morris, A. (2015). *A practical guide to in-depth interviewing*. SAGE Publications.

Narratives Inc. (2020). *Sagkeeng Anicinabe psychosocial impact assessment*. <https://iaac-aeic.gc.ca/050/evaluations/document/146118>

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## Matrices

Matrices—grids that link system components with project activities—are among the oldest and most familiar methods for IA. According to Fischer and Davies (1973), matrices show the “interactions between environmental management activities or development activities and a set of environmental characteristics,” though in recent decades their use has expanded beyond environmental characteristics to include many additional social–environmental system components. Multiple matrix methods are used in IA. The **Leopold matrix** and **compatibility matrix**, for example, help assess first-order interactions between project actions and valued system components by listing project activities on one axis of the matrix and system components on the other (Bisset, 1980; Fischer & Davies, 1973; Wathern, 1984). **Component interaction matrices** are used to map component interactions and indirect higher-order impacts by listing the same system components on the vertical and horizontal axes and determining where dependencies exist (Bisset 1980; Wathern 1984). This matrix method can reveal “the relative importance of environmental components within a particular environmental system, in terms of their ability to initiate secondary impacts, and their susceptibility to secondary impacts” (Shopley et al., 1990, p. 199). Matrix methods can be considered a mixed method since quantitative measures and/or qualitative descriptions (e.g., high/medium/low) and indicators can be used to evaluate the interactions among project and system components.

While matrix methods often rely primarily on expert judgement to determine the most relevant system components and conduct significance evaluations, innovative participatory matrix applications have also been developed to include a wider range of values and perspectives in IA (e.g., Ahmed, 2010; British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development, 2022; Nchanji et al., 2017; Sagkeeng Anicinabe & Firelight Research Inc., 2020; Satterfield et al., 2013). Participatory applications, such as in multiple accounts analysis, typically involve diverse partners and stakeholders in the identification of valued system components and associated indicators and/or scoring and ranking component interactions within the matrices.

### Why select matrix methods?

- Matrices provide flexibility, as they can be tailored to specific development objectives, area characteristics, and the people involved.
- Matrices can integrate both quantitative and qualitative indicators into a single systematic analysis of potential system interactions.
- They enable a quick visualization of the possible interactions among valued system components and project activities.

### When can matrices be used in IA?

- Both strategic and project-level IA.
- Screening.
- Scoping, to identify areas for more detailed study and analysis.
- Identifying and evaluating the significance of potential impacts.
- Evaluating alternatives, especially as a component of multiple accounts analysis (e.g., British Columbia Ministry of Forests and Lands Natural Resource Operations and Rural Development, 2022).

*I see [matrices] more as a visualization tool than an analysis tool.*

*(Survey, P50, government/regulatory agency staff)*

*[Matrices allow participants] to learn a lot more about what is proposed and what the potential different alternatives are. To overlay their values against those alternatives in a way that's never been done before, and then make an informed determination based on their own value set that can then be put into the impact assessment process.*

*(Interview, P149, IA practitioner)*

### Impact categories:

- Early applications of matrix methods focused mainly on environmental components, but their use has since expanded to include a wide range of social, cultural, economic, health, and environmental considerations.
- Matrix methods may also contribute to gender and equity analyses (e.g., GBA+). See, for example, the access and control matrix method (Nchanji et al., 2017).

## Who is involved?

- Matrices are often used by IA professionals as an internal planning and analysis tool.
- Participatory matrices may involve a range of rights holders and stakeholders (e.g., Indigenous government representatives, local/regional government representatives, affected communities, non-governmental organizations, proponents, and industry)



*We've used an approach that I think is generally called multiple accounts analysis. Where possible, it's great for that multiple accounts to mean many different types of people—proponents, government, communities—all giving their own account.*

*(Interview, P149, IA practitioner)*

## How much time is needed?

- Matrix methods are generally considered a time-efficient method. The time required will, however, largely depend on whether they are used as an internal or a participatory planning tool. Planning and implementing participatory matrix methods via such tools as workshops, focus groups, and planning meetings take more time, particularly when participants are unfamiliar with matrix approaches.



*... it takes time to familiarize people with the project and the environment. In fact, it takes time just to get people, to learn how the exercise is going to work. So, we needed nine hours of people's dedicated time over a series of three meetings to conduct this exercise and they also had homework in between.*

*(Interview, P149, IA practitioner)*

## Matrices in practice

### Identifying matrix components

- The valued system components included in matrices should be tailored to the specific project or strategic activity.
- In participatory matrix methods, the valued system components are generally identified through collaborative discussion or other qualitative methods (e.g., focus groups, interviews, or workshops).

### Facilitation

- Researchers must consider who would be an effective facilitator for implementing participatory matrix methods. Will they be perceived as impartial by those involved?
- Facilitators must provide participants with sufficient information about the project or strategic initiative to enable an adequate evaluation of system components through matrices. This information should be impartial, thorough, and presented using language appropriate for the audience.

*People can't make these determinations without good, impartial information and there's always the risk that your facilitators may have a preference that they're angling for themselves, or that they may be perceived to have had a preference by someone on the outside which impacts on the confidence that an external party has in in the findings*

*(Interview, P149, IA practitioner)*



### Evaluating matrix interactions

- In matrix methods, the magnitude of interactions between components on the vertical and horizontal axes are described using quantitative (e.g., a scale of 1-5) or qualitative descriptors (e.g., low, medium, or high). Other indicators of impact significance, such as direction (positive/negative), duration (long term/short term), and reversibility (reversible/irreversible) may also be described for each interaction in the matrix.
- For participatory matrix methods, scoring approaches should be selected based on the preference of those involved.

## Related methods

- Other qualitative methods, such as workshops, focus groups, and interviews, may be used to identify relevant valued components and to conduct scoring/ranking exercises.
- Systems/network analysis may be used to facilitate the identification of system components to include in matrices (e.g., Rai & Singh, 2015).

## Limitations

- Matrix methods do not allow for the integration or presentation of rich, in-depth information.
- For participatory applications, it can be challenging to communicate the method and to obtain consistent results.
- Matrices typically do not account for spatial or temporal considerations and interactions.
- The success of participatory matrix methods depends on a committed group of stakeholders with sustained engagement over time.

*[Matrices] provide only very high-level information such as yes/no/maybe. As more detail is added, a matrix becomes quite unwieldy quite quickly. They provide a good overview but they do usually not reflect the fact that the information behind each box on the matrix can be of very different quality, depth, certainty, and detail. They contain, and often hide, biases of whoever created the matrix.*

*(Survey, P50, government/regulatory agency staff)*

*One of the main challenges I faced is related to communicating the methodology and explaining how the methods work to different stakeholders. Sometimes filling matrices could be an exhaustive task and require much attention from the respondent. Difficult to get consistent results.*

*(Survey, P4, researcher/academic)*



## Case Study 6.8.

### T8FN Development Component/Valued Component Interaction Matrix

The Treaty 8 First Nations (T8FN) Community Assessment Team employed a Development Component/Valued Component Interaction Matrix to inform the regulatory environmental assessment process for the proposed Site C Hydroelectric Project in British Columbia, Canada (T8FN Community Assessment Team & The Firelight Group, 2012). This matrix approach facilitated the identification of potential interactions between specific Site C project components and T8FN-identified valued components. The columns of the matrix comprised the physical works and activities associated with each phase of the proposed development, while each row indicated a T8FN valued component. The rows included nearly 100 valued components related to meaningful practice of Treaty rights; protection and promotion of culture; meaningful role in governance and stewardship; equitable

access to education, training, and economic opportunity; healthy communities; and other environmental considerations. The valued components were identified through interviews, focus groups, validation workshops, and document reviews conducted throughout the community assessment process. Instead of using a scoring technique to describe the magnitude of potential interactions, the matrix provided numbered footnotes that correlated to a more detailed description of the potential impact pathways contained in an “initial impact pathways table.” The matrix also indicated the expected direction of each interaction between project and valued components (i.e., unknown, beneficial, adverse, or potential for both beneficial and adverse impacts, denoted by ?, +, -, +/-, respectively).

## Recommended method guides

British Columbia Ministry of Forests, Lands Natural Resource Operations and Rural Development. (2022). Socio-economic and environmental assessment guidance for modernized land use plans. [https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/land-water-use/crown-land/land-use-plans-and-objectives/policies-guides/mlup\\_guide\\_socio-economic\\_environmental\\_assessment\\_2022.pdf](https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/land-water-use/crown-land/land-use-plans-and-objectives/policies-guides/mlup_guide_socio-economic_environmental_assessment_2022.pdf)

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## Multi-Criteria Analysis (MCA)

### What is MCA?

Used to inform choice decisions, multi-criteria analysis (MCA) is a “family of mathematical techniques that generate comprehensive input for decision-making by aggregating the performance of alternatives on multiple, often conflicting, decision attributes” (Te Bovelde et al., 2021, p. 493). MCA methods are considered mixed methods as they incorporate both qualitative and quantitative data, which are converted into numbers and mathematically combined. Qualitative methods are particularly applicable in the weighting step, which involves assessing the relative importance of each criterion and allows for the integration of the subjective views and values of different stakeholder groups.

There are numerous different MCA techniques, all of which have slightly different mathematical algorithms according to which scores and weights are derived and/or combined. All forms of MCA involve some or all of the following steps (Dodgson et al., 2009, p. 31):

1. Establish the decision context. What are the aims of the MCA, and who are the decision makers and other key players?
2. Identify the options;
3. Identify the objectives and criteria that reflect the value associated with the consequences of each option;
4. Describe the expected performance of each option against the criteria. (If the analysis is to include Steps 1 and 5, also “score” the options (i.e., assess the value associated with the consequences of each option);
5. “Weighting.” Assign weights for each criteria to reflect their relative importance to the decision;
6. Combine the weights and scores for each of the options to derive an overall value;
7. Examine the results;
8. Conduct a sensitivity analysis of the results to changes in scores or weights.

When all eight steps are applied to deliver an overall ranking of options in terms of preference, this is termed multi-criteria decision analysis (MCDA), sometimes also called multi-criteria decision-making (MCDM) (Dodgson et al., 2009). MCDA/MCDM is thus a subset of MCA.

### Why select MCA?

- MCA provides a clear structure and transparent process for evaluating a choice decision where many competing objectives are at play and trade-offs are inherent.
- MCA embraces qualitative data more readily than other choice processes, such as cost benefit analysis, and offers a means of combining quantitative and qualitative data in one process.
- MCA enables community members and other stakeholders to participate in the process and for different views and values to be reflected in the options analysis (particularly in the weighting of Step 6).
- The output of an MCA process is often a visual product, such as a graph or a diagram, which is a helpful communication tool.

### When can MCA be used in IA?

- Informing the evaluation of alternatives in strategic and project-level IA.
- Developing a composite indicator representing an impact (see, for example, Torres-Sibille et al., 2009 in relation to visual impact indicators), although this use is uncommon.

#### Impact categories:

- The value of MCA is that it brings together consideration of all impact categories into one method to provide a picture of the comparative sustainability of options under consideration.

#### Other contextual considerations:

- A full MCA process may not be necessary if the choice decision is simple or the best option becomes quickly obvious.



## Who is involved?

- MCA requires expert coordination to operate any software and ensure that the method is correctly applied with appropriate mathematical rigour.
- Typically, appropriate subject matter experts undertake the scoring for each criterion (Step 4).
- Broad community and stakeholder involvement is desirable, particularly in the weighting step (Step 5) and potentially also in the identification of options (Step 1) and development of objectives and criteria (Step 2). For some criteria, particular stakeholders may be the appropriate experts to undertake scoring (Step 4).



*We have disciplinary experts that provide factual information and then we add the stakeholders that provide the values. And then we have the experts that sort of sit in between and try to translate the two flows of information and then merge them together. And basically impact assessment is about combining criteria. So the MCA provides a nice framework for doing that.*

*(Interview, P65, researcher/academic)*

*So that requires a sort of experience in applying it. It's not just a software that you just buy off the shelf and use. You have to know how to make it work so that that it's considered by stakeholders to be legitimate.*

*(Interview, P43, researcher/academic)*

## How much time is needed?

- Once the required data has been gathered and the software set up, the actual MCA process can be done quite efficiently through a single stakeholder workshop followed by review of results by the assessment team.

## What costs may be involved?

- Proprietary software with associated licence fees, although some forms of MCA can be undertaken manually or using a spreadsheet.
- Stakeholder workshops.

## MCA in practice

### Step 1: Decision context

- When MCA is applied to the evaluation of alternatives as part of an IA process, the decision context is based upon the regulatory requirements for IA.
- At this point, potential participants in the process (including stakeholders) should be identified. For example, if the options relate to the siting of infrastructure, then community members from the area embracing all the site options may be invited to be involved. Alternatively key stakeholders may be invited to represent the broader community.
- Regardless of which stakeholders are invited to participate, it is important to spend some time explaining the functioning of the MCA to the participants, as MCA has been described as having a “black box feel and complex jargon” (Survey, P29, multiple roles).

### Step 2: Options

- It is important to make sure that the options are comparable (i.e., that they are all directed towards the same objectives and that there is enough data available to be able to score each option).
- If many options are identified, it may be useful to conduct a feasibility assessment before the MCA to reduce the number of options to six or less.

### Step 3: Objectives and criteria

- It can be challenging to translate the issues associated with the options into objectives and criteria that can be measured and assessed.
- Ideally, a set of criteria should be comprehensive and cover as many of the issues as possible but should not overlap, as this can result in double-counting.
- Due to human cognitive limitations, if there are many criteria, it may be useful to group them in categories and subcategories so that not more than  $7 \pm 2$  categories or subcategories are being considered together in any step.

### Step 4: Scoring

- The scoring of each option against each criterion is the impact assessment step of MCA. The outcome of this step is a “performance matrix” of options versus criteria, showing the performance of each option against each criterion.

- Scoring should be based on data and use appropriate expertise, so scoring of more technical criteria should be undertaken by subject matter experts.
- Scoring can be done qualitatively (for example using colour coding) or quantitatively (in which case scores need to be normalized to account for different units of measurement).
- Sometimes a simple qualitative method is enough to demonstrate that one option clearly outperforms other options or to identify a “red flag” option.
- However, if the scoring gives ambiguous results, weighting and subsequent steps using normalized, quantitative data scoring will be required; simply allocating scores of 1, 2, 3, etc. to colours on an ordinal scale is not mathematically acceptable.



*What I think is more useful is to use a colour coding type thing. We might give a green, you know orange or red against the criteria, there might be four or five of those colours. But it gives you that sort of visual comparison. And you can see where an option might have quite a few greens, and maybe a couple of yellows and no reds, whereas if something else has a lot of reds that pretty much weighs it and chucks it out. And there will be some criteria where red is a showstopper.*

*(Interview, P82, IA practitioner)*

### Step 5: Weighting

- Depending on the outcomes of the scoring step and whether it was done qualitatively or quantitatively, weighting may not be necessary or appropriate.
- It is important to ensure that participants in the weighting process understand that weights should reflect the relative importance of the criteria in the specific context of the decision at hand and not in general terms. For example, biodiversity may be considered very important in general, but if the biodiversity impacts of each option being assessed are quite similar, biodiversity should not be weighted very highly in the MCA.
- There are different methods to generate numerical weights that are sufficiently robust to enable mathematical functions to be performed in subsequent steps, depending on the MCA technique being used. These weighting

methods include pairwise comparison and swing weighting, which are explained in Dodgson (2009).

- Weighting may be undertaken in a workshop situation involving a broad range of stakeholders. It can be a consensus process undertaken with the whole group of stakeholders or by smaller groups representing particular interests (see Case Study 6.9) or even at an individual level.

### Step 6: Combining weights and scores

- There are many different MCA techniques based on different mathematical algorithms. Three broad categories of MCA techniques are particularly relevant to IA because they promote transparency and provide opportunities for community and stakeholder engagement:
  - linear-additive methods;
  - analytic hierarchy process (AHP);
  - outranking methods.
- These processes are described, along with their relative strengths and weaknesses, in Te Boveldt et al. (2021) and Dodgson et al. (2009).
- In most cases, Step 6 will be undertaken using appropriate software that reflects the chosen technique.
- The MCA can be run with different weights, for example, using an average of individual weights or the consensus weights of each smaller stakeholder group to evaluate how much difference the weights make to the outcome. This process can be part of the sensitivity analysis (Step 8).

### Step 7: Review results

- The review process involves evaluating the relative strengths and weaknesses of each option. This may highlight opportunities to create new options that perform better against more criteria.
- It is important to remember that MCA is a decision-aiding tool, not a decision-making tool.

### Step 8: Sensitivity analysis

- Sensitivity analysis is a way of dealing with uncertainty in the MCA process by testing what would need to change and by how much for the outcome of the MCA to change. It enables “what if” questions to be asked (e.g., What if this impact (score) is greater than predicted? What if we change the weights?)
- Sensitivity analysis can be an important way of mitigating any stakeholder concerns about the process and its outcomes.

## Limitations

- To apply the methods correctly and rigorously in accordance with mathematical rules, MCA requires expertise. There are many ways in which rules can be inadvertently broken.
- The use of software can evoke perceptions of a “black box.” It is therefore essential to ensure that the process is transparent and that stakeholders and participants understand the process and how their inputs will be used.

## Related methods

- Fuzzy systems: Fuzzy sets can be applied to both the scoring and weighting steps of MCA (Dodgson et al., 2009), including by fuzzy pairwise comparison (Mikhailov & Singh, 2003; Kaya & Kahraman, 2011).
- GIS: Spatial MCA involving GIS tools is increasingly used in strategic environmental assessment (Gonzalez & Enríquez-de-Salamanca, 2018). GIS can be useful for first mapping constraints to identify options (e.g., for site locations or routes for linear infrastructure) and then for assessing the options.

- Interviews: In some cases, MCA inputs can be collected through interviews (Corral & Hernandez, 2017).
- Workshops: The participatory components of MCA are typically facilitated through stakeholder workshops, particularly when consensus of inputs is sought (Te Boveldt et al., 2021).
- Delphi: The Delphi method has been applied to gain consensus on scores or weights.
- Deliberative methods: Methods such as citizens' jury have been proposed as viable alternatives to MCA.

*So, within the GIS application, this was an example where we wanted to find a corridor from point A to point B. The GIS gave value factors to each area so we're going through a regional ecosystem. So we [...] basically go through all the different environmental values, and [...] the GIS is tasked with finding the road of least impact, so to speak.*

*(Interview, P47, IA practitioner)*

## Case Study 6.9.

### Strategic Assessment Fremantle Outer Harbour, Western Australia (Multi-Criteria Analysis)

As part of a proposal to develop a new port in Western Australia, a potential location and four alternative configurations of the port and transport connections were identified. A strategic assessment incorporating MCA was conducted by consultants GHD on behalf of the Department for Planning and Infrastructure and Fremantle Ports to identify the best configuration from a sustainability perspective, which would then be subject to regulatory IA. A broad range of sustainability criteria and sub-criteria were identified and scored by the technical team. Weighting was undertaken by stakeholders representing marine recreation groups, local business/industry, environmental groups, the local community, port operators, and technical advisors through surveys, interviews, and workshops. Participants self-

identified with one of the stakeholder groups, and the weights allocated by members of each stakeholder group were averaged. It was found that in many cases the weights were similar between the different groups, although there were some areas of divergence (particularly in relation to economic and operational criteria). Two different MCA techniques were applied, using the weights generated by each different stakeholder group, as well as overall average weights. The results clearly showed that one option outperformed the others across all criteria and that the different weightings had a minimal influence on the outcomes. This outcome was tested through sensitivity analysis, giving stakeholders confidence in the rigour and validity of the MCA process (GHD, 2006).

## Recommended method guides

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## Narrative Methods

### What are narrative methods?

Narrative research involves the telling and interpretation of people's experiences through storytelling. It is a way of ordering and making meaning out of the events and circumstances experienced by individuals, while also providing a window into the broader cultural, social, and institutional contexts in which people live (Moen, 2006). There is no single data collection strategy for narrative research; rather, it draws on a variety of techniques, such as oral histories, interviews, journal entries, digital recordings, and unstructured discussion (Moen, 2006; Ross, 1989). In narrative research, researchers “collect stories and then retell them on behalf of the participants, partly by collating different people's stories and also by interpreting them and restating them in particular ways” (Savin-Baden & Major, 2013, p. 232). The write-up of narrative findings uses rich, detailed description of the participants and settings and uses narrative excerpts and quotes to maintain participants' direct voice. Narrative data can be presented through vignettes (e.g., Vanclay, 2015), through detailed contextualizing information interspersed with passages directly from data (e.g., Groater et al., 2012), or, in the case of digital storytelling, through short audio-video compilations (e.g., Gislason et al., 2018). **Digital storytelling** (also called filmed narrative<sup>1</sup>) is a specific narrative method that uses audio-video technology to gather, synthesize, and share participant stories. These methods may also integrate other forms of media, such as photographs, drawings, maps, and satellite images (Roque de Oliveira & Partidário, 2020).



*...stories are the primary way in which we communicate with each other. My somewhat jokingly way of thinking about this is to ask people well, have you ever seen a statistical coefficient that's changed your life? Probably not. But I bet you've heard a story or two that changed your life or thinking... that's the point, we oversell quantitative methods as a life changing event for people. And we undersell the narrative.*

*(Interview, P38, researcher/academic)*

<sup>1</sup> See, for example, Roque de Oliveira & Partidário (2020) and Witteveen et al. (2009).

### Why narrative methods in IA?

- Narrative research can produce powerful stories that are relatable and easily communicated across boundaries (e.g., between potentially affected communities and proponents/decision makers).
- Narrative methods and the narrative accounts produced are engaging and can give participants confidence that their concerns and perspectives are being meaningfully included in IA processes.
- Narrative methods can provide a comfortable and culturally familiar way of participating in IA. They allow participants to determine what is important and communicate their stories in their own way and can be a way to preserve stories for future generations (Ross, 1989)

*When doing these narrative and storytelling type descriptions, which I have found in the sense of representing a First Nation and trying to communicate to a regulator what's happening, to be one of the more effective ways to engage non-Indigenous regulators in what has happened to the community in this place.*

*(Interview, P106, IA practitioner & researcher)*



### When can narrative methods be used in IA?

- Scoping, including in the participatory identification of locally significant valued components and assessment indicators.
- Baseline studies.
- Impact prediction, including cumulative impacts and determining how these impacts are also shaped by historical and regional contexts (e.g., Ross, 1990).
- Information gathering and analysis by decision-making bodies, such as oral testimony at IA hearings.
- Follow-up and monitoring, especially to provide insight into how and why a development intervention led to positive or negative change.
- Possibly in strategic IA (there is some indication that narrative methods may be applicable) (e.g., Vanclay, 2015).





*One of the reasons we have Indigenous led impact assessment is because people want impact assessment to tell a story of change. And for Indigenous people, it's all about the stories. And so a story is inevitably a qualitative method of sharing information about something that has happened, that can help us predict what will happen.*

*(Interview, P149, IA practitioner)*

*Through the hearings it was informal, and it got to the point where the spoken word was clearer than all the scientific evidence that was stacked up on the side, and it was just people speaking from their heart, from their experiences, and it just puts things into perspective.*

*(Interview, P137, government/regulatory agency staff)*

### Impact categories:

- Narrative methods are relevant to many impact categories, including social, health, cultural, and environmental.
- They can provide insight into potential impacts on intangible valued components, such as mental and emotional well-being, spirituality, and social cohesion, and attachment to place.

### Other contextual considerations:

- Narrative methods are most often used in community-led IA, which is rooted in local values and priorities and emphasizes community control over the IA process (e.g., Cameron et al., 2011; da Silva et al., 2020; Gillis, 1999; Niiwin Wendaanimok Partnership, 2021; Ross, 1990; Treaty 8 First Nations Community Assessment Team, 2012). In these cases, IA practitioners or researchers act primarily as facilitators rather than the driver of the research.

### Who is involved?

- Typically, a small group of individuals with intimate knowledge or experience related to the study is involved. In some contexts, it may be valuable to hold storytelling sessions with participants from various sub-groups within the population (e.g., Elders, men, women, youth) to ensure a variety of perspectives are captured.
- For digital storytelling, an experienced videographer and film editor can be important for ensuring quality final products.

### How much time is needed?

- The time required varies depending on the data collection method. For planning, consider the time it takes to develop research instruments (e.g., interview guide), identify and recruit participants, and secure any equipment and skills required (e.g., video equipment and software for digital storytelling).
- Interviews are a common data collection technique for narrative inquiry. A semi-structured interview typically takes approximately one hour, while oral history interviews are often somewhat longer (1.5 to two hours).
- Transcribing typically takes three to four hours for every hour of recorded audio (manual). Digital transcribing programs can substantially reduce time required. Filmed narratives may be analyzed directly without transcribing.
- Two to three hours of data coding per hour of interview should be planned for.
- The time for analysis and synthesis depends on the volume of data and output type. Because the collating and retelling of participants is a core aspect of narrative inquiry, substantial time must be allowed for synthesizing the information through written or visual outputs and for verifying the interpretations with participants.

### What costs may be involved?

- Staffing for planning and gathering data, as well as analyzing and synthesizing information.
- Contracting additional expertise, if necessary (e.g., videographer).
- Equipment and materials (e.g., audio recorder, video equipment).
- Participant honoraria.
- Qualitative data analysis software.

### Narrative methods in practice

#### Relationships and protocols

- Storytelling is a deeply personal experience. Taking the time to establish relationships with the storytellers can create a more comfortable environment and provide the listeners with a deeper understanding of the story context.
- Researchers should learn about and honour community protocols.

“

*...in Africa, I think it's not only South Africa, following the correct procedure is critical, because we came on board on this one project a little bit late, and they did not consult with the Chief first and we hear it at every single meeting a couple of times you didn't follow the procedure... And some people won't speak to you if you don't have the permission of the chief.*

*(Interview, P56, IA practitioner)*

*The method itself... instead of a series of questions—tell me about this and then on to the next question—it is rather can you tell me about this and then interpreting it and fragments using content analysis, you're using an interview guide that invites them to tell you long stories. Can you tell me about a time when... do you have a story about what brought you here?*

*(Interview, P38, researcher/academic)*

### Story prompts

- Narrative methods may pre-establish some questions or prompts to guide the discussion, though these are usually minimal, open-ended, and flexible.

### Ethical considerations

- Researchers should recognize and honour that there are instances where certain information may be too culturally or personally sensitive to share.
- Participants should retain ownership of their stories (for additional information, see the First Nations principles of ownership, control, access, and possession (OCAP™)).
- The informed consent process should clearly communicate how participants' stories will be synthesized and shared.
- Opportunities should be provided for participants to review and verify transcripts, and direct quotes and interpretations of their stories should be presented in reports and other outputs.
- There are limitations to confidentiality when using video recordings, so associated risks must be considered and mitigated where possible. Informed consent involves participants fully understanding how video-recorded information will be used and with whom it will be shared.

*First Nations data ownership is pretty important. We go over the fact [that] you the interviewee own your data and in giving consent you're giving the Band office permission to use it in these regulatory discussions. You can retract your interview anytime. The only exception is we cannot retract any quotes that have since been made public. So like if your quote is posted on the [Impact Assessment Agency] registry, we can't take it down, but we can not use any other parts of your interview ever again and return your data.*

*(Interview, P106, IA practitioner & researcher)*

”

### Gathering stories

- Narrative interviews are typically captured using audio or video recordings (with participant consent) and then transcribed for analysis.
- Filmed narratives focus primarily on participants' narratives and may include some contextual shots or information.

### Synthesizing stories: Analysis

- Qualitative data analysis (often using a computer-assisted qualitative data software package like NVivo) is typically used for analyzing narrative data. (See the “qualitative data analysis” section of this report for more information).
- Analysis may be done collaboratively with the storytellers (see, for example, the PATH approach to community-led Health IA (Gillis, 1999)).

### Presenting narrative data

- Written narrative reports typically rely on storytellers' direct voice as much as possible by integrating direct quotes and excerpts with researcher interpretation.
- Filmed narratives are typically edited and compiled into short videos. Like written narrative reports, these are typically presented in a thematic manner.

*Many of the traditional use studies that we're involved in now, probably 25 to 30% of the body text is devoted to people's verbatim statements. And then with some interpretation thereafter. But sort of letting them speak for themselves.*

*(Interview, P149, IA practitioner)*

”

## Validating interpretations

- Validating the interpretations of participant stories and use of direct quotes in written reports and videos is an important step in ensuring that the outputs accurately reflect the storytellers' intent.
- The researchers who compile the narratives should take a reflexive approach and pause to consider how their own perspectives affect how the stories are being told and retold.

## Limitations

- Analyzing and presenting narrative data in a way that both honours the holistic nature of participants' stories and meets the needs of IA regulatory processes can be time-intensive and challenging.
- In some scientific and regulatory circles, there may still be scepticism about the credibility of story-based approaches.

## Related methods

- Narrative methods may be used in conjunction with other methods, such as archival document review and spatial mapping.

*Visits on the land with Elders to document stories about specific places – using audio/video recordings and mapping these places.*

*(Workshop participant)*



## Case Study 6.10.

### Harmonized Impact Assessment for the TransCanada Highway Twinning Project (Narrative Method)

The Niiwin Wendaanimok Partnership is a collaboration among four Anishinaabe Nations (Wauzhushk Onigum, Washagamis Bay, Shoal Lake 40, and Niisaachewan), established to collectively respond to the Government of Canada and Government of Ontario's joint proposal to twin a section of the TransCanada highway that runs through Anishinaabe territory (Niiwin Wendaanimok Partnership, 2021). The harmonized impact assessment that emerged from the partnership is a ground-breaking initiative rooted in both Manito Aki Inakonigaawin (Anishinaabe Sacred Earth Law) and contemporary impact assessment principles (Niiwin Wendaanimok Partnership, 2021). A narrative approach was key to the development of the harmonized impact assessment. For example, "rather than following a strict 'question-answer' framework, semi-structured interviews were conducted to allow for greater flexibility

and discussion, and to promote storytelling" (p. 30). Archival research and stories told during community and Elders' gatherings, individual and group interviews, and ceremonies were analyzed and synthesized to communicate the Anishinaabeg understanding of well-being and relationship to the lands, skies, soils, and waters. This analysis enabled the establishment of a "web of values" as a foundation for the assessment. The assessment then harmonized participant stories and teachings with western scientific knowledge to evaluate project impacts and propose mitigation measures. Although the harmonized impact assessment document contains the usual IA elements, it feels more accessible than a typical IA report, largely because it uses plainer language and its narrative excerpts are compelling. The report can be accessed on the Niiwin Wendaanimok Partnership website (<https://niiwinwendaanimok.com/projects/>).

## Recommended method guides

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## Q Methodology

### What is Q methodology?

Q methodology was developed by William Stephenson in the 1930s as a method to enable the systematic study of subjectivity (Brown, 1993). It identifies groups of underpinning perspectives, beliefs, or worldviews that different people may bring to a situation and thus sheds light on how and why responses to that situation differ. Q methodology differs from traditional social surveys in that it “reveals typologies of perspectives that prevail in given situations, rather than purporting to investigate the prevalence of views within a population” (Cotton & Mahroos-Alsaiari, 2015, p. 96). It can generate insights beyond a polarized description (e.g., jobs versus economy), whereby there are often three, four or five distinct points of view on an issue.

In the Q methodology process, participants are invited to sort a series of subjective statements (known as a “Q sample,” developed from a longer list of statements called a “concourse”) according to the extent to which they are like the participant’s view or unlike their view. The Q sample can also comprise visual images, sounds, or other forms. The process of ordering the statements is called the “Q sort”, as is the ordered set of statements that results. Statistical methods, involving inverse factor analysis, are then applied to the Q sorts to develop composite Q sorts representing the collective perspectives to which participants subscribe in varying degrees (Cotton & Mahroos-Alsaiari, 2015).



*The Q sorts that you work with cannot be traced back to a specific participant. It is not a participant, it's a composite...so it's really about clusters of perspectives that exist in a larger practice.*

*(Interview, P151, researcher & government agency staff)*

### Why select Q methodology?

- Q methodology is potentially useful whenever subjective evaluations in IA are made. It can reveal statistically significant differences in perspectives, beliefs, or worldviews among stakeholders or decision makers, and identify where the key points of difference in those perspectives lie.

- A feature of the method is that large sample sizes are not required because “the unit of measure... is not the number of participants who express a particular belief ... but the beliefs to which a number of participants subscribe” (Dziopa & Ahern, 2011, p. 40).
- Expertise in statistical methods is not generally required due to the availability of software for Q methodology analysis.

*Sometimes it's very clear. Like in the stuff we did on the key sorts we did on energy system in Canada. One of the most dominant discourses there was intense climate concern. Climate is the key motivator. But then it's these other ones that are more nuanced and in the middle ground between wholesale support for renewable energy versus a kind of retrenching of the status quo.*

*(Interview, P38, researcher/academic)*



### When can Q methodology be used in IA?

- Impact significance evaluation (for impact categories below).
- Decision-making when the goal is to understand the different perspectives or worldviews that may be held by different decision makers (see for example Jenkins, 2017).

#### Impact categories:

- These include both visual impacts (see for example Lu et al., 2018) and social impacts in general.

#### Other contextual considerations:

- Q methodology may have greater potential application in strategic or regional forms of IA, where higher-level, more subjective evaluations of alternative future scenarios may be made (see, for example, Accastello et al., 2019).

### Who is involved?

- Researchers with some knowledge of Q methodology are required.
- Depending on the application, the participants can be community members, other stakeholders, or decision makers.



## How much time is needed?

- Q methodology can be time-consuming for the researcher because of the effort required to develop the concourse, refine the list of statements into a Q sample, and then analyze and interpret the Q sorts.
- The Q sort process can also be relatively time-consuming for participants, taking significantly longer to complete than a similarly scoped survey based on a Likert-scale, for example.

## What costs may be involved?

- Q methodology software, although there are free versions available online.
- Expertise in Q methodology, if none exists on the IA team.

## Q methodology in practice

### Development of concourse

- A series of statements relevant to the topic at hand should be developed. These statements could come from interviews, document review, or many other methods.
- The concourse can also comprise pictures, music, or other sounds.

### Development of Q sample

- The Q set is a subset of the concourse. As in developing a survey tool, the aim is “to provide a miniature which, in major respects, contains the comprehensiveness of the larger process being modelled” (Brown, 1993, p. 99).
- The Q sample should be balanced and not biased in one direction or another.

### Participant selection

- Participant selection will depend on the topic; for example, it might be appropriate to involve only experts if the topic relates to a specialist field, or, if it is more general, a wider range of stakeholders may be invited to participate.
- The number of participants can be small and rarely exceeds 50 (Brown, 1993).
- The group of participants is known as the “P set.”
- The P set should not be larger than the Q sample.

### Q sort

- The researcher presents the series of statements in the Q sample to the participants, either manually (using cards) or more commonly using software. It is important to shuffle the order of the statements between Q sorts.

- Participants initially sort the statements into broad categories or indicate that they agree, with them, are neutral, or disagree.
- They are then asked to apply a more nuanced categorization according to a distributed rating scale established by the researcher. For example, if there are 15 statements in the Q sort, the distribution might be: 1@-3, 2@-2, 3@ -1, 3@0, 3@+1, 2@+2, 1@+3. In this example, the statement in the -3 category would be the one least like the participant’s view, while the +3 statement is the one most like the participant’s view. The shape of the distribution is not important for the analysis (Brown, 1993).

### Interview

- A Q sort should be followed by an interview to allow participants to clarify and elaborate on their points of view, particularly in relation to the statements at the extremes of the agreement/disagreement spectrum in the Q sort. This step is often missing from applications of Q methodology, but the findings are not validated if it is omitted.

### Factor analysis

- There are different factor analysis methods available, including centroid analysis and principal component analysis (PCA) (Dziopa & Ahern, 2011). It is important to justify exactly which methods have been selected.
- Some Q sorts may be confounded, that is, they are internally conflicting. In this case, they are excluded from the data set.

### Analysis

- The researcher reviews and interprets the outcomes of the factor analysis and what it means for the case at hand. For example, the researcher considers the responses of each group of participants (those holding a particular perspective) to the statements in the Q sample to identify areas of commonality and significant differences between the groups (e.g., Accastello et al., 2019, as discussed in Case Study 6.11).

*It's like all these statements are collapsing together in terms of what people prefer like or don't like, but it's up to you to interpret what that means. So there's an interpretive component which is qualitative. Then as a researcher, you're left with these statements, the computer says that they've that they hang together, but you have to figure out how they do that. So that's the interpretive or qualitative part.*

*(Interview, P38, researcher/academic)*

## Limitations

- The perspectives (factors) identified through Q methodology cannot be said to be representative of the entire population and may not be exhaustive.
- The framing of the Q sort instructions in terms of “like my view” or “unlike my view” can be confusing to participants more familiar with questions asking them to agree or disagree to varying degrees. The requirement to allocate the statements within a predetermined structure can also be frustrating for participants unfamiliar with the method.

### Case Study 6.11.

#### Conflicting Demands on Natural Resources in Northern Sweden (Q Methodology)

Accastello et al. (2019) describe the use of Q methodology to support the assessment of the social, economic, and environmental impacts of alternative future scenarios for a mining region in Northern Sweden. Although undertaken as a research project rather than as part of an actual assessment, this case study offers a useful demonstration of how Q methodology could be usefully applied within a strategic or regional IA process. Four potential future scenarios for the region were identified through a participatory process (tourism, wood production, nature conservation and mining), and Q methodology was then applied to evaluate the potential societal acceptance of the four scenarios. The concourse was developed through a combination of literature, interviews, and expert knowledge, comprising a set of statements about the potential impacts of each scenario. Of the 35 statements in the concourse, 26 were selected to form the Q sample. The P set comprised stakeholders who had participated in earlier stages of the process. Three distinct groups of perspectives were identified: pro-mining, pro-production, and pro-nature. The responses of these three groups were compared to highlight areas of significant divergence and commonality among the responses of the three groups. This process enabled the researchers to identify issues that could support or hamper the implementation of future plans for the region.

## Related methods

- Interviews and/or document analysis may be used to develop the concourse.
- Surveys may also be conducted to complete the Q sort.

### Recommended method guides

Watts, S., & Stenner, P. (2012). *Introducing Q methodology: The inverted factor technique. Doing Q methodological research theory, Method & Interpretation*. SAGE Publications.

### References and additional resources

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## Qualitative Data Analysis

### What is qualitative data analysis?

Qualitative data analysis is a systematic process of organizing and making sense of text and image data (Creswell & Creswell, 2018; Leavy, 2017). A wide range of data sources and types can be qualitatively analyzed (e.g., interview and focus group transcripts, written documents, photographs, video clips, and workshop notes). Five generic steps of qualitative data analysis include: 1) Organizing and preparing the data; 2) an initial review of the data; 3) data coding; 4) categorizing and theming, and 5) interpretation (Creswell & Creswell, 2018; Leavy, 2017). Organizing and preparing the data involves transcribing data (e.g., audio-recorded interviews, focus group discussions, or workshop notes), digitizing data (e.g., archival and hard-copy documents), and gathering and sorting the data for analysis. An initial review of the data allows the analyst to gain an overall sense of the information before the systematic coding process begins. Coding involves systematically moving through the data and attaching descriptive words, phrases, or labels to data segments, a process that enables the researcher to identify patterns across the data. Data can be coded inductively (i.e., codes are determined based on what is observed in the data), deductively (i.e., codes are predefined and data are fit to them), or with a combination of both (Creswell & Creswell, 2018). Once the initial coding is complete, the analyst reviews the established codes and clusters related or similar codes, enabling dominant “themes” in the data to become apparent. Interpretation involves considering what the identified themes—and relationships among them—mean in relation to the study’s purpose and context and how they will be represented in reporting.

There are many specialized forms of qualitative data analysis that build upon the generic steps above. Common types included thematic analysis, content analysis, narrative analysis, and discourse analysis. **Thematic analysis**—the most common and basic form of qualitative data analysis—is the general process of identifying, analyzing, and sharing key patterns found in the data (Braun & Clarke, 2006). According to Braun and Clarke (2006, p. 82), “a theme captures something important about the data in relation to the research question, and represents some level of patterned response or meaning within the data set.” In IA, thematic analysis can, for example, be used to identify key valued components or perceived potential impacts discussed by interview or focus group participants (e.g., Alexander,

2013; Garibaldi et al., 2015; Leuenberger et al., 2021; Sinclair et al., 2009). **Content analysis** involves finding patterns in the use of terms or phrases, usually in written documents (Savin-Baden & Major, 2017). In addition to coding and categorizing the data, it may also include a quantitative process of tabulating the frequency with which terms or ideas appear in the data (e.g., Pimental da Silva, et al., 2021; Keith Storey Consulting, 2015). **Narrative analysis** is the examination and interpretation of the stories people tell. The focus of narrative analysis is on the “elements purpose, plot, setting, structure, linguistic features, and language, to derive the meanings embedded in these for the storyteller and for [their] audience” (Bazeley, 2013). Data are organized and coded to form a sequenced story following a plot arc that communicates the key points of significance and meaning in/across storytellers’ narratives. For example, through a narrative analysis of a mine employee’s experiences of fly-in-fly-out work arrangements, Goater et al. (2012) identified possible pathways for enhancing well-being of Australian mine workers and their families. **Discourse analysis** focuses on identifying and analyzing themes related to how language is used to represent an issue or event. It can be useful in understanding, for example, how IA issues and various groups involved are perceived, framed, and represented (e.g., Rozema & Bond, 2015; Runhaar, 2009).

*I just finished coding interviews about a river. I coded for fish, but then I went through all of the quotes that were coded for fish and fish habitat and then divided them into past and present and did the same for other aspects like flows or riparian areas. And then the narrative of the report was very much split into past, present, and the community’s hopes for the future. We tried to include all of the information and paint a picture of how the river was used and what it looked like prior to known human activities in the watershed. And then continuing to tell the story of all of these changes that happened after those human activities occurred and what the changes look like to the community and how the changes affect use.*

*(Interview, P106, IA practitioner & researcher)*



## Why use qualitative data analysis?

- Qualitative data analysis is an essential component of qualitative studies, including in many of the methods in this toolkit, but in practice our research reveals that it is often not given sufficient attention or is diminished by attempts to quantify qualitative information in the context of IA. Rigorous, systematic qualitative data analysis is crucial for establishing credibility and validity in qualitative studies.

## When can qualitative data analysis be used in IA?

- Analysis of data collected through many qualitative methods (can contribute to any IA process step).

### Impact categories:

- Qualitative data analysis is relevant to all impact categories such as environmental, economic, social, health, cultural, psychosocial, and gender and equity.

## Who is involved?

- An analyst, or team of analysts, is needed to coordinate data organization, coding, analysis, and interpretation.
- Collaborations among community-based and external researchers are increasingly common. Who is involved in the qualitative data analysis process and how it is accomplished should be discussed early in the study planning phase.

## How much time is needed?

- Transcribing typically takes three to four hours for every hour of recorded audio (manual). Digital transcribing programs can substantially reduce the time required.
- Analysts should plan for two to three hours of initial data coding per hour of transcribed data. The time required for coding other forms of data (e.g., documents) will depend on the size and amount of data.
- Additional time will be needed to further analyze, synthesize, and report findings.

## What costs may be involved?

- Transcription software and/or staff time for manual transcription of audio-recorded data.
- Qualitative data analysis software such as NVivo or ATLAS.ti.

## Qualitative data analysis in practice

### Preparing and organizing data

- For ease of navigating the data during analysis, each “piece” of data should be transcribed and given its own file. Each interview transcript, for example, should be stored as a separate document.
- A logical file naming system should be developed so that the data “pieces” are easy to identify. This may include the data source (e.g., interview, focus group), participant ID code, and the date of collection.
- Analysts should reflect on whether there are any key parent codes or nodes from the literature that may help to inform their analysis. Parent themes, or nodes, do not all have to be grounded in the data; they can also come from the literature.

### Initial review of data

- Before starting the coding process, analysts should read each piece of data (e.g., interview transcript, workshop notes, and documents, etc.) in its entirety, reflecting on the key ideas and perspectives presented and how they relate to the study’s purpose and objectives.
- Initial analytical thoughts and observations should be recorded as they arise. These notes can be written by hand or using memo and annotation tools in qualitative data analysis software.
- This initial review process can facilitate the development of an initial code list as a starting point for the coding process.

*An important step forward is ensuring rigorous analysis through qualitative data software like NVivo. It helps make analysis more repeatable.*

*(Workshop participant)*



## Coding

- While coding and analysis can be done manually (e.g., cutting and organizing data with note cards or using digital spreadsheets), using computer-assisted qualitative data analysis software (CAQDAS) is generally considered good practice as it enhances coding efficiency and consistency. Popular CAQDAS programs include NVivo, ATLAS.ti, MaxQDA, and Dedoose.
- Coding involves segmenting the data into meaningful “chunks” (sentence(s), paragraph(s), or passages) and applying labels (i.e., the codes) that describe the key idea contained within. A code label is a word or short phrase that can range from descriptive (i.e., simply describes what is happening in the text segment) to more analytical (i.e., an interpretive concept) (Bazeley, 2020; Gibbs, 2008). In CAQDAS programs, the analyst creates the code and copies and pastes relevant data segments to the code. Once the entire dataset is coded, the analyst is then able to retrieve all data related to each code, providing a clearer sense of what is happening across the entire data set.
- Writing memos and annotations about analytical insights and possible relationships among codes enhances later analysis and interpretation. A detailed record of coding decisions (an “audit trail”) should also be kept throughout the process.

## Further categorization, analysis, and interpretation

- As noted above, analysis is typically an iterative, multi-stage process in which codes are reviewed and further refined to identify overarching concepts or themes. Refining coding may include grouping similar codes, more finely coding data when the initial codes are too broad, renaming codes, and/or removing irrelevant data (Bazeley, 2013).
- Once key categories, concepts, or themes are identified, the analyst must interpret what they mean in relation to the study at hand (e.g., what implications do the findings have for conclusions and recommendations made in an IA?). Describing the contours of each key category, concept, or theme in writing can be a helpful first step in interpretation.

## Enhancing validity and credibility

- The credibility of the interpretation of qualitative data largely depends on the strength and clarity of the arguments made and how well they are grounded in participant experiences and perspectives (Bazeley, 2013;

Savin-Baden & Major, 2013). For example, do the identified categories, concepts, or themes make sense in relation to the study’s purpose? Does the evidence (e.g., quotes from data) clearly support the interpretation? Does the interpretation explain and accurately reflect participants’ perspectives?

- Qualitative analysts must take a reflexive approach and consider how their own worldviews, backgrounds, and perspectives influence how the data are analyzed and interpreted.
- For team projects with multiple coders and a developed code list, having team members code the same piece of data and reviewing for (in)consistencies can enhance inter-coder reliability.
- A clear, comprehensive description of the qualitative analysis process should be written into final reports. Such descriptions help demonstrate the validity and credibility of the study.
- Particularly for narrative methods and analysis, validating the interpretation of participant stories and use of direct quotes in written reports ensures the outputs accurately reflect the storytellers’ intent. This form of validation can also be important with other types of qualitative analysis.

*What I'll see is a description that says we interviewed 20 people neighbouring the project and this is what we found. Hang on a minute, we've jumped a step here! [...] what we will see in place of thematic analysis is a list of issues or maybe some identified impacts, but not actually thematic areas. I think there's a gap there and that's not to say that these practitioners are not doing a good job, but I don't think [they're] necessarily describing what they're doing, even if they're doing it well.*

*(Interview, P110, government/regulatory agency staff)*

*... we send transcripts along with any instances of using a direct quote in a report highlighted. And very much encourage the knowledge holders to like you know... Is what you said what you meant? Because sometimes it comes out very differently when you look at it on paper. And is it contextually correct?*

*(Interview, P106, IA practitioner & researcher)*





## Limitations

- Qualitative data analysis requires a substantial time commitment, so sufficient time must be allotted for analysis from the beginning of the study. This analysis is essential, though, for ensuring the reliability of the results presented and to avoid “cherry-picking” ideas or quotes.
- CAQDAS can be expensive and involves a steep learning curve for first-time users.

## Related methods

- Qualitative data analysis can be applied to data collected through any qualitative method. The specific type of qualitative data analysis used will depend on the purpose of the study and the data source.
- Thematic analysis, for example, is commonly applied to data collected through interviews, focus groups, open-ended survey questions, and workshops. It may be applied to other methods with qualitative components, such as some applications of the Delphi method, systems/network analysis, scenario methods, deliberative methods, participatory multi-criteria analysis, participatory spatial methods, and visual methods.
- Document analysis commonly applies thematic or content analysis.
- Narrative methods are most closely associated with narrative or thematic analysis or a combination of both.
- Discourse analysis may be used when the goal is to examine how various groups speak about and frame issues relevant to a proposed project (e.g., in news media analysis or developing the discourse in Q methodology).

## Case Study 6.12.

### Qualitative data analysis in the Fort Chipewyan Métis Local 125 Cultural Impact Assessment

The Fort Chipewyan Métis Local 125 Cultural Impact Assessment evaluated the potential project-specific and cumulative cultural impacts of Teck Resources Limited’s proposed Frontier Oil Sands Mine Project in Alberta, Canada (Garibaldi et al., 2015). Along with a literature review and interviews, a team of community researchers and external consultants collaboratively designed and implemented three focus groups with community Elders, adults, and youth. Data from the first focus group were audio-recorded with participants’ permission, transcribed, and inductively coded (i.e., codes were created based on the content of the data)

using the qualitative data software package dedoose®. The IA report provided a helpful example of how data excerpts were coded and then grouped to identify key valued cultural components and subcomponents. Using the identified valued components and subcomponents as predetermined codes, the data from the subsequent focus groups were transcribed and coded deductively to identify potential impacts of the proposed development on these valued cultural components. The key themes were summarized and supported with direct quotes throughout the report.

## Recommended method guides

- Bazeley, P. (2020). *Qualitative data analysis: Practical strategies* (2nd ed.). SAGE Publications.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Research in Psychology*, 3(2), 77-101.
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- Narratives Inc. (2020). *Sagkeeng Anicinabe psychosocial impact assessment*. <https://iaac-aeic.gc.ca/050/evaluations/document/146118>
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- Runhaar, H. (2009). Putting SEA in context: A discourse perspective on how SEA contributes to decision-making. *Environmental Impact Assessment Review*, 29(3), 200-209. <https://doi.org/10.1016/j.eiar.2008.09.003>
- Sinclair, A. J., Sims, L., & Spaling, H. (2009). Community-based approaches to strategic environmental assessment: Lessons from Costa Rica. *Environmental Impact Assessment Review*, 29(3), 147-156. <https://doi.org/10.1016/j.eiar.2008.10.002>

## Scenario Methods

### What are scenario methods?

Scenarios are descriptions of future actions or events. Scenario methods are not a single approach but encompass a variety of techniques that facilitate strategic mid-range and long-term planning when a certain degree of uncertainty exists (e.g., Rounsevell & Metzger, 2010; UK Government, 2017). These methods are typically used for either risk management (i.e., by testing decisions against desired futures) or for generating creative new ideas (Duinker & Greig, 2007).

**Scenario analysis** (also called scenario development or scenario planning) is a “systematic method for thinking creatively about dynamic, complex and uncertain futures, and identifying strategies to prepare for a range of possible outcomes” (Reed et al., 2013). Scenario analysis involves developing alternative visions of the future and examining the possible decisions, actions, and contextual conditions that lead to those futures (Duinker & Greig, 2007; Torrieri, 2020). These scenarios are not meant to predict the future but to identify plausible desired—or undesirable—futures and the pathways that attain them. Scenario analysis can include quantitative scenarios (i.e., describe possible futures through numbers), qualitative scenarios (describe possible futures through storylines and narratives), or a blend of both. Qualitative scenarios are particularly useful for including social conditions, values, and behaviours in scenario analyses involving complex social-environmental systems (Ernst et al., 2018). Participatory scenario analysis diversifies the range of knowledge and perspectives included, thereby creating more comprehensive and higher-quality planning outcomes (Allan et al., 2022; Ernst et al., 2018; McBride et al., 2017; Reed et al., 2013). Four generic steps of scenario analysis include: 1) defining the problem, purpose, and context (biophysical, socio-economic, and political); 2) examining system components and key drivers of change; 3) developing plausible scenarios; and 4) evaluating scenarios and proposing options, strategies, actions, or policies.

*The interesting thing is that people differ about where we are heading or should be heading. And that that's important to understand early on.*

*(Interview, P127, researcher/academic)*

**Gaming** (or simulation gaming) is a scenario-based method that “involves getting participants to use information to make decisions about the future in a controlled, risk-free environment. It can be used to develop alternative perspectives of the future, or to test the strengths and weaknesses of policy or strategy against a future vision or scenario set” (UK Government, 2017, p. 111). In gaming methods, participants are assigned roles and then analyze or make decisions from the perspective of their assigned role (e.g., Toth, 2001; Toth & Hizsnyik 2008). Scenarios in gaming often include qualitative storylines but may also include quantitative models or other information. The method can provide decision makers with a better sense of challenges faced by various groups and encourage the development of creative solutions to complex social-environmental problems.

### Why select scenario methods?

- IA is a forward-looking process that explores alternative futures to facilitate sustainable outcomes. Scenario analysis, as a systematic future-oriented planning tool, naturally lends itself to this task.
- Uncertainty and systems complexity are important, but often not adequately accounted for, considerations in IA. Scenario analysis is a method that actively identifies and accounts for uncertainty and complex drivers of change within social-environmental systems (e.g., Khosravi & Jha-Thakur, 2019; Priess & Hauck, 2014; Torrieri, 2020; Zhu et al., 2011). Project design and decisions, therefore, can become more resilient to change and uncertainty by using scenarios to investigate alternative futures.
- Qualitative scenarios can be developed with little technical input and can be effective for facilitating communication and social learning among decision makers and stakeholders (Kok et al., 2007; Zhu et al., 2011).
- Participatory scenario analysis can effectively include local knowledge, as well as bridge Indigenous and western scientific knowledge systems in decision-making (Nilsson et al., 2021; Weshe & Armitage, 2014).
- Gaming methods can provide a safe, engaging environment for experimenting with decision-making and negotiation in complex planning processes (Mayer et al., 2005).



*I look at it as a forecast, that's what it is. It's a forecasting tool of which you're trying to then take back to a present situation and say, what do we have to do to make this happen? I don't think in any case it should be looked at as this is the way it's going to be. It's just a way for us to look at alternative futures. And that's what we're trying to do in EIA...*

*(Interview, P52, IA practitioner)*

*And it worked like a charm... my client was initially, "no it's unprofessional, we need to have a workshop," but you just see people's eyes glaze over so we suggested this very interactive [role-playing] workshop for two days. And people loved it [...] it's quite non-threatening to people.*

*(Interview, P56, IA practitioner)*

## When can scenario methods be used in IA?

- Scenario methods are generally used in strategic planning processes and, therefore, arguably most suitable for strategic and regional IA. Scenario analysis can contribute to all phases of strategic assessment, including development of alternatives, baseline studies, scoping, impact identification and evaluation, and formation of mitigation and enhancement measures (Khosravi & Jha-Thakur, 2019; Torrieri, 2020; Zhu et al., 2011).
- In project-level IA, scenario methods are potentially useful for identifying and evaluating cumulative effects and developing effective mitigation measures that respond to those effects. Duinker and Grieg (2007, p. 214), for example, argued that scenario analysis "might emphasize different types of future developments that would interact differently with the effects of the proposed project. Exploring how different mitigation strategies might perform under different scenarios could provide insight into how robust they might be under different future conditions". Scenario analysis for cumulative effects assessment can also include various development possibilities and other contextual drivers, such as climate change and demographic shifts.

## Impact categories:

- Scenario methods are relevant to many impact categories, including environmental, social, economic, cultural, and sustainability.
- They can contribute to gender and equity analyses (e.g., GBA+) by drawing attention to the distribution of impacts across diverse subpopulations. Gaming methods may be especially relevant for this purpose.

*...we give [participants] a picture of a person with a few questions [and they] can put themselves in that person's shoes without exposing themselves too much [...] So for instance I will get a picture of an old lady and then I say, this is Gogo. [She is a] grandmother, she is a widow, she looks after her children's children and some orphans. This is the type of work she does. And so I tell a little story. Under the picture I have three or four questions and I have people discuss in little groups [...] And you get lots of emotions out of that as well--I've had people say, this is just like my granny, or my mother. The questions also flag what does she do for a living? What do you think will happen to her if there is now this big mine? And then they discuss it and then I can tell you about this person.*

*(Interview, P56, IA practitioner)*



## Who is involved?

- Those involved vary depending on the goals and the scale at which the method is applied (e.g., local, regional, national, international). Scenario analysis is often thought to be most successful when it is participatory and includes a range of expert and local knowledge (Ernst et al., 2018; Khosravi & Jha-Thakur, 2019; Reed et al., 2013). The UK Government (2017) suggests participants can include anyone with an interest in, or influence over, the planning outcomes.

## How much time is needed?

- Time required varies depending on which scenario methods are used and how they are implemented. For participatory scenario analysis, the time needed depends largely on which stage(s) participants are involved

in (i.e., identifying key drivers of change, developing scenarios, and/or analyzing scenarios to identify preferred options and strategies). Each of these stages require approximately a half-day workshop.

- Researchers must consider the time it takes to develop the methodology, identify and recruit participants, secure a venue, and report findings.

## What costs may be involved?

- Staff time for planning, implementing scenario workshops, and reporting outcomes.
- Workshop materials (e.g., notebooks, flipcharts, scenario development tools, etc.).
- Venue rental and refreshments.
- Participant honoraria.

## Scenario methods in practice

### Participant selection

- For participatory scenario methods, participants must be selected to represent those who may be affected by, or affect, the IA process. An intentional, systematic participant selection process is recommended (Reed et al., 2013).
- The number of participants will vary depending on the purpose and type of scenario method employed. However, approximately 15-25 participants are thought to be ideal for a scenario analysis workshop.

### Timing

- Scenario methods are most effective if integrated at the earliest phases of IA, particularly in project-level IA.

### Developing and evaluating scenarios

- Scenarios should be plausible. For scenario analysis, the scenarios developed should be not completely outside the realm of real future possibilities. For gaming methods, situation scenarios should also be plausible and relatable.
- Two to five alternative scenarios with sufficient contrast between them is considered ideal for scenario analysis. However, three scenarios may create an obvious middle option and should be avoided (Duinker & Grieg, 2007).
- In some cases, the effectiveness of scenario storylines can be enhanced through visual representations, such as maps or artwork (Priess & Hauck, 2014; Wesche & Armitage, 2014).

*I make sure the character has enough, you know, characteristics and flaws and challenges that people can relate to do that. Because I think it's important to connect with the humanness*

*(Interview, P56, IA practitioner)*



## Evaluating Scenarios

- There are multiple techniques for evaluating scenarios, such as SWOT (strengths, weaknesses, opportunities, threats), back casting, roadmapping, and matrix techniques (e.g., see Alcamo, 2008; Reed et al., 2013; UK Government, 2017).

## Using participatory scenario analysis

- Participation is most effective if integrated in multiple stages of scenario analysis, including in scenario development, in scenario evaluation, and in proposing relevant solutions and strategies.
- Power dynamics within and across participants should be considered (Ernst et al., 2018; Reed et al., 2013). In some circumstances, it may be appropriate to hold separate scenario workshops for various groups, and in others, to include diverse voices and perspectives in the same workshop.
- Skilled facilitation enabling everyone to meaningfully contribute regardless of age, gender, background, socioeconomic status, etc. is important. In some cases, capacity building may be required to facilitate participation.

*I would say to see to it that you are not just given the scenarios, you have to be there and influence how they are developed [...] You can adjust these scenarios in a way so they are actually realistic, because if they are not realistic then the SEA will give very negative impacts on everything.*

*(Interview, P119, researcher/academic)*





## Limitations

- Scenario methods can be both time- and cost-intensive.
- The success and credibility of participatory scenario analysis depends on the diversity of participants involved.
- Building meaningful scenarios can be difficult, given the uncertainties involved in imagining alternative future visions.
- Scenario-based methods can challenge deeply held assumptions and the status quo. Some scenarios may be undesirable or upsetting to some of the participants involved.

## Related methods

- Workshops are a common qualitative method used to collect qualitative data and enable participation in scenario-based methods. A wide range of methods and tools, such as deliberative methods, multi-criteria analysis, participatory rural appraisal techniques, systems/network analysis, seasonal activity calendars, and Delphi may be used in or alongside workshops to facilitate participatory scenario development and analysis (Reed et al., 2013).
- Other qualitative methods, such as interviews, focus groups, and surveys, can be used to inform scenario development and analysis. An example is the “7 questions” interview technique (UK Government, 2017).
- Scenario development may be supported with quantitative modelling, GIS mapping, or other visualization tools (Reed et al. 2013).

### Case Study 6.13.

#### Strategic Environmental and Social assessment of Mauritania's Oil and Gas Sector (Scenario Analysis)

A strategic environmental and social assessment (SESA) for Mauritania's oil and gas sector applied scenario analysis to facilitate the identification and evaluation of strategic alternatives for the nation's future natural gas development (Ciera Group et al., 2023). The purpose of the scenario analysis was to evaluate how government institutions could respond to possible future change and development. The SESA team first identified key environmental, social, economic, and governance and legal drivers of change and uncertainty that may affect natural gas development (e.g., climate change, in/out migration, shifting gender roles, domestic energy demand, tourism, energy prices, and geopolitical stability). The team then developed four plausible scenarios based on material presented in Mauritania's Oil and Gas Master Plan:

- Scenario 1 (business-as-usual): Continued development of a planned major offshore liquified natural gas (LNG) project, with no additional associated onshore infrastructure.
- Scenario 2 (gas-to-power): Slow, steady economic growth. Continued development of the planned offshore LNG project, with additional infrastructure for use of the gas for domestic power generation.

- Scenario 3 (gas-to-power + displacement of conventional fuels): Moderate economic growth. Additional development of onshore gas and LNG reserves, with gas used to convert an existing power station and for replacing conventional fuels used in residential, transportation, and mining sectors.
- Scenario 4 (industrial application of gas): Rapid economic growth. Development of additional offshore gas reserves and an industrial park for refining, converting, marketing, distributing gas products to the end-market.

Each of the scenarios and its associated development activities were assessed against a set of strategic environmental and social quality objectives set out in the SESA. Using a qualitative matrix approach, the SESA team determined whether each scenario enhanced, impeded, or had no effect on each objective, as well as the degree of the potential effect (low/medium/high). A ranking exercise helped the team determine the relative significance of the potential impacts. Findings were used to recommend policies, programs, and plans to enhance institutional effectiveness under the possible future scenarios.

## Recommended method guides

Alcamo, J. (2008). *Environmental futures: The practice of environmental scenario analysis*. Elsevier Science.

UK Government. (2017). Futures Toolkit: tools for strategic futures for policy-makers and analysts. Cabinet Office and Government Office for Science. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/674209/futures-toolkit-edition-1.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/674209/futures-toolkit-edition-1.pdf)

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## Participatory Spatial Methods

### What are participatory spatial methods?

Participatory spatial methods are extremely diverse, but all integrate geospatial, rich, and in-depth qualitative information. They incorporate the land-based knowledge and experience of the public, communities, and/or Indigenous rights holders. This information enhances decision-making. In IA, these methods can rely on basic materials in situ, printed maps, or digital technologies (e.g., remote sensing imagery, geographic information system (GIS), and global positioning system (GPS)).

**Public Participation Geographic Information Systems (PPGIS) and Participatory Geographic Information Systems (PGIS)** are a suite of methods that use GIS technology to include local spatial knowledge, perceptions, and values in decision-making (Alagan, 2007; Alagan & Aladuwaka, 2012; González et al., 2008; Sieber, 2006; van Riper et al., 2021). In practice, the terms PPGIS and PGIS are often used interchangeably. The first applications of PPGIS/PGIS involved workshops where participants sketched their spatial knowledge and perceptions on existing hardcopy maps, which were digitized into GIS databases for further analysis (Alagan, 2007; Huang & London, 2016; Kwan & Ding, 2008). PPGIS/PGIS now encompass a wide variety of approaches that involve local participation in, or control over, processes of spatial data collection, analysis, map creation, and communication. Variations and related methods include **web-based GIS** (Alagan, 2007; González et al., 2008; Kwan & Ding, 2008; Tang & Lui, 2015), **volunteered geographic information** (Brown et al. 2014; Tang & Lui, 2015), **geo-visualization** (Alagan, 2007), and **geo-narratives** (Kwan & Ding, 2008).

**Land use and occupancy mapping** (or traditional land use mapping) is “the collection of interview data about traditional use of resources and occupancy of lands by Aboriginal peoples, and the presentation of those data cartographically. It is an exercise in the geography of oral tradition, and equally in the mapping of culture and resources” (Tobias, 2014, p. 14). Data collection involves “map biographies”—a form of face-to-face interview in which participants are asked about their lifetime experiences on the land and map a range of physical and spiritual sites of significance base on personal and indirect (passed down from parents and grandparents) knowledge and experience (Tobias, 2000, 2014). Land use

and occupancy mapping methods should be initiated, led, and controlled by Indigenous Peoples, be applied and used in ways that reflect Indigenous worldviews, and support Indigenous sovereignty and self-representation (e.g., Joly et al., 2018; Taggart, 2021).

**Community mapping** emerged from participatory rural appraisal (PRA) approaches that centre community participation and empowerment in decision-making. Community mapping is a versatile, low-tech, easy-to-facilitate method that reveals the understanding and knowledge of landscapes held by grassroots stakeholders. Data are collected in situ using readily available materials (e.g., sticks, seeds, rocks, or paper) and may involve transect walks to map social, economic, and environmental assets and other features (e.g., hunting, gathering, herding areas, food sources, medicine, type of clay for roofing, and kinds of trees for building canoes) (Chambers, 2006). This method may be most relevant to community-based IA in rural contexts, particularly in the global South (e.g., Spaling et al., 2011).

*I almost always do community mapping where the community draws the map and drawn on the ground with various kinds of geographic features that, then, is an entry-way into a discussion about those features.*

*(Interview, P53, researcher & IA practitioner)*

### Why select participatory spatial methods?

- Participatory spatial methods create visually powerful, easy-to-understand representations of possible interactions between local values and proposed projects. It can be an important tool for translating knowledge between communities and decision makers.
- Participatory spatial methods can move beyond biophysical spatial components to include tangible and intangible social, cultural, and spiritual values and relationships associated with the landscape (e.g., Pearce et al., 2021; Taggart, 2021).
- The methods can foster participant reflection and learning about their communities and territories, preserve cultural knowledge, and facilitate intergenerational knowledge transfer.

## When can participatory spatial methods be used in IA?

- Scoping, particularly to identify important environmental, social, cultural, and spiritual values associated with the land.
- Baseline studies.
- Impact prediction and significance evaluation, including perceived impacts on local valued components and cumulative effects (e.g., Huang & London, 2016; Joly et al., 2018; Pearce et al. 2021).
- Mitigation and enhancement measures.
- Follow-up and monitoring.
- Possibly in strategic and regional IA, where they may be useful (e.g., González et al., 2009).

### Impact categories:

- All, especially environmental, social, cultural, and visual impacts. Also useful in environmental, social, and disaster risk analysis.

## Who is involved?

- Participatory spatial methods may include:
  - GIS technicians to assist with method design and implementation;
  - members of the public;
  - community knowledge-holders;
  - cultural and language translators;
  - social scientists and community researchers.

## How much time is needed?

- The time required varies widely depending on the specific method used. Time allotments may be required for:
  - building relationships and co-designing processes with or within communities (can take weeks to months);
  - training community researchers and participants (one to two weeks);
  - data collection, which can take from less than a month to two years (Tobias, 2010);
  - transcribing and analyzing qualitative inputs (interviews, map biographies, and workshop notes, etc.);
  - digitizing data and producing map composites.

## What costs may be involved?

- GIS equipment and software.
- Fees for GIS technicians and experts.
- Training costs.
- Culturally appropriate incentives/compensation for participants' time.
- Qualitative data analysis software.

## Spatial methods in practice

### Preparation

- The purpose and aims of the method should be clearly defined. This includes determining from the outset, for example, the types of attributes that are of interest (e.g., tangible/intangible landscape values, place qualities, participant experiences, harvest sites, travel routes and habitation, spiritual sites, and place names, etc.), the technologies that will achieve the specified aims, and what/how/with whom information will be compiled and communicated. In land use and occupancy mapping, it may be important to include not just areas of use and occupancy but also loss of use.
- For methods using GPS/GIS technologies, up-front participant and facilitatory training on the purpose and use of the technologies may be required (González et al., 2008).
- Where participatory spatial methods include the collection of rich, in-depth qualitative information (e.g., interviews, map biographies, or narratives, etc.), the questions should be tested and revised accordingly prior to data collection.

*...avoidance of use or loss of use can also be mapped and that's been a critically important thing in the oil sands where particular changes in river flow level, changes in perception of contaminants, other kinds of things have had massive impacts on how people use lands and resources. And so paying attention to where somebody used to fish and mapping that but also mapping that they don't fish there anymore and why has become a really critical thing.*

*(Interview, P77, IA practitioner)*



## Fostering inclusion

- Participatory spatial methods prioritize collaboration. Local people should be involved in every phase of method design and implementation (e.g., Pearce et al., 2021).
- Participatory spatial methods have been promoted as promising tools to include groups, such as youth and women, who have been historically under-represented in land-based decision-making. However, in practice, high costs, technical ability, and limited spatial knowledge can limit meaningful involvement. Such barriers should be considered and addressed early in the planning process (Roque de Oliveira & Partidário, 2020). Strategies may include selecting participants to represent a diversity of voices (e.g., women, men, Elders, and youth), technical training, reliance on community leadership, administration, and project staff to identify community members with extensive knowledge and experience on the land.
- Researchers should consider the spatial tools with which participants might most easily engage (e.g., hardcopy maps or direct-to-digital).



*I also found in my research that just putting on the screen a map, people will not react the same way as if they have the map in paper...They need to point at them and put their finger on it... That can be the difference between people just being quiet and not saying anything, not contributing, not reflecting upon it, and having people actually providing good information for your impact assessment.*

*(Interview, P153, IA practitioner & researcher)*

## Data collection location

- For community-based applications, data collection may be most valuable and comfortable for participants when it occurs in-place (e.g., land-based interviews for land and occupancy mapping or transect walks during community mapping), though this may need to be balanced with practical considerations such as the need/availability of internet access if direct-to-digital spatial technologies are required. Where possible, data collection location should be decided with those involved in the mapping methods.

## Care of participants

- Human limitations should be recognized and respected, including energy, time, and willingness to concentrate on the task at hand (Tobias, 2010).

## Information processing and storage

- Participatory spatial methods typically involve the simultaneous collection of spatial information (i.e., participants indicating values and attributes directly on paper or digital maps) and rich qualitative information (e.g., through interviews). Cross-checking the spatial information against the interview audio-recordings/transcripts can verify the accuracy and comprehensiveness of the information.
- Data should be stored, so it is available and can be built on beyond the scope of a single project (Tobias, 2000).

## Verification

- The quality and accuracy of the spatial and qualitative outputs and their interpretation should be verified with those who were involved in data collection.

## Ethical considerations

- It is essential to establish informed consent with individual participants prior to data collection.
- Data and knowledge documented in traditional land-use mapping methods must be owned and controlled by the Indigenous community who produced them. The research should account for OCAP™ principles (ownership, control, access, and possession). Communities may negotiate agreements prior to data collection that clearly indicate what and how information may be shared for the purposes of an IA.



## Limitations

- Participatory spatial methods can be technically challenging as many require specialized software, equipment, expertise, training, and digital and spatial literacy (Alagan, 2007; González et al., 2008; González, 2012).
- They can be very time- and cost- intensive.
- There is a risk of Indigenous knowledge depicted on maps being misrepresented, misinterpreted, or used inappropriately outside the context in which it was intended. Recent studies emphasize community control and spatial techniques that reflect ongoing relationships, values, and cultural importance across whole territories—rather than single points on a map (e.g., Joly et al., 2018; Taggart, 2021).

## Related methods

- Participatory spatial methods often rely on other qualitative methods that are modified to include spatial information. These other methods may include workshops (Alagan, 2007; Huang & London, 2016), interviews (Pearce et al., 2021; Tobias, 2000, 2014), focus groups (Alagan, 2007), and surveys (Alagan, 2007; van Riper et al., 2021).
- Qualitative thematic or narrative analysis is often used to analyze qualitative inputs in participatory spatial methods (Kwan & Ding, 2008; Pearce et al., 2021).

*A map that is sparse, a map that does not accurately depict a community's knowledge and experience on the land and use of an area can be a profoundly important tool to dismiss a community's knowledge. Where a proponent is in control of the methods and in control of the data and in control of how it's represented, those maps can be a really wicked double-edged sword. [So] put the tools in the hands of the communities.*

*(Interview, P77, IA practitioner)*



## Case Study 6.14.

### Using Public Participation Geographical Information Systems (PPGIS) to identify Fijian Social Values of a River Estuary

PPGIS was used to identify locally significant social values associated with the Sigatoka River estuary in Fiji and to assess the potential impacts of a government-sponsored flood mitigation dredging project and a proposed iron-sands mining project on those values (Pearce et al., 2021). The project was initiated by a local village leader and designed and implemented in collaboration with a provincial administration and a university-based research team. Participants included local people—men and women ranging widely in age—whose livelihoods were directly connected to the estuary. Data collection involved semi-structured interviews during which participants reflected on the values of, uses of, and perceived threats to the estuary, and indicated areas of value, use, and threat on hardcopy maps. The interviews were audio-recorded,

transcribed, and analyzed with the assistance of a hybrid deductive/inductive coding strategy using NVivo qualitative data analysis software. Initial codes included monetary values, non-monetary values, and threats, with additional specific subthemes emerging from the data (e.g., a monetary value was livelihood activity, while non-monetary included spiritual values and connection to place). The spatial analysis involved digitizing participants' identified areas of value, use, and threat on a digital map using ArcGIS. The map outputs did not reveal specific value points but rather used heatmaps to indicate areas of cumulative value, use, and perceived threat across the territory. Results were used by local communities to communicate their concerns and assert their rights to government decision makers.

## Recommended method guides

DeRoy, S. (2016). *Direct-to-digital mapping methodology: A hands-on guidebook for applying Google Earth*. The Firelight Group. [https://firelight.ca/wp-content/uploads/2016/04/Guide\\_FirelightGroup\\_DirectToDigital\\_20JAN2016.pdf](https://firelight.ca/wp-content/uploads/2016/04/Guide_FirelightGroup_DirectToDigital_20JAN2016.pdf)

Forrester, J., & Cinderby, S. (2014). *Guide to using Community Mapping and Participatory-GIS*. Prepared as part of the Managing Borderlands project and funded by the Rural Economy and Land Use (RELU) programme of the Economic & Social and Natural Environment Research Councils. <http://www.iapad.org/wp-content/uploads/2015/07/Borderlands-Community-Mapping-Guide.pdf>

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## Qualitative Surveys

### What are surveys (with a qualitative component)?

Surveys use highly structured questionnaires to examine individuals' experiences, perspectives, attitudes, or opinions about a specific topic (Gillam, 2007). To obtain comparable information from everyone who completes the survey, they allow standardized measurement across responses. Surveys are typically considered a quantitative method since they rely mainly on closed-ended questions and the statistical analysis of the data. However, they can also include qualitative open-ended questions, which allow respondents to expand on their answers in their own words. For this reason, we opted to include surveys in this qualitative method toolkit. In IA applications, the use of open-ended questions in surveys ranges from minimal to moderate frequency.

### Why select surveys?

- Surveys can provide a preliminary indication of the range of perspectives held about valued components or projects, as well as key concerns and issues relevant to an IA. However, surveys typically prioritize information breadth over depth, so other qualitative methods are likely needed to explore issues in greater detail.
- Surveys can be a valuable community-led tool for gathering social, cultural, health and well-being, and environmental information outside of a specific IA process. The information can subsequently inform Indigenous- and community-led IA of specific projects.
- Surveys can provide a large amount of data in a relatively low cost and time efficient manner.
- A key benefit is their ability to engage a large number of people, including those who might not otherwise become involved in IA processes. They also provide the ability to maintain respondent anonymity.

*So the value that [surveys] add, to my mind, is just in providing a preliminary understanding of the landscape of sentiment, if you like. And maybe identifying some preliminary issues that you then can use to follow up through interviews or other methods.*

*(Interview, P110, government/regulatory agency staff)*

*I explicitly avoided doing any surveys that were specific to a project. And we very much use surveys as a tool to understand [First Nation] members' experiences in the wider territory and then it was up to staff to consider that in the context of a given project. [...] I think one thing for surveys, I consider them to be a much more useful tool for longitudinal data outside of any specific project, but then they can do a very good job informing any specific project.*

*(Interview, P106, IA practitioner & researcher)*

*It was a telephone-based survey run by a market research company, so it would be a way of reaching out to people who wouldn't necessarily come along to or speak up at public meetings and the workshops...*

*(Survey, P66, IA practitioner)*

### When can surveys be used in IA?

- Baseline studies, including to explore social, cultural, health, and economic baseline conditions in the project area.
- Impact prediction, but to a limited extent because surveys may produce superficial information and require respondents to speculate about potential impacts of the project (Suopajärvi, 2013); surveys are often more useful for identifying key areas of concern to explore in greater depth through other methods.

*...if you've got something that something specific that you're trying to monitor. Then follow up surveys and annual or biannual intervals can be a good way of tracking change over time. Again, if it's constructed well.*

*(Interview, P110, government/regulatory agency staff)*

### Impact categories:

- Surveys appear to be most frequently used in social IA (e.g., Suopajärvi, 2013). They are relevant to other impact categories as well, including health and well-being, psychosocial, and environmental considerations.

### Other contextual considerations:

- Surveys are not recommended for engaging Indigenous communities within proponent-led IA processes. Communities often have a long history of distrusting industry, and surveys are not a method that generally promotes active relationship building.



*I have never worked on a project during which a survey from a proponent would have been well received [...] And so I think in the case of the proponent, maybe it's like making sure the funding is available for the communities to do it themselves if needed or if they want to.*

*(Interview, P106, IA practitioner & researcher)*

### Who is involved?

- Surveys in IA most often aim to include a broad range of individuals in potentially affected communities.

### How much time is needed?

- Planning time includes developing, pre-testing, and adjusting the survey questionnaire.
- Surveys are considered a relatively time-efficient method, but the time required for survey implementation varies depending on mode (e.g., telephone, online, or door-to-door).
- Time required for data analysis depends on the number of questions and proportion of open-ended responses. Open-ended responses allow for richer data but take longer to analyze.

### What costs may be involved?

- Vary widely depending on whether the survey is developed, implemented, and analyzed in-house or outsourced to a professional survey research firm.
- Depend on mode of implementation (e.g., door-to-door surveys require more staff time than online surveys using a free online survey platform).

### Surveys in Practice

#### Designing and implementing the survey

- Every survey question should be intentional and clearly align with the overarching objectives of the survey. Leading, loaded, double-barreled, and negatively phrased questions should be avoided.
- The time commitment required of respondents should be considered. A survey completion time of 10-12 minutes is often considered ideal. The quality of responses tends to drop off after about 20 minutes.
- The number and extent of open-ended questions also influence the time required to complete the survey. Open-ended questions need to be used strategically.
- The researcher must consider the mode of survey delivery that will be most effective in the specific IA context. Self-enumerated surveys (e.g., online) are relatively easy and inexpensive to administer but often have lower response rates than interviewer-assisted surveys. In these cases, strategies for follow-up should be considered, along with possible incentivization for survey completion. Although interviewer-assisted surveys (e.g., door-to-door, sidewalk, and telephone surveys) provide opportunities to clarify participant responses, they are resource intensive. Nor do they allow for respondent anonymity.
- The survey should be pre-tested to ensure questions are clear and flow well.

*Keeping the questions clear enough that respondents can understand them; oftentimes this requires using community-trained facilitators to support in the completion of surveys. Getting a strong response rate may require both simplicity and incentivization (a participant fee or opportunity to win a prize)*

*(Survey, P122, IA practitioner)*







*Oh my goodness. Have someone test your survey. Don't just write a survey and then send it out. Having at least a minimum of one person, but ideally a couple people who are kind of somewhat representative of those you will be sending the survey to and getting their feedback on am I asking the right questions? Will this make sense to people? I think is super important.*

*(Interview, P106, IA practitioner & researcher)*

## Participant sampling

- Surveys typically seek responses from a sample of the total population and rely on either probability or non-probability sampling. With probability sampling, every member of the target population has an equal chance of being included in the sample. Considered representative, this type of sampling is preferred by statisticians because inferences can be made about the target population from a relatively small sample. In real-world survey settings, non-probability sampling is often more realistic since the list of the entire population of interest may not be available. Non-probability sampling includes, for example, convenience sampling (e.g., sidewalk surveys), voluntary sampling (e.g., an invitation to opt into a survey through advertising), quota sampling (i.e., ensuring specific numbers of respondents from various demographic categories), and snowball sampling (i.e., initial respondents suggest additional participants). When non-probability sampling is used, it is important to consider who may be unintentionally included and excluded. For example, Suopajärvi (2013) found that household surveys were typically answered by one household member, resulting in an overrepresentation of middle-aged and elderly men and an underrepresentation of women and youth.

## Analysis

- For surveys containing open-ended questions, analysis requires a combination of quantitative (i.e., descriptive/statistical analysis) and qualitative (e.g., thematic/content analysis) techniques.

## Limitations

- Open-ended questions can provide more in-depth information, but they also require more time to complete and to analyze than purely quantitative surveys.
- Although surveys have been a popular method in social IA, some argue their effectiveness has been declining over time due to challenges with achieving strong response rates, increasing bias among participants, and reaching certain populations, such as youth (Sherren et al., 2017; Suopajärvi, 2013).

## Related methods

- Follow-up interviews may be conducted to gain deeper insights into the survey responses (e.g., Anciaes et al., 2017). Household or community surveys may also be conducted alongside “key person” interviews and focus groups (e.g., Del Rio et al., 2017; Petkova et al., 2009).
- Surveys are often used as a component of Delphi studies (see “Delphi method”).
- They may be combined with spatial mapping techniques, for example to identify valued components.

*...the one I'm doing at the moment we we've got some open-ended questions and obviously we've got lots of others, but we're asking people to drop pins on places they use and value in the harbour. And then provide short comments on what they use and why they value that spot and what they're concerned about.*

*(Interview, P36, IA practitioner)*



## Case Study 6.15.

### Community Survey for the Wylfa Newydd Project Health Impact Assessment

A community survey was conducted as a component of the health impact assessment (HIA) for the proposed Wylfa Newydd nuclear power station project in Anglesey, Wales (Horizon Nuclear Power, 2018). The purpose of the HIA was to evaluate the potential effects of the project on determinants of community health and well-being. The 10-minute telephone survey contributed to the HIA by gathering information related to local residents' "cognitive and emotional responses to the Project (e.g., cognitive: support or lack of support for the Project; emotional: feelings such as "concern" about the Project), and also attitudes towards its potential behavioural effects (e.g., changes in the behaviour of affected people)" (Horizon Nuclear Power, 2018, p. 385). Participants chose whether to respond in Welsh or English. While the bulk of

the survey questions asked participants to respond using a 5-point Likert scale (ranging from "strongly agree" to "strongly disagree"), it also included two open-ended questions to which participants responded in their own words (i.e., What do you like about life on Anglesey? What do you dislike about life on Anglesey?). The open-ended questions were developed to set a positive and comfortable tone and to inform the development of mitigation measures that enhance existing community assets. The survey received a total of 509 responses from randomly selected residents. The HIA team statistically analyzed the Likert-scale responses and deductively grouped the open-ended responses into predetermined categories. The survey results also informed a Welsh Language IA, an environmental IA and an Equality IA of the project.

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## Network & Systems Analysis

### What is network/systems analysis?

Both network and systems analysis are “(b)ased on the concept that there are links and interaction pathways between individual elements of the environment, and that when one element is specifically affected this will also have an effect on those elements which interact with it” (European Commission, 1999, p. ix). Thus they are “a diagrammatic representation of relationships among elements and the attribution of causality to these relationships” (Perdicoúlis & Glasson, 2006, p. 554).

A broad distinction can be drawn between network analysis, which is based upon linear chains of causality (sometimes called “effects pathways,” which may be direct or indirect) and systems analysis, which also incorporates circular causality and feedback loops (European Commission, 1999; Perdicoúlis & Glasson, 2006). In reality, however, there is a wide variety of methods that fall within these categories, and there is something of a continuum of increasing complexity and sophistication. For example, simple causal network diagrams such as those described by the European Commission (1999), can be qualitatively enhanced by indicating whether impacts are positive or negative and by graphically showing the relative strength of (Monavari & Fard, 2011) or the degree of confidence in (Voegeli et al., 2019) the causal relationships. Other enhancements of network/systems analysis are discussed under “Related methods” below. Various forms of quantitative analysis can also be applied to network and systems models that have been initially developed qualitatively.

### Why select network/systems analysis?

- Both network and systems analysis provide a visual representation or model of the potential pathways linking stressors and valued components and showing how individual valued components within the system are connected through impact pathways. These methods are therefore useful for understanding and simplifying complex systems, integrating different specialist fields within an IA process and developing a common language and shared understanding.

- Network and systems analysis also provide a holistic understanding of the receiving environment, which is particularly useful for regional or strategic assessment processes and for cumulative effects assessment and management.
- Qualitative network and systems models can be relatively simple to develop.

### When can network/systems analysis be used in IA?

- Scoping, particularly scoping of cumulative effects assessment by illustrating which valued components are subject to the most pressures (including pressures resulting from the proposed development and other external pressures).
- Impact prediction and significance, particularly in cases where impact pathways are indirect, non-linear, or cumulative; also useful for understanding how multiple impacts of a single project collectively interact with various valued components and systems.
- Comparing/evaluating alternatives (Kuai et al., 2015).
- Monitoring and follow-up, by informing the identification of appropriate mitigations and monitoring indicators.
- Communicating essential information throughout the IA process—an important tool.

*You can predict that if we have many aspects going to another aspect, that will be significant and you will have to really assess that one and the evaluation will probably be that this is a very large impact.*

*(Interview, P119, researcher/academic)*



### Impact categories:

- Network/systems analysis may be used within an impact category, for example to identify connections between valued components of the natural environment.
- These methods may be particularly useful in social impact to understand where impacts extend well beyond the immediate project vicinity through pathways of relationships between people and communities.
- They are valuable for integrating impact categories to develop a holistic understanding of a socio-ecological system, including from First Nations perspectives (Ehrlich, 2022).

### Who is involved?

- Network/systems analysis is used as an in-house tool by a project manager in collaboration with the various specialists on an IA project team to develop a common language and shared understanding within the team of the connections between impacts and impact categories.
- Contributions from other rights-holders and stakeholders may be sought to identify other potential impact pathways of concern.

### How much time is needed?

- Network/systems analysis can be undertaken as a one-off exercise in which case it may require half a day to a full day, depending on the scope of the IA.
- Alternatively, the development of a network or systems diagram may occur iteratively over time, particularly if the process is undertaken in-house by the IA team.



*It's not for the faint hearted or the time poor.*

*(Interview, P31, IA practitioner)*

### What costs may be involved?

- Subscriptions for specialist software, which may be used to draw diagrams of the network or systems, although one widely used software package (Vensim), which constructs both qualitative causal loop diagrams and quantitative systems dynamics modelling, is available in a free version.

### Network/systems analysis in practice

#### Participant selection

- Depending on the purpose of the network/systems model (e.g., if it is to develop a framework to be used as a management tool), it may be important that participants are knowledgeable about the system in question. In some cases, only specialists (either IA team members or expert stakeholders) are involved.

#### Scheduling

- The process of developing the network/systems model is likely to be more effective through a face-to-face conversation, particularly for workshops involving multiple stakeholders.

#### Facilitator selection

- A facilitator is required who should be knowledgeable about systems and be able to guide participants through what can be a challenging process.

*It's really hard for people to think that way. So [the facilitator] was drawing things as people were saying, well, this is here and then is it here or is it here? To be able to do that you need to be a bit of a pedant.*

*(Interview, P31, IA practitioner)*



## Draft network/systems model

- It may be useful (and time efficient) to develop a draft model as the basis for discussions with contributors about the process. This could be a generic model or prototype developed previously for a specific type of project.



*You would just start from the beginning using hopefully some kind of prototype model... And say this is the prototype we have which variables within this model do you think are relevant for this project? And see if there's anything which is too much or that is missing and then add to it.*

*(Interview, P118, researcher/academic)*

## Identifying potential links and pathways

- The process involves starting with the valued components and then considering which pressures, either arising from the proposed development or other pressures such as climate change, are acting on them and then in turn how a change in one valued component might affect another.
- Information can be gathered through interviews or in a workshop and incorporated into the model.
- To develop a holistic network or systems model, it is important to integrate different perspectives from multiple sources: different specialists, participants in different workshops, or other sources of information such as reports or media articles.

## Refining the model

- It is essential to verify, usually by expert judgement, whether identified connections and pathways are likely to materialize and how significant they are.
- In most cases, the model development will be iterative over time as information is gathered and evaluated.
- In some cases, the model may become overly complicated (sometimes referred to as a “spaghetti diagram”) and so is of limited value. In such cases, the model should be simplified by focusing on the most important pathways or separating the model into a series of submodels.

*And the other thing is that when you show the total model to people, then you see how the brain just shuts down. You want to call them the spaghetti maps. We have all these spaghettis going on everywhere you see there. So you really need to have someone that can also filter and doesn't show constantly the large model.*

*(Interview, P119, researcher/academic)*



## Limitations

- The network/systems analysis can be time-intensive.
- It may require a facilitator with specialist systems skills.
- Overly complex network and system models can be overwhelming and difficult to understand quickly.

## Related methods

- These include workshops or interviews with experts for gathering information on causal relationships between activities and impacts and developing network and systems models (Aledo et al., 2021).
- GIS for spatial representation of networks and systems is also used (Peeters et al., 2022).



## Case Study 6.16.

### A systems Approach to Assessing Cumulative and Collective Effects of Swedish Transport Projects

Following research that ascertained that Swedish EIA practitioners had divergent understandings of direct versus indirect impacts and cumulative effects and that, as a result, cumulative effects assessment was undertaken inconsistently and generally poorly, a project was commenced to develop a systems approach to assessing the cumulative effects of transport projects in Sweden. As part of the IA of the East Link Rail project, a research team developed a causal loop diagram (CLD) showing the interconnections between project-related activities and the receiving environment and between elements of the environment. The model development was coordinated by one of the researchers who had some systems expertise. This process involved running workshops and conducting interviews with each of the various specialist disciplines working on the IA to identify

the causal pathways. The researchers used this expert input to develop a CLD for each subsystem using Vensim software; these CLDs were then combined into an overall CLD for the project following the approach of Bureš (2017). The model proved valuable as a communications tool amongst the IA team members and provided a structured way to identify the environmental values subject to the most cumulative pressure. Most of these cumulative impacts arose within the project itself so were an example of what Ehrlich (2021) calls “collective impacts.” Due to the similarity of transport projects, whether road or rail, this model can be used for the IA of other projects, with minimal customization required. The CLD mainly focuses on the biophysical environment, and opportunities have been identified to expand the model to better include cumulative social impacts.

## Case Study 6.17.

### Tłıchǫ All-Season Road Project Systems Analysis (Systems Analysis)

A systems analysis was conducted by the Mackenzie Valley Environmental Impact Review Board (MVEIRB)—the governing body for environmental assessment in the Northwest Territories, Canada—as part of its decision process on the proposed Tłıchǫ All-Season Road Project (Ehrlich, 2022; MVEIRB, 2018). The systems analysis was based on information from environmental assessment hearing transcripts, notes, and observations (based on testimony from Elders, youth, traditional land users, and other community members), as well as other documents submitted as evidence throughout the assessment process. The MVEIRB synthesized this information in a pictorial diagram that visually illustrates the interconnections among individual valued components in the wider ecological-social system. The diagram is a simplified representation of the complex interactions between parts of this system in the proposed project location, such as wildlife habitat, caribou population, recreational hunting and fishing, traditional harvesting,

traditional culture and language, and family connectedness. The systems diagram uses directional arrows to link related components and plus (+) and minus (-) signs to denote whether an increase in one valued component would increase (+) or decrease (-) a related one. For example, the diagram indicates that an increase in linear routes would increase non-Indigenous recreational hunting and fishing (due to greater access), which would both directly (through competition) and indirectly (through decreased caribou population) reduce opportunities for Indigenous traditional harvesting. Conversely, increased caribou populations would increase traditional harvesting, which would in turn have a positive effect on health, traditional culture, and language. Although, in this case, the diagram was primarily developed to more easily visualize the holistic nature of the social-ecological system, it can also enable the analysis of the interconnections among project impacts on the system as a whole (Ehrlich, 2022).

## Recommended method guides

European Commission. (1999). *Guidelines for the assessment of indirect and cumulative impacts as well as impact interactions*. Office for Official Publications of the European Communities. <https://ec.europa.eu/environment/archives/eia/eia-studies-and-reports/pdf/guidel.pdf>

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## Visual Methods

### Photo-based methods

Photo-based methods are not a single approach but a suite of methods that involve the collection of photographs as data or that use photographs to facilitate data collection through other methods, such as interviews. Photo-based methods can be valuable for “conceptualiz[ing] landscape change in a way that privileges the voices and stories of those experiencing that change, as opposed to other means of documenting change such as aerial maps or satellite images that are more often accorded more significance” (Vitous & Zarger, 2020, p. 116). Photographic methods range from being researcher-controlled (e.g., the researcher collects and analyzes social media images) to being highly participatory and collaborative (e.g., photovoice). Photo elicitation, photovoice, photo preference surveys, photo visioning, and social media image analysis are photo-based methods applicable to IA.

**Photo elicitation** uses photographs, taken either by the researcher or participants, in qualitative interviews to explore tangible and intangible aspects of participants’ experiences (Clark-Ibáñez, 2004). Particularly when participants take the photos, the method may provide richer contextual information than interviews alone, allow participants to feel more at ease as the photos become the object of attention, and give participants greater control over the framing of their observations (Kong et al., 2015).

**Photovoice** is a participatory action research method in which participants take photographs reflecting specific aspects of their lived experiences and use the photographs to foster critical reflection and collective dialogue on salient community issues (Healey et al., 2011; Wang & Burris, 1997). According to Wang and Burris (1997), the key aims of photovoice are to enable participants to document their community’s strengths and concerns, promote critical analysis through group discussion, and to reach decision makers. Photovoice differs from photo elicitation primarily in its facilitation of group discussion and analysis and in its explicit orientation towards action.

**Photo preference surveys** (or visual preference surveys) give stakeholders the opportunity to view a range of photos depicting various elements of a proposed development and provide feedback (Roque de Oliveira & Partidário, 2020). Photo visioning manipulates photos representing current conditions to

simulate proposed changes (e.g., various alternatives presented in an IA). It can allow stakeholders to more easily understand, compare, and provide feedback on proposed alternatives (Roque de Oliveira & Partidário, 2020).

**Social media image analysis** is an increasingly common method in natural resource and environmental research. It involves collecting and analyzing photos and captions posted by individuals on social media platforms, such as Instagram, Flickr, and Facebook (Chen et al., 2019, 2020; Lamoureux et al., forthcoming). An analysis of these images can contribute to developing an understanding of human-environment interactions and people’s perceptions of landscapes and landscape change.

*...[the] social media stuff—it’s not about opinions, it’s about it’s about how people live. It’s about their everyday activities and that if you blur your eyes and kind of get rid of some of the noise, you actually do get a sense of what it’s like to live in a place, and particularly to be a young person in that place. Those young people who are going to have to live with this [project] for so long. So I find these approaches balance some of the gaps and challenges with the more active methods. And also it is a much cheaper kind of longitudinal option, filling a bit of a gap when where I think monitoring is very poor.*

*(Interview, P123, researcher/academic)*

### Why select photo-based methods?

- Photo-based methods are often effective for examining emotional and intangible connections to place.
- Photos can effectively communicate across groups (e.g., communities, researchers, and decision makers), as well as across literacy, language, and cultural barriers.
- Highly participatory photo-based methods give participants greater control over the research process, which can be empowering.
- Social media image analysis, depending on the size of the data set, can be more time-efficient than other qualitative methods.



*But if you can include photographs, that is very enriching for your data collection. Because a lot of people cannot verbalise their opinions or they cannot write about them. A very important thing with photographs is you can invite people to bring photographs about their concerns for example, in impact assessment. And then have them explain them to everybody. As they explain them, they are projecting their fears or opinions about your impact assessment study, for example.*

*(Interview, P153, IA practitioner & researcher)*

## When can photo-based methods be used?

- Scoping, particularly to identify locally significant valued components, including both tangible and intangible values connected to place and land.
- Documenting baseline conditions.
- Identifying potential impacts.
- Comparing and evaluating alternatives, especially photo preference surveys and photo visioning methods.
- Follow-up and monitoring.



*I would like to be able to know what it's like to live somewhere. How people adapt or not, how they experience the change, and actually using that to understand how people might be affected by a proposal or how they are being affected, kind of in a monitoring role.*

*(Interview, P123, researcher/academic)*

## Impact categories:

- Photo-based methods are relevant to several impact categories, including environmental, visual/aesthetic, health and well-being, and social impacts.
- They may contribute to gender and equity analyses (e.g., GBA+). Masterson et al. (2018), for example, held separate photovoice discussion groups based on age and gender. Social media image analysis may be valuable for identifying young people's perspectives (e.g., Chen et al., 2019).

## Who is involved?

- Who is involved largely depends on the method being applied.
- Social media image analysis primarily involves analysts from the research team to coordinate data collection and analysis.
- Photo preference surveys and photo visioning methods are most likely to include key stakeholders and members of the public during IA engagement sessions.
- More participatory methods, such as photovoice and photo-elicitation, are most likely implemented with individuals and groups in potentially affected communities. They may be particularly appropriate for community-led IA processes.

## How much time is needed?

- The time needed varies widely depending on the method.
- For planning, the researcher needs to consider the time it takes to develop research protocols, materials, and instruments (e.g., photo-elicitation interview guide, participant training materials, and photo survey questionnaires, etc.) and to identify and recruit participants (if applicable).
- Social media image analysis may be more time-efficient than other qualitative methods, but it can be time-consuming if a large number of images need to be manually filtered and sorted (Chen et al., 2019).
- More participatory photo-based methods, such as photovoice, can require several days to weeks to implement, since time is needed for participant training, taking photographs, and collaborative discussion.

## What costs may be involved?

- Photography equipment and software for creating (e.g., digital cameras for participant use in photovoice/photo-elicitation; software for photo simulations for photo preference surveys and photo visioning).
- Qualitative data analysis software.
- Quantitative data analysis software, especially for evaluating associations among photographic features and values in social media image analysis.
- Participant honoraria.

## Photo-based methods in practice

- Good practice varies widely among photo-based methods, so a comprehensive overview is not feasible here. Below a few key implementation considerations are outlined. Further methodological detail can be found in the suggested method guides and references below.

### Ethical considerations

- Ethical considerations must be prioritized when involving participants in photography, as photos identifying individuals or sensitive topics can have harmful consequences for people or communities. Certain Traditional Ecological Knowledge depicted in photos, for example, may not be appropriate to share outside the community (Bennet & Lantz, 2014). These challenges can be minimized by:
  - recognizing that photo copyrights remain with the photographer and honouring participant preferences for what is and is not publicly shared;
  - allowing participants themselves to determine whether their names or pseudonyms are used when sharing photos in the public domain;
  - obscuring participant identities in dissemination and/or encouraging participants not to take photos of identifiable people (e.g., take photos from far away, from back, etc.).

### Accurate representation

- In photo preference surveys and photo visioning, it is important to ensure crafted images are accurate representations of the project components they depict.

*...thinking about animations, the other thing you've got to be careful about is not to mislead people. You need to be careful that the animation or anything you develop to illustrate a project does give a true impression of scale and doesn't present an angle that might be designed to minimize impacts.*

*(Interview, P82, IA practitioner)*



## Participant training

- Highly participatory photo-based methods (e.g., photovoice) should begin with a participant training session that includes information about the purpose of photographic methods, photography techniques, ethical photography, and data ownership.

## Data collection

- Social media image analysis may require manual filtering to include only photos relevant to the topic. Inclusion/exclusion criteria should be developed to facilitate a consistent filtering process.
- Data collection and analysis procedures for certain photo-based methods are similar to their most closely related methods. Photo-elicitation, for example, typically involves interviews that are recorded and transcribed for analysis. Photo preference surveys may use online or in-person questionnaires, which include closed- and/or open-ended questions relevant to the presented photographs.
- In photovoice, the participant-created images are the primary data. Often, participants also generate short narratives that explain the meaning behind their photographs.

## Analysis

- Certain qualitative data analysis software packages (e.g., NVivo, ATLAS.ti) support image coding and analysis, which can be useful when analyzing user/participant-created photos.
- In photovoice, analysis often includes a collaborative component in which participants select the most salient photos, share the meaning behind them, and collectively identify important themes.



## Reporting

- For methods in which photographs are the data, the researcher should consider including photographs as supporting evidence for any key findings or themes identified in final reports.
- To promote positive social action and change, photovoice often results in a public display or forum that engages the wider public and decision makers with the issues identified by the participants (Kong et al., 2015; Wang & Burris, 1997).

## Limitations

- Some photo-based methods can be technically challenging, particularly those that require image manipulation (e.g., photo visioning).
- Highly participatory photo-based methods can be time-consuming for both researchers and participants.
- Analysis can be difficult for some photo-based methods, particularly those that include qualitative analysis of images.
- Photo-based methods can be ethically challenging. Confidentiality and privacy issues associated with both the use of social media data and with participant-collected photo data should be carefully considered.

## Related methods

- Photo-based methods can be combined with spatial methods (e.g., Bennet & Lantz, 2014; Kok, 2020).
- Photography can be used alongside participatory rural appraisal methods for community-based IA (Spaling et al., 2011). It can be valuable for validating and reporting key IA findings in the community context.

## Case Study 6.18.

### Understanding Perceptions of Hydroelectric Landscapes Through Social Media Image Analysis

Chen et al. (2019) applied social media image analysis to predict the potential impacts of a proposed hydroelectric dam in British Columbia and a dam removal in New Brunswick, Canada. Instagram was chosen as the data source to specifically capture the perspectives of youth. Through the online tool Netlytics the researchers collected over 2000 geo-referenced Instagram photos and captions from within five kilometers of the dam reservoirs over a one-year period. A qualitative data coding process facilitated the thematic categorization of landscape features, human activities, and

landscape values. Z-score testing was then applied to identify statistically significant associations among the specific landscape features, activities, and values identified through the coding process. These associations revealed the values and activities that may be impacted if the associated landscape features are impacted by the developments. The authors found, for example, that the inundation of farmland at the British Columbia case study site could impact the associated value of “sense of home.”

## Recommended method guides

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Lamoureux, B., Zurba, M., Chen, Y., Islam, D., & Sherren, K. (forthcoming). Image- and arts-based methods in natural resource and environmental social science: Scoping the domain for methods that empower. In K. Sherren, G. Thondhlana & D. Jackson-Smith (Eds.). *Opening windows: Emerging perspectives, practices and opportunities in natural resource social sciences*. University Press of Colorado & Utah State University Press.

Masterson V. A., Mahajan S. L., & Tengö M. (2018). Photovoice for mobilizing insights on human well being in complex social-ecological systems: Case studies from Kenya and South Africa. *Ecology and Society*, *23*(3), 13. <https://doi.org/10.5751/ES-10259-230313>

Nimegeer, N., Thomson, H., Foley, L., Hilton, S., Crawford, F., & Ogilvie, D. on behalf of the M74 study team. (2018). Experiences of connectivity and severance in the wake of a new motorway: Implications for health and well-being. *Social Science & Medicine*, *197*, 78-86.

Roque de Oliveira, A., & Partidário, M. (2020). You see what I mean? – A review of visual tools for inclusive public participation in EIA decision-making processes, *Environmental Impact Assessment Review*, *83*, 106413. <https://doi.org/10.1016/j.eiar.2020.106413>

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## Seasonal Calendars

### What are seasonal calendars?

The seasonal calendar method (also called seasonal activity calendars, community calendars, or Indigenous calendars) emerged from participatory rural appraisal (PRA)—a process that enables communities to envision their desired future, analyze relevant conditions and resources, and develop strategies for achieving their own goals (Chambers, 1994; Narayanasamy, 2008). Seasonal calendars involve the collection of qualitative data, which are used to develop diagrams depicting important environmental conditions and community activities, events, issues, and opportunities over an annual cycle (Narayanasamy, 2008). They are used to gather information about a wide range of conditions, such as patterns in climate and rainfall, wildlife movements, agricultural conditions and activities, traditional land uses, social events, labour trends, and income. The seasonal calendar method is typically conducted in a workshop-type forum, but may also draw on data collected through other methods, such as interviews, focus groups, and document review. Seasonal calendars are visual products, often in the form of flow charts (Nchanji, 2017), graphs (Narayanasamy, 2008), tables and circular diagrams (Prober et al., 2011; Qikiqtani Inuit Association (QIA), 2019), or even art (Great Barrier Reef Marine Park Authority, 2017). Once developed, the calendars can be used as an analysis framework or planning tool that aids in the evaluation of possible effects of developments projects or initiatives at various times of the year.

### Why select seasonal calendars?

- Environmental conditions and land use activities fluctuate across seasons, and, therefore, proposed development projects may have different effects at different times of the year. Seasonal calendars are generated through locally held knowledge of environmental, social, cultural, and economic conditions across time, knowledge that can deepen understanding of these variations and effects.
- Calendars can serve as “boundary objects,” enabling the communication of ecological knowledge across cultures and knowledge systems (Prober et al., 2011).
- Seasonal calendars are also useful in recording the knowledge and activities of various subgroups in the broader population. Nchanji et al. (2017), for example, developed seasonal activity calendars with groups of participants that were segmented by gender and age to

capture the gendered division of labour in the harvesting and processing of a food and income-generating forest product in Cameroon.

*...in the fishing industry, people say the snoek [fish] season is only for three or four months and then we will catch them. And the rest of the year we either prepare for it or do we do something else, so you can also find out very good information about livelihoods by using the seasonal calendar.*

*(Interview, P56, IA practitioner)*

### When can seasonal calendars be used in IA?

- Baseline studies—describing baseline conditions as a basis against which impacts can be predicted, monitored, and addressed.
- Identifying potential impacts, often for specific thematic areas or specialized studies (e.g., cultural values, traditional land uses, livelihood practices, and migration patterns of specific species).
- Identifying relevant mitigation measures.
- Strategic IA processes (e.g., QIA, 2019).

#### Impact categories:

- Calendars can help develop understanding of a variety of environmental, cultural, social, and health conditions and impacts, though seasonal calendars typically focus on a specific theme or topic relevant to the community.
- They can contribute to gender and equity analyses (e.g., GBA+) by drawing attention to the knowledge and practices of diverse subpopulations.

#### Other contextual considerations:

- Seasonal calendars generally identify patterns across an annual cycle, which might not account for variabilities over longer periods of time. This method, therefore, is not appropriate for gathering historical baseline information. It may be beneficial to supplement seasonal calendars with other historical timelining techniques.

## Who is involved?

- Seasonal calendars are a highly participatory, community-based method and should include relevant knowledge holders in a community.
- In some circumstances, it may be valuable for specific subgroups (e.g., gender, age, farmers, trappers, etc.) to develop their own calendars to include diverse knowledges and practices.

## How much time is needed?

- Planning time varies, but the researcher should consider the time it takes to co-develop the purpose and methodology with community partners, identify and recruit participants, and secure a venue and materials.
- Approximately two to three hours should be allowed for each calendar development workshop.
- Analysis is typically done collaboratively with participants. This may require extra time during the calendar development workshop or a separate follow-up discussion or workshop.

## What costs may be involved?

- Staffing for planning and conducting calendar development and analysis workshops.
- Workshop materials (e.g., flipcharts, markers, etc.).
- Venue rental and refreshments.
- Participant honoraria.

## Seasonal calendars in practice

### Method co-design with community partners

- Community partners should define the core theme/topic that will shape the content of the calendar.
- The researcher needs to identify relevant knowledge holders.
- The researcher and partners should plan the end product: Will the calendar be a table, circular diagram, or drawing, for example?

### Good facilitation

- The purpose, objectives, and procedures must be clearly understood by participants.

- The facilitator should be experienced with participatory, community-based approaches.
- They should facilitate natural discussion among participants but know when to ask probing questions to gain a deeper understanding of a discussion topic or to understand differences among participants or participant groups.
- A notetaker or recorder can capture key points from the discussion.

### Populating the calendar

- Seasons should be defined by the involved communities. Some communities, for example, define seasons based on environmental conditions rather than discrete time periods such as months within the Gregorian calendar (Prober et al., 2011; QIA, 2019). This means that seasons can be variable across time and communities.
- The researcher needs to consider the best way for participants to record information on the calendar (e.g., flipcharts, whiteboards, on the ground, digitally, etc.).
- Symbols or words can be used to represent the seasons, environmental conditions, cultural activities, etc.

### Using the calendar: Collaborative analysis

- The bulk of any further analysis involving the seasonal calendars is typically done collaboratively with participants, rather than alone by the researcher/IA practitioner. This analysis may be done during the calendar development workshop, though a separate analysis meeting or workshop may be beneficial. Photographs, notetakers, and/or audio-recorders can capture the discussion.
- Analysis involves discussion about observed patterns and significant differences in calendars among groups (if applicable). Importantly, in IA applications, analysis also includes an evaluation of the possible linkages or impact pathways between seasonal conditions/activities and proposed project activities. If high risk periods are identified, appropriate avoidance or mitigation measures can be proposed and discussed.
- The calendars may be stylized/digitized and findings synthesized in a report. The draft outputs must be verified for accuracy with community partners and participants.

## Case Study 6.19.

### Baffin Bay and Davis Strait SEA (Seasonal Calendars)

Seasonal calendars were used within a community-driven IA developed by the Qikiqtani Inuit Association (QIA) as part of a submission to the Nunavut Impact Review Board for the Baffin Bay and Davis Strait Strategic Environmental Assessment (QIA, 2019). The assessment sought to identify potential impacts of proposed offshore oil and gas developments on wildlife and wildlife habitat, Inuit culture, and food security. The assessment was grounded in Inuit Qaujimajatuqangit (IQ)—Inuit knowledge and worldviews—which are deeply intertwined with the Arctic environment of the Qikiqtani Region. As a component of the assessment, QIA's IQ committee (developed specifically for this project with members from all potentially impacted communities) developed a series of seasonal calendars that included accumulated knowledge of environmental conditions and marine animal distribution across the six seasons recognized by IQ. For example, the calendars depicted ice conditions, weather patterns, seasonal marine animal breeding cycles, and community activities during those periods. The information used to develop the calendars was derived

from data collected during previous traditional land use and occupancy studies, workshops, and consultations. Through an analysis of oil and gas activities and timings (e.g., seismic, exploratory drilling, production drilling) against the IQ depicted in the seasonal calendars, QIA identified potential impacts and generated a set of recommendations aiming to enhance the understanding of, as well as mitigate, potential season-specific effects of the proposed developments. These recommendations included, for example, additional baseline studies and seasonal restrictions on oil and gas activities based on specific communities' seasonal calendars as a condition of approval (e.g., when marine mammals are in their critical wintering grounds—Ukiaq through Upirngasaaq seasons, or early spring, winter, and late fall). Recognizing that seasons are somewhat variable from year to year, QIA's effects assessment also recommended that a standing IQ advisory committee be developed to assist in decisions about when to allow or restrict oil and gas developments based on seasonal conditions rather than using arbitrary Gregorian calendar dates.

## Recommended method guides

Better Evaluation. (2022). *Seasonal calendars*. <https://www.betterevaluation.org/methods-approaches/methods/seasonal-calendars>

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## Workshops

### What are workshops?

Workshops are facilitated participatory sessions in which participants discuss, brainstorm, and identify solutions to a specific problem. As a research method, workshops aim to collect reliable and valid data, while also providing participants an opportunity to work collaboratively toward solutions to a shared problem or issue (Ørngreen & Levinson, 2017).

Workshops are very versatile and can integrate a wide range of qualitative and quantitative information gathering techniques. They generally include more participants (10+) and run longer (three hours to multiple days) than a focus group discussion.

### Why select workshops?

- Workshops bring together diverse perspectives, which can contribute to a holistic IA and break down silos among those with various environmental, social, economic, and health interests and priorities.
- Workshops can be interactive, deliberative, and used to support decision-making. They can facilitate a deeper understanding of others' perspective and work towards the accommodation of diverse interests.
- Workshops provide opportunities for building relationships, making new connections, and learning in IA processes.

*...workshops are often a mix of public citizens who come with one particular view, or maybe local authority officers who come with another particular view, and health boards that might come with another particular view to discuss a topic or a project or a plan. You get those really diverse conversations and also I think they're very useful for helping people understand and breakdown silos and sort of see each others' perspectives.*

*(Interview, P54, government/regulatory agency staff)*

*I found it very good for people to see each others' perspectives, start discussions, make connections, get a better understanding of health and well-being as well and inequalities, as well as a better understanding of the project or the plan or whatever. So it has quite a lot of benefits.*

*(Interview, P54, government/regulatory agency staff)*

### When can workshops be used in IA?

- Strategic IA, particularly in evaluating and comparing alternatives.
- Scoping, including in the participatory identification of valued components and assessment indicators.
- Predicting and evaluating impacts, including cumulative effects.
- Identifying alternatives (e.g., Sinclair et al., 2009);
- Mitigation/enhancement measures.
- Follow-up and monitoring (e.g., Brereton & Forbes, 2004).

### Impact categories:

- Workshops are relevant for many impact categories, including health, environmental, social, and economic. Workshops may be especially common in health impact assessment.
- They can contribute to gender and equity analyses (e.g., GBA+) by drawing attention to the range of values across diverse sub-populations and the distribution of impacts across these groups. In a social impact assessment of a landfill proposal in South Africa, for example, multiple workshops were conducted to include the perspectives and concerns of historically marginalized groups (Scott & Oelofse, 2005). These workshops were followed by a larger, multi-stakeholder workshop.

### Who is involved?

- Who is involved depends on the purpose and objectives of the workshop.
- Workshops may be used as an internal organizational tool, bringing together professionals and experts from various disciplines in the early stages of IA planning or to fill information gaps. They can be a valuable means of systematically integrating expert knowledge and opinion into IA processes.

- Community workshops are used in both proponent- and community-led IA. These workshops may involve any interested members of potentially affected communities. Separate workshops may be held to include the perspectives of specific sub-populations.

## How much time is needed?

- Planning time varies, but time is required to select and recruit participants, develop a workshop plan and agenda, and secure a venue and materials.
- The time required for a workshop varies depending on its purpose and objectives. Workshops can range from a few hours to multiple days, though approximately three hours is often considered ideal.
- The researcher needs to consider the time required for transcribing, collating, and analyzing any workshops notes, recordings, and participant inputs.



*Over the years, I've tested many methods with workshops. We've had long full day workshops and half day workshops and two hour workshops. Basically what I've found is at the end of the day, a three hour workshop with a break in between works. And that's mainly because the people that you need in the room can commit for half a day or three hours—they've still got time to do their emails and their meetings in the afternoon or whatever.*

*(Interview, P54, government/regulatory agency staff)*

## What costs may be involved?

- Staff time for planning, facilitating, and analyzing workshops.
- Equipment and materials (e.g., audio recorder, notebooks, flipcharts, any other workshop materials such as posters, maps, and handouts, etc.).
- Venue rental and refreshments.
- Participant honoraria.

## Workshops in practice

### Participant selection

- The value of workshops largely depends on the people in the room. In some circumstances, it may be appropriate to hold workshops with segments of the populations with similar characteristics/backgrounds. In others, it is appropriate to include participants with diverse knowledge and interests, but special attention must be given to building an inclusive and safe environment.

### Planning workshop activities

- Workshop activities should be tailored to the participants, so the researcher must consider which activities will best meet the workshop objectives and engage participants in a meaningful way.

### Attention to inclusivity and equity

- Strategies for achieving inclusivity and equity must be built into all phases of workshop planning and implementation. McGill University's (2022) Inclusive workshop toolkit has useful tips and strategies for developing inclusive workshops.

*Special care must be taken to: 1) ensure participants represent the unique voice of the community; 2) participants feel comfortable in speaking up (e.g., opportunities for introverts and extroverts and consideration of context, including potential colonial trauma; 3) barriers are removed for those that may wish to participate but may not be for various reasons (e.g., transportation, childcare, etc.).*

*(Survey, P9, government/regulatory agency staff)*

### Establishing a clear purpose and objectives

- The workshop must have a clear purpose and objectives, and these must be clearly communicated to participants at the beginning of the workshop.

### Facilitation

- Because workshops often include many participants with diverse perspectives, strong facilitation skills are necessary to hear all voices and to stop certain voices from dominating the discussion.

- Workshops for information gathering in IA should be dialogue-centered. Some initial information about the project or other aspects of IA may be important for ensuring participants have necessary background information to effectively participate, but workshops should quickly move from “information-out” to fostering dialogue among participants.

*If lead by a skilled facilitator these can be an essential tool in understanding baseline conditions, project alternatives, impacts and mitigation. However, the facilitative piece is key. Proponents are often keen to share results of studies instead of fostering dialogue to contribute to the creation of results, but if done well these can be a very effective data collection tool.*

*(Survey, P117, IA practitioner)*



## Data collection and analysis

- How data are collected varies depending on how the workshops are implemented. For example, data may be recorded through researcher notes, audio-recordings, photographs, or participant inputs (e.g., flipchart notes). Often, these data are transcribed, collated, and analyzed using a qualitative thematic analysis approach.

## Verifying outcomes

- Summarizing and sharing workshop outcomes with participants help verify that participant perspectives were captured accurately.

## Reporting workshop findings

- Final IA reports should clearly identify how the workshop findings influenced the IA process and outcomes. This step can enhance the credibility and perceived legitimacy of the IA.

## Limitations

- It can be difficult to ensure wide participation due to scheduling challenges, etc.
- There is a risk that certain voices may dominate the discussion, while others go unheard.
- The workshop can be a time- and resource-intensive method.

## Related methods

- Workshops can be used to facilitate a wide range of other methods and techniques, such as deliberative methods (e.g., world café, deliberative polling), matrices, questionnaires, mapping techniques, multi-criteria analysis, scenario analysis, and systems analysis.
- Other qualitative methods, such as interviews, focus groups, document analysis, and participant observation, may be used alongside or in addition to workshops.

## Case Study 6.20.

### Participatory Workshop for the North Wales Connection Project Well-being Assessment

The North Wales Connection Project proposed the development of infrastructure to deliver electricity from the Wylfa Newydd Power Station. The project did not require a formal health impact assessment (HIA), but the proponent (National Grid), in collaboration with Isle of Anglesey County Council and the Wales Health Impact Assessment Support Unit (WHIASU), undertook a voluntary rapid health and well-being assessment to evaluate the potential impacts of the project on regional health and well-being goals (National Grid, 2018). A participatory workshop, independently facilitated by WHIASU, was a main method contributing to the assessment. Workshop participants—39 in total—were selected to include professionals and community residents with knowledge relevant to the well-being goals defined by Wales's Well-

Being of Future Generations Act, 2015. The workshop included an overview of the project, an overview of HIA, systematic completion of the WHIASU's determinants of health checklist to identify positive and negative impacts, and breakout discussions to formulate key recommendations (see Chadderton et al., n.d. for further information about WHIASU's rapid participatory workshop process). Following the workshop, the assessment team conducted a qualitative thematic analysis of the workshop participants' comments. This analysis resulted in a summary of vulnerable groups that could be disproportionately affected, key priority areas and potential impacts (e.g., noise, landscape, and severance effects), and suggested mitigation measures (National Grid, 2018).

## Recommended method guides

Hamilton, P. (2016). *The workshop book: How to design and lead successful workshops*. Pearson.

McGill University. (2022). *Inclusive workshop toolkit*. <https://www.mcgill.ca/skills21/facilitator-guide/reflect/inclusive-workshop-toolkit>

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# Part 7: Qualitative Method Selection Considerations





This study asked participants about factors that must be considered when deciding which qualitative methods are appropriate for specific IA processes.

Other than elaborating upon why and at which IA steps they apply these methods, participants generally avoided prescriptive advice (e.g., use method X in situation Y) since appropriate methods vary widely depending on IA context. Instead, they pointed towards considerations that can guide method selection regardless of the context and the need to be able to justify the methods chosen. According to participants, qualitative method selection and the chosen methods should meet the following criteria:

- **Purpose-driven:** IA priority issues are identified, and the methods are fit-to-purpose.
- **Responsive and respectful:** method selection responds to local preferences, needs, cultural norms, values, and practices.

- **Informed:** method selection is informed by a breadth of knowledge about available qualitative tools and a depth of knowledge about rigorous procedures for implementing specific methods.
- **Manageable:** selected methods align with available time, budget, and skillsets.
- **Aware of engagement dynamics:** selected methods actively engage and account for the dynamics among those involved.
- **Flexible:** method selection involves thorough planning but remains flexible as new information and situations arise.
- **Diverse:** multiple methods are employed to achieve the IA objectives.

These considerations for qualitative methods selection were identified through the qualitative coding and analysis process outlined in [Part 2](#) of this document. The thematic summaries are presented in the order of relative frequency as discussed by participants.

## Method Selection Should Be Purpose-Driven

Participants most frequently stated that qualitative methods should be selected to fit the purpose of the IA. Purposive method selection involves precisely identifying the key IA issue(s) that should be addressed and employing methods that most effectively gather and evaluate the relevant information.

*I think these techniques should be purpose-driven. I'm not going to take my problem and put it into an established methodology. I'm going to adapt my methodology to the problem. (Interview, P46, IA practitioner)*

*[The] number one question is what problem do you want to solve? I think you have to really identify clearly what the problem is and also the scope of the problem to determine what kind of qualitative method you want to use. (Interview, P118, researcher/academic)*

Some participants noted that IA terms of reference and/or requirements of the regulatory regime in which the IA is taking place may set out the key IA issues, which then provides guidance for method selection. Those involved in community-led IA cited the need for collaborative decision-making to be used to identify key IA priorities before specific methods are selected: “Mostly what I asked them is if you woke up tomorrow and you were a board member, what would you spend your time studying? And that’s an easy way to get people to prioritize” (Interview, P147, IA practitioner and IA agency representative). The following participant added that other considerations, such as project scale, IA process stage, and outstanding information gaps, can help hone the key issues and provide direction for method selection.

*And I think there's often an interest in collecting data for the sake of collecting data. So right sizing your approach matters because all the data collection in the world about a topic that has no overlap with the project is not appropriate either. So it really depends on the scale, what you're trying to accomplish, what stage in the process you're at, where there are gaps in information, and what information you need to be able to understand impacts that will dictate what's the best way to do it [...] You need to be able to focus it in on why are you doing this and then that gets to the how. (Interview, P117, IA practitioner)*

**Early attention to the end audience and final products can also help define which methods are appropriate:**

*And then there's probably the end result—if we need it to be a really kind of emotional journey that we expect to produce, then photovoice is great because you can have these really powerful images and things, but if it's to feed into like a more standard report, potentially interviews.... (Interview, P26, IA practitioner)*

**As participants discussed, methods for IA must be fit-to-purpose. A purposive method selection process first clearly defines the key issues that must be addressed and needs for the final products and then considers which methods most adequately address these needs.**

## Method Selection Should Be Responsive and Respectful

In addition to being fit-for-purpose, methods must also respond to the needs, preferences, and cultural norms of those engaged in the information gathering process. Qualitative methods require relationships, trust, and the ability to listen deeply. Selecting methods that resonate with, ensure the safety of, and are consistent with the values and practices of potentially affected communities and other stakeholders offer greater opportunities for positive engagement. Preferences, needs, and local norms, values, and practices should not be assumed but determined through early deliberation and partnership with those who will be sharing their knowledge and information.

*Community preference is the other piece, right? So, you don't necessarily want to come in and suggest we're going to do this when they really feel like the best way to do it is you're going to do that. So, balancing that out as well. (Interview, P117, IA practitioner)*

*First you need to know people's expectations about the project. And when you hear people's expectations and you interact with them, you can kind of grasp what type of tools and methods you could use. Instead of the other way around—instead of imposing a tool and then finding out the problems with tools or benefits. Go the other way around [...] If you bring a tool without having them choosing or participating in its design, then you have all these drawbacks because it's something that is imposed. (Interview, P153, IA practitioner and researcher)*

**As noted, participants stressed that method selection should be respectful of cultural protocols and community information gathering and decision-making processes.**

*...the way that I ended up doing [cultural impact assessment] was very much responding to the needs of the people that I was working with. So really drawing on those participatory tools, working together, and then learning what methods Māori use. So, it was mostly Hui [meetings] people want to discuss stuff together as a group, rather than individuals. (Interview, P57, IA practitioner and researcher)*

*Impact assessment must be considered contextually as this will sometimes depend on specific cultural diversities. For instance, conducting IA in an African context mustn't be same as Europe or America. The principles may remain the same, but the approach may be different. (Interview, P2, IA practitioner)*

**Imposing methods without considering cultural protocols and community preferences can not only create distrust and reluctance to engage, but also foster culturally unsafe conditions. A respectful approach to method selection considers both cultural and individual safety.**

*...And then there's this other project where, surprise, surprise, the proponent sent out a fill in the blanks, tell us these locations where you practice traditional... It was bad and it's just immediately culturally unsafe for the community. (Interview, P106, IA practitioner and researcher)*

*We did a project a few years ago where we were doing an evaluation of—I think it was in Uganda—and looking at girls who are in the program and in the community and their experience[s] [...] we have a lot of male enumerators, and you're like we cannot do one-on-one interviews. [It]'s not that there's a checklist that I'm going through, but it's just common sense. We should not do one-on-one interviews for this, but what's going to make the girls feel most comfortable? It's probably a focus group discussion of six friends who are like oh, yeah, let's chat about our preteen years and things. And so, I guess it's often just thinking through the people...what's going to make them feel most comfortable? (Interview, P26, IA practitioner)*

As participants discussed, method selection should be responsive to the preferences and needs of those involved in IA. Importantly, it should also be respectful of cultural protocols and cognizant of cultural and individual safety. A method selection process guided by responsiveness and respect not only contributes to ethical practice, but also to more engaging processes and higher quality information.

## Method Selection Should Be Informed

Informed method selection requires knowledge of the qualitative methods available for IA and how they can be implemented in a rigorous manner to effectively meet specific IA needs. Some participants mentioned that they have developed extensive expertise in specific methods, which allows them to rigorously apply the methods in a variety of IA contexts. For example:

*I think that the decision is also influenced by my knowledge and the two systems that I'm more familiar and comfortable with are key informant interviews and focus group discussion. So, these are always done. Anything else or anything more would require more time and investment from our clients. (Interview, P121, IA practitioner)*

While participants generally agreed that there is value in holding depth of knowledge about specific methods, others also promoted familiarity with a broad range of qualitative methods to ensure that methods can be selected to align with the needs of specific IAs.

*I think every process designer should have a big bag of tricks because the priority thing is that the process should be purpose built. You don't just do this stuff because I'm really good at surveys. I have a survey operation and I do surveys. When your only tool is a hammer, everything looks like a nail. (Interview, P49, IA practitioner)*

*You kind of feel your way into the subject. And then say, well, given who it is that I want to talk to and what it is that I want to talk to them about, then what's the best way to do it. I don't have an answer, but you feel your way into that area. But it does presuppose that you do know or are aware of, the nature and merits of different types of methods. (Interview, P148, IA practitioner and researcher)*

In addition to familiarity with a broad range of methods, another participant advocated for deep reflection and learning about the chosen methods, including their philosophical underpinnings and established practices for rigorous implementation.

*...when I observe people doing qualitative research, which is often the default qualitative method of interviews, right? I'm often critical of that. When we're training students we ask, "So you want to go do interviews?" "But what else is possible?" If you were thinking about qualitative methods, what other kinds of methods come to mind? Surely there's more than one approach to doing this. I try to encourage people to think about what type of qualitative methods you're using. What's the philosophical basis? What's the methodology? How do you actually do good interviews? So, part of it is just thinking more deeply about qualitative methods and the diversity of methods. (Interview, P38, researcher/academic)*

Ultimately, participants indicated the need for both a breadth of knowledge about the range of qualitative methods available for IA and depth of knowledge about how specific methods can be rigorously implemented. This likely requires a fine balance between developing expertise in specific methods over time and openness to learning about and testing new methods as diverse IA contexts demand.

## Selected Methods Should Be Manageable

Participants remarked that method selection often depends on logistical practicalities, such as the "time, money, [and] availability of skills to do the work" (Interview, P66, IA practitioner). In terms of time, the same IA consultant noted that constrained timelines can influence which methods are possible.

*Time. I'm sure this applies to EIA teams as well but bear in mind that we're not always present at the beginning of the project—we can be brought in a bit later. So, time is definitely something. (Interview, P66, IA practitioner)*

Conversely, another practitioner selects contracts based on client willingness to support the types of qualitative methods that "tell a good story" and provide sufficient time to make them achievable.

*I want to tell a good story. I'm lucky to be in a position where I can choose to not work with clients that I don't think will be responsive. For instance, I regularly say no where it looks like the time frame is going to be stupid. (Interview, P88, IA practitioner)*

Available budgets are also a factor that can shape method selection. While budget constraints may make some methods untenable, participants also noted a key strategy is to consider trade-offs and find an optimal balance between the cost of implementing various methods and the value of the information they produce.

*It's possible that you may choose, or the community may choose, an individual interview approach. Again, it comes down to a bit of a funding issue. The more individual settings you need to conduct, which is community meetings least, focus groups middle, interviews the most, the more that your costs likely increase, but also the more detailed data you get. And that's the balance you need to look at as well. (Interview, P149, IA practitioner)*

In addition to time and cost considerations, participants noted that the availability of certain methodological skillsets can influence method selection, since appropriate expertise is vital for achieving reliable and rigorous outputs.

*...so looking particularly at the qualitative survey, there are clearly skills required to do that [...] Go back to document analysis as well, we are looking at different skills within that. There are the academic skills of looking at all the peer reviewed articles. There are public health skills looking at population profiles, so there are different skills within that as well. I think we need each of those. I suppose that's the fact—you've got to have the expertise available... (Interview, P66, IA practitioner)*

Ultimately, time, budget, and available skills can dictate the manageability of various qualitative methods in IA. It is important to select methods that achieve high quality data and rigorous procedures within these constraints.

## Method Selection Requires Awareness of Engagement Dynamics

Participants mentioned that qualitative method selection should consider which techniques will actively engage and hold the attention of those participating in the IA.

*Yeah, so this thing about getting people's attention... I guess this would be an interesting angle that in terms of your research methods, which of these actually get people's attention? (Interview, P146, IA practitioner and professional association representative)*

*What I have learned is, having experimented with workshops, where you would invite a community into workshop mode... and workshops, almost by definition they are interactive, but it's verbal interaction, right? It is Q&A, or small groups, and I've used those as well, and they will work. But if you only use workshops, people get tired more, and if it's a two, three, four-day workshop, by day three nobody comes any more [...] it's remembering always that engagement and participation and making it fun. That's really important, just making it fun. And when people are dynamic, and they're expressing themselves, and they're laughing. You just know you're really engaging with people, and they're having a good time, and it works. (Interview, P53, researcher and IA practitioner)*

Several participants mentioned that method selection should also consider the dynamics among those involved. For example, awareness of the degree of controversy or conflict around the IA can influence which qualitative methods are selected. In some cases, selecting methods that bring together a diverse range of perspectives may be valuable, while in other cases such methods may be less productive.

*I still think at the end of the day it's a range of methods. As I said to you before, I think the first thing we're trying to do in EIA, which we don't do well [is] achieve consensus and agreement. And so, we would need a larger context in that. And that's where I would say we might use other tools like scenarios, or break into workshops, and we would look at opportunities where people then are sort of balancing out their opinions. (Interview, P52, IA practitioner)*

...it's the context of the problem. The extent of controversy, the extent of sort of stakeholder engagement in the problem...if it's a standard project that impact assessment is applied to, then the degree to which qualitative research would need to take depends significantly on how serious the conflict is, what's at stake? Are stakeholders engaged? I think those are the most significant determinants of what kind of approach needs to be taken. (Interview, P43, IA practitioner)

Finally, participants mentioned that regardless of the methods selected, how they are implemented matters.

Of course, there's another thing that I think is very important. You cannot only think about the tools, you have to think about what are the conditions that you give people to actually convey that knowledge to the researchers. So, we cannot do just one session with no time for questions and answers, you have to create a forum for discussion. You need the time, you need probably the face-to-face interaction. (Interview, P153, IA practitioner and researcher)

Ultimately, selecting methods—and implementing them—to actively engage people in the IA process can not only make involvement more meaningful and enjoyable for participants, but can also contribute to higher quality information to inform the assessment.

## Method Selection Should Be Flexible

Participants cited the importance of “maintaining the flexibility to support situation-based need” (Survey, P21, IA practitioner). A flexible IA method selection process, therefore, plans thoroughly but does not tightly prescribe.

*Make a good thorough plan, but don't be dogged about it [...] How do I best get from the community the information that I need to make a good decision. That's my job—how do I get the information that you need to be able to make a good decision. That's the priority for me. And you can only do that by having a really big toolbox. Halfway through the meeting, just to say, you know what, this ain't working, I'm gonna do something else. And the client takes you away at the break and says I thought we were supposed to be on agenda item three. Well, we'll talk about that tomorrow, but we're not doing that. (Interview, P49, IA practitioner)*

As new information is learned about the core topic of study through qualitative methods, data collection procedures, sites visited, people involved, and questions asked may need to shift (Creswell & Creswell, 2018). IA method selection should be guided by the best possible knowledge of the IA purpose, potentially affected populations, methodological procedures, and logistical constraints, but should also be open to adjustment as new information and situations arise.

## Consider Diverse Methods

Achieving IA objectives involves the synthesis of diverse sources of data. Techniques may vary from case to case, but participants felt that effective IA typically draws upon multiple qualitative methods.

*To me, you use information from a variety of sources to achieve objectives, planning. It involves integration of a variety of techniques. (Workshop participant)*

A wide range of qualitative methods are available for IA; the methods appropriate to a specific IA depend on the context in which it occurs. This research revealed seven considerations that can guide qualitative method selection. First, method selection should be purposive—the selected methods should directly address the core IA issues. Second, selected methods should be responsive to, and respectful of, the needs and preferences of those involved. Third, the methods should be manageable within the time, budget, and skillsets available. Fourth, selected methods should actively engage, and consider the dynamics of, those involved. Fifth, method selection and implementation should remain flexible to new information and situations. Lastly, multiple and diverse methods are often needed to fully address the needs of the IA. We turn now to an overview of the specific qualitative methods that were identified through our structured literature review, survey, and interviews.



# Part 8: Conclusions and Paths Forward



Qualitative methods play an increasingly important role in IA as many jurisdictions transition to next-generation, sustainability-oriented IA frameworks that require consideration of a broader range of social, cultural, health, economic, and equity implications of proposed projects and strategic planning initiatives.

Qualitative methods enable the integration of diverse values and perspectives, provide rich contextual information, facilitate the understanding of interactions in complex systems, support the broadening scope of IA, and complement quantitative data collection and analysis.

This research identified 17 qualitative method categories available for this next generation of sustainability-oriented IA. These categories represent a mix of conventional qualitative methods, highly participatory methods, and mixed methods that rely on a blend of qualitative and quantitative data collection and analysis techniques. Many of these methods (e.g., document analysis, interviews, focus groups, workshops) are already commonly applied in IA; others are less familiar. Each has a unique set of strengths and limitations. For this reason, it is important not to utilize only the most familiar methods but to select those that best fit the situation at hand, including local needs, preferences, values, and practices. Implementing the methods in ways that align with good practice and uphold standards of rigorous data collection and analysis are also crucial for maximizing their contributions to IA, and our work reveals that data analysis requires particular attention, even for methods that are commonly applied in IA.

As Parts 5 and 6 of this report demonstrate, there is already a range of interesting and innovative examples of qualitative methods in IA. The list of methods is not exhaustive, as it represents a snapshot of the available literature and participant experience during the period of this study. Building on current practice will require a more complete documentation of qualitative methods being applied in IA practice, so others can continue to learn from them. Moreover, while there was evidence that some of the methods reported here have been implemented with or by Indigenous communities, the study also confirmed that there is a need for further work that centres on Indigenous methodologies for IA—particularly related to Indigenous-led IA.

Despite the promise of qualitative methods to contribute to strong, comprehensive IA processes and outcomes, their value may not be fully realized unless action is taken to strengthen their overall effectiveness in IA. Participants involved in this research identified several avenues for strengthening qualitative methods in IA, including:

- Elevating the perceived value of qualitative methods in IA.
- Enhancing qualitative research skills and training in IA.
- Taking measures to ensure qualitative methods meaningfully influence IA processes and outcomes.
- Consistent implementation of standards for qualitative methodological rigour in IA.
- Greater community and Indigenous inclusion, leadership, and control over information gathering processes.
- Adequate attention to ethical considerations when using qualitative methods to involve people in IA.

The perceived value of qualitative research in IA would be elevated if action were to be taken on the items in the above list. At the same time, elevating the perceived value of qualitative research would make the subsequent suggestions more feasible and likely. Thus, these multiple avenues for strengthening the effectiveness of qualitative methods in IA must be addressed together. All IA actors—governments, practitioners, proponents, researchers, professional associations, non-governmental organizations, and communities—have a role to play. Some key action items are listed below by sector; however, many of the action items will require collaboration and coordination across sectors.

## What can government do?

- Ensure IA law, policy, and guidance recognize the importance of qualitative work in properly considering certain components of IA, such as equity impacts through gender-based analysis plus (GBA+).
- Ensure IA Terms of Reference support and enable qualitative assessment.
- Create new spaces for Indigenous-led and community-led approaches to qualitative methods. This includes providing funding for Indigenous-led studies related to Indigenous methodologies for IA. Hire Indigenous staff members who can review the qualitative findings in Indigenous-led IAs and effectively balance the information with that contained in other (e.g., proponent-led) assessment reports.
- Develop an accessible repository of good practice qualitative method case study examples from IA practice.
- Develop further policy and guidance for the implementation of qualitative methods in IA. This includes guidance on the best practice application of specific methods, on ethical best practice for collecting qualitative data and reporting findings, and frameworks that illustrate harmonization and complementarity of qualitative and quantitative information. Ensure skills and experience are available within IA decision-making bodies to critically assess and understand qualitative methodologies and findings presented in IA statements.

## What can IA practitioners do?

- Build your “toolbox” of qualitative methods. Seek out information about the range of qualitative methods available and how to apply them rigorously, inclusively, and ethically.
- Bring further rigour to your analysis of qualitative data, as well as transparency in terms of how it was conducted.
- Help build community capacity for qualitative research in IA.
- Relationship building and trust are vital when working with communities. Be reflexive when using qualitative methods—reflect on how your own worldview influences how IA issues are framed, decisions about how data are collected, and how data are interpreted.
- Many practitioners are already using innovative qualitative methods for IA. Find opportunities to share successes and failures.
- Find champions in client organizations who can highlight the value of qualitative findings to their colleagues.

## What can proponents and consulting firms do?

- Hire people with qualitative research skills and training to lead qualitative data collection and analysis of data.
- Offer qualitative research training for staff, including on ethics procedures and protocols, data collection, and qualitative data analysis.
- Ensure the right tools are available to enable rigorous qualitative analysis (e.g., qualitative data analysis software).
- Educate the public on the of range of data collection techniques available and include the public in decisions about which methods will be used.

## What can non-governmental organizations and IA associations do?

- Promote the importance of qualitative methods in advanced forms of IA.
- Provide training and skills development for using qualitative methods in IA, as well as on harmonizing qualitative and quantitative information. This could be in the form of certifications, micro-credentialling, and informal courses and presentations.
- Develop further policy and guidance for implementation of qualitative methods in IA and harmonization of qualitative and quantitative data.

## What can researchers and academics do?

- Undertake further research into the breadth of qualitative methods, approaches to implementing the methods in IA, and the value that qualitative information brings to IA process and outcomes.
- Engage in IA knowledge mobilization with other IA stakeholders such as government, industry, and NGOs.
- Ensure post-secondary IA courses incorporate a specific focus on qualitative approaches. Technical approaches relevant to the biophysical sciences tend to be the norm, so actioning this may require reaching outside of traditional units teaching IA to find people who can offer training in qualitative approaches.
- Promote IA courses to students in social science programs. Enable those trained in qualitative research to see IA as a viable career option.

## What can communities and groups do?

- Build capacity and understanding about qualitative research in IA, and share experiences of having been involved in such IA related research.
- Seek out opportunities to conduct community-led and Indigenous-led IA and build methodological capacity to lead information gathering processes. Indigenous-led IA is already providing leadership in demonstrating the effective use of qualitative methods in IA. Find opportunities to share methodological insights—including what constitutes rigour in the context of Indigenous-led assessment methodologies—with other communities interested in conducting such assessments.
- Encourage proponents and consultants to co-design and use methods that adequately integrate community perspectives and concerns, hold them to high ethical standards (e.g., following OCAP™ principles), and ensure there is clarity around how information will be used and integrated into the IA.

This report, and the conclusions beside, support the overarching aims of our project work, which were to:

- identify appropriate qualitative methods for IA of major projects, particularly in the Canadian context, including both data collection and analysis methods;
- define good practice with respect to method selection and implementation, taking contextual factors into account;
- develop a guidance toolkit to support IA practitioners with respect to qualitative methods.

We have learned a lot as we actioned these project goals through a survey, interviews, a workshop, BPAC meetings, as well as our many core research team discussions. We grappled with implementing a largely qualitative project on a global scale. We have tried to describe our own methodological journey and results as thoroughly and transparently as possible in hopes of achieving what we suggest others need to do. This has included, for example, highlighting the voice of our participants as much as possible, while being rigorous in how we selected quotations.

In the end, through our data collection and discussion, we have come to understand that the task ahead is quite large. For some of us it was surprising to find the extent to which quantitative natural science approaches are so deeply entrenched in IA. Some suggested that you cannot use stand-alone qualitative data in IA, that it must be supplemented or supported by quantitative data. Others suggested that the IA system itself needs to be re-tooled to incorporate qualitative methods and thinking and, importantly, to get properly trained people to do the work. We feel that while our work underscores the significance of the task ahead, it also reveals that there is a strong foundation to build on—many people are working hard to integrate qualitative research approaches into IA and many others are open to learning more and trying new approaches. Like most things IA related, the place of qualitative methods will evolve, new paths will be charted, and we feel the outcomes will have a positive effect on next-generation approaches to IA.

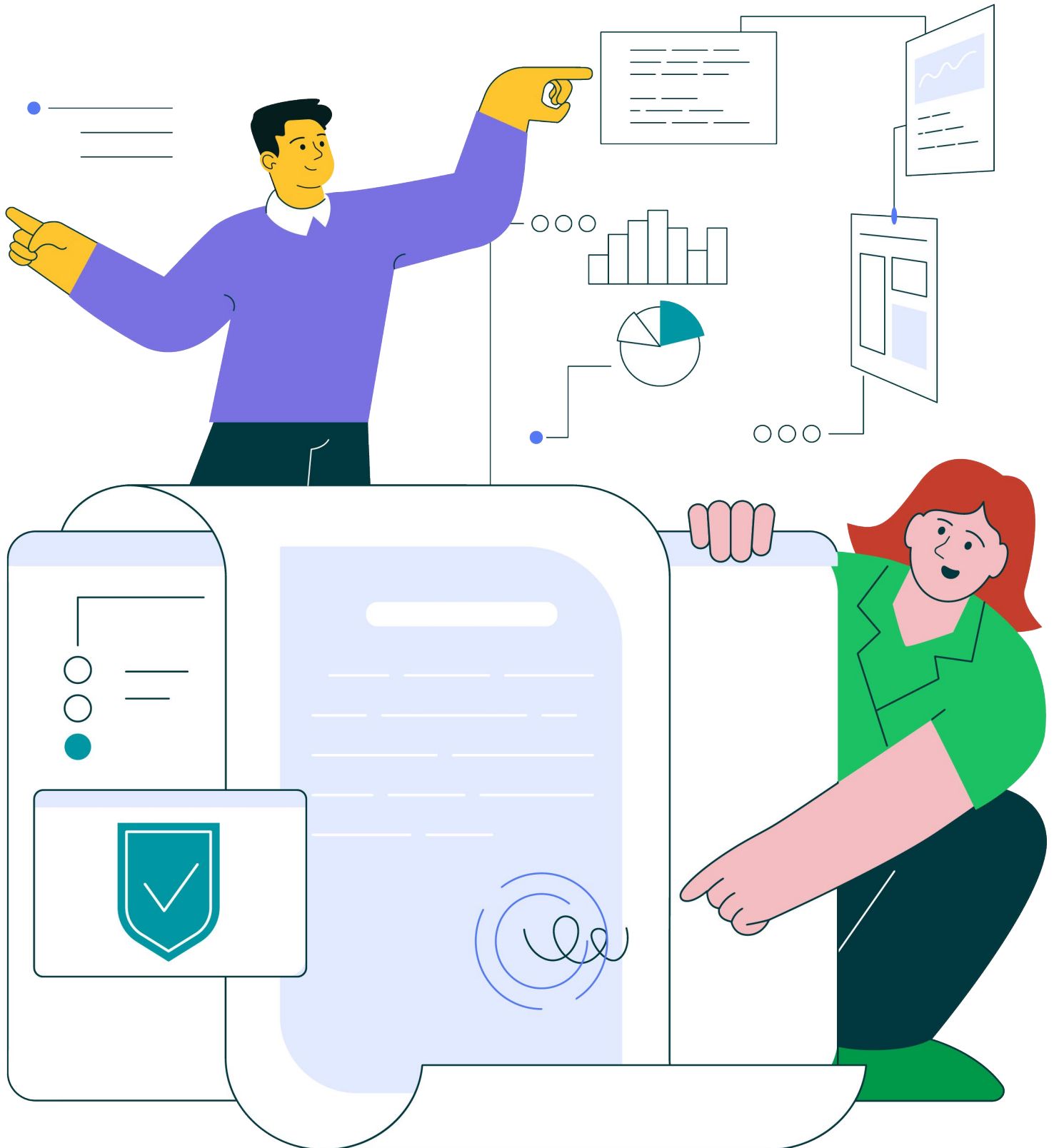
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# Appendices



## Appendix A: Ethics Approval and Consent Forms



University  
of Manitoba | Research Ethics and Compliance

Human Ethics - Fort Garry  
208-194 Dafoe Road  
Winnipeg, MB R3T 2N2  
T: 204 474 8872  
humanethics@umanitoba.ca

### PROTOCOL APPROVAL

Effective: January 14, 2022

Expiry: January 13, 2023

Principal Investigator: Andrew John Sinclair  
Protocol Number: HE2021-0214  
Protocol Title: *Qualitative Study Design for the Next Generation of Impact Assessment*

Andrea L Szwajcer, Chair, REB2

**Research Ethics Board 2** has reviewed and approved the above research. The Human Ethics Office (HEO) is constituted and operates in accordance with the current *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans*- TCPS 2 (2018).

This approval is subject to the following conditions:

- i. Approval is granted for the research and purposes described in the protocol only.
- ii. Any changes to the protocol or research materials must be approved by the HEO before implementation.
- iii. Any deviations to the research or adverse events must be reported to the HEO immediately through an REB Event.
- iv. This approval is valid for one year only. A Renewal Request must be submitted and approved prior to the above expiry date.
- v. A Protocol Closure must be submitted to the HEO when the research is complete or if the research is terminated.
- vi. The University of Manitoba may request to audit your research documentation to confirm compliance with this approved protocol, and with the UM *Ethics of Research Involving Humans* [Ethics of Research Involving Humans](#) policies and procedures.



University  
of Manitoba

Research Ethics and Compliance

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### RENEWAL APPROVAL

Effective: December 15, 2022

New Expiry: January 13, 2024

Principal Investigator: Andrew John Sinclair  
Protocol Number: HE2021-0214  
Protocol Title: *Qualitative Study Design for the Next Generation of Impact Assessment*

Andrea L Szwajcer, Chair, REB2

**Research Ethics Board 2** has reviewed and renewed the above research. The Human Ethics Office is constituted and operates in accordance with the current *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans- TCPS 2* (2018).

This approval is subject to the following conditions:

- i. Any changes to this research must be approved by the Human Ethics Office before implementation.
- ii. Any deviations to the research or adverse events must be reported to the HEO immediately through an REB Event.
- iii. This renewal is valid for one year only. A Renewal Request must be submitted and approved prior to the above expiry date.
- iv. A Protocol Closure must be submitted to the HEO when the research is complete or if the research is terminated.

**Natural Resources Institute**

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Tel: (204) 474-7170 Fax: (204) 261-0038  
[http://www.umanitoba.ca/academic/institutes/natural\\_resources](http://www.umanitoba.ca/academic/institutes/natural_resources)

**Please review this consent form and accept if you wish to continue to the survey.**

**Research Project Title:** Qualitative Study Design for the Next Generation of Impact Assessment

**Research Team:**

John Sinclair, Professor, University of Manitoba, Canada ([john.sinclair@umanitoba.ca](mailto:john.sinclair@umanitoba.ca))  
Alan Bond, Professor, University of East Anglia, UK ([alan.bond@uea.ac.uk](mailto:alan.bond@uea.ac.uk))  
Alan Diduck, Professor, University of Winnipeg, Canada ([a.diduck@uwinnipeg.ca](mailto:a.diduck@uwinnipeg.ca))  
Angus Morrison-Saunders, Professor, Edith Cowan University, Australia ([a.morrison-saunders@ecu.edu.au](mailto:a.morrison-saunders@ecu.edu.au))  
Francois Retief, Professor, North West University, South Africa ([francois.retief@nwu.ac.za](mailto:francois.retief@nwu.ac.za))  
Glen Koroluk, Executive Director, Manitoba Eco-Network, Canada ([executivedirector@mbeconetwork.org](mailto:executivedirector@mbeconetwork.org))  
Jenny Pope, Director, Integral Sustainability, Australia ([jenny@integral-sustainability.net](mailto:jenny@integral-sustainability.net))  
Meinhard Doelle, Professor, Dalhousie University, Canada, ([meinhard.doelle@dal.ca](mailto:meinhard.doelle@dal.ca))  
Richard Roberts, President, The Praxis Group, Canada ([roberts@praxis.ca](mailto:roberts@praxis.ca))  
Heidi Walker, Research Associate, University of Manitoba, Canada ([heidi.walker@umanitoba.ca](mailto:heidi.walker@umanitoba.ca))  
Brendan Middel, Student, University of Manitoba, Canada ([middelb@myumanitoba.ca](mailto:middelb@myumanitoba.ca))

**Project Description:** In recent years, impact assessment (IA) has shifted from a primary focus on environmental impacts towards incorporating a broader range of social, economic, and cultural sustainability considerations. This 20–30 minute online survey seeks to understand which qualitative methods are currently being used in IA and how they are being applied.

**Anonymity and Confidentiality:** The survey data will be collected and stored through secure platforms managed by The Praxis Group, a consulting firm based in Calgary, Canada, and the University of Manitoba. At the end of the survey, you will have the option to enter your name and contact details, which may be used to invite you to participate in a voluntary follow-up interview. Your name and email will not be used for any other purpose and will not be used in publication. You may also choose to skip these questions, which means that your responses will remain anonymous.

Data will be presented in aggregate and thematic summaries. After the study has been completed, the list linking participants' identity with participant codes will be permanently deleted. The survey data will be kept indefinitely.

Some data and information from this study may be sent outside of the University of Manitoba to other researchers, organizations, or made publicly available. This is for further analysis, as part of the research study, or a requirement by a granting agency or journal. Any information sent out of the University of Manitoba will not show your name or address, or any other identifiable personal information about you. However, despite efforts to keep your personal information confidential, absolute confidentiality cannot be guaranteed. Your personal information may be disclosed if required by law.

**Potential Risks and benefits:** The risks of participating in this survey are minimal risks that would occur in everyday life. There will be no direct benefits of participation in this study, though your responses will contribute to the advancement of best practice guidance for qualitative methods in IA.

**Compensation:** There will be no compensation for participation in this survey.



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**Withdrawal:** Your participation in this online survey is completely voluntary. You can stop the survey at any time by simply closing your browser. Responses are saved after each page of the survey. If you choose to end the survey by closing your browser, your previous responses may still be used in analysis.

After submitting your responses, it will not be possible to withdraw your data if you choose to remain anonymous as there is no way of connecting the data to individual participants. If you choose to provide your name and email address, you can withdraw your data up until the point that it has been aggregated and analyzed, two weeks after the survey closing date (**MM/YY**).

**Dissemination:** The primary output of this project is a best practice toolkit for qualitative methods in IA. If you would like a copy of the toolkit upon its completion (approximately August 2023), please email John Sinclair or Heidi Walker (emails above). The survey data may also inform the development of training workshops & webinars, peer-reviewed publications, conference presentations, briefing notes, and online blogs and magazine articles.

**Funding:** This study is funded by the Impact Assessment Agency of Canada.

**Questions or Concerns:** If you have any questions about this study, please contact any of the research team members by using the information provided above. This research has been approved by the Research Ethics Board at the University of Manitoba, Fort Garry campus. If you have any concerns or complaints about this project you may contact the Human Ethics Officer at 204-474-7122 or [HumanEthics@umanitoba.ca](mailto:HumanEthics@umanitoba.ca).

If you do not wish to participate, please close your internet. By clicking 'I agree', you confirm that that you have understood to your satisfaction the information regarding participation in the research project and agree to participate. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

**Natural Resources Institute**

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**Research Project Title:** Qualitative Study Design for the Next Generation of Impact Assessment

**Research Team:**

John Sinclair, Professor, University of Manitoba, Canada ([john.sinclair@umanitoba.ca](mailto:john.sinclair@umanitoba.ca))  
Alan Bond, Professor, University of East Anglia, UK ([alan.bond@uea.ac.uk](mailto:alan.bond@uea.ac.uk))  
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Glen Koroluk, Executive Director, Manitoba Eco-Network, Canada ([executivedirector@mbeconetwork.org](mailto:executivedirector@mbeconetwork.org))  
Jenny Pope, Director, Integral Sustainability, Australia ([jenny@integral-sustainability.net](mailto:jenny@integral-sustainability.net))  
Meinhard Doelle, Professor, Dalhousie University, Canada, ([meinhard.doelle@dal.ca](mailto:meinhard.doelle@dal.ca))  
Richard Roberts, President, The Praxis Group, Canada ([roberts@praxis.ca](mailto:roberts@praxis.ca))  
Heidi Walker, Research Associate, University of Manitoba, Canada ([heidi.walker@umanitoba.ca](mailto:heidi.walker@umanitoba.ca))  
Brendan Middel, Student, University of Manitoba, Canada ([middelb@myumanitoba.ca](mailto:middelb@myumanitoba.ca))

**This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.**

**Project Description:** In recent years, impact assessment (IA) has shifted from a primary focus on environmental impacts towards incorporating a broader range of social, economic, and cultural sustainability considerations. Sustainability-oriented IA requires the effective integration of qualitative research methods along with quantitative ones. Within this context, the overarching aim of our research is to contribute to more effective application of qualitative research methods in IA. We are currently conducting interviews, which will gather information about the best practices associated with qualitative methods in IA.

**Procedures:** A member of the research team will interview you via an online video-conferencing tool (Zoom or Teams) or telephone. The interview will take approximately one hour and will cover several topics, including: which qualitative IA methods you use or are familiar with; how these methods are applied; best practice considerations for the implementation of these methods; and what factors determine when these methods are appropriate. With your permission, the interview will be recorded using the video-conferencing tool or a digital audio-recorder, depending on which is available to the interviewer. When Zoom is used, only audio will be recorded. Teams automatically records both audio and video. The recording will only be used to transcribe the interview, after which it will be permanently deleted. If you decline to be recorded, notes will be taken instead.

**Potential Risks and benefits:** There are no known risks posed by participation in this research. There will be no direct benefits of participation in this study, though your responses will contribute to the advancement of best practice guidance for qualitative methods in IA.

**Compensation:** There will be no compensation for participation in this interview.

**Withdrawal:** Your participation is completely voluntary. You can skip any questions you prefer not to answer and you can withdraw at any time by alerting a member of the research team. Interview data can be withdrawn (deleted) up until the point

that it is analyzed, at which point it will have informed the study and may be impossible to withdraw. Please inform a member of the research team within one month after completion of the interview if you wish to withdraw your data. At the end of this form, you will be given the option to review your transcript for accuracy. If you choose this option, analysis will not occur until you have had the opportunity to review the transcript; therefore, withdraw is still possible during the review period.

**Confidentiality:** Your confidentiality will be protected throughout all phases of the research. Any identifying information (e.g., name, contact information) will be removed from the transcripts and replaced with a participant code. A list that connects the data to individual participant names/contact details will be held by the Principal Investigator (John Sinclair) on a password protected computer and will be permanently deleted upon completion of the study. The data will be stored in a University of Manitoba OneDrive account that is only accessible to the research team members listed above. The interview data will be stored for 5 years after completion of the project, after which it will be permanently deleted.

Interview data will generally be presented as synthesized thematic summaries in reports, publications, and presentation. Occasionally, we may use direct quotes from interviews to illustrate the themes. In these cases, we will only refer to participants using general descriptions (e.g., IA practitioner, regulatory agency representative) in order to maintain your anonymity.

Some data and information from this study may be sent outside of the University of Manitoba to other researchers, organizations, or made publicly available. This is for further analysis, as part of the research study, or a requirement by a granting agency or journal. Any information sent out of the University of Manitoba will not show your name or address, or any other identifiable personal information about you. However, despite efforts to keep your personal information confidential, absolute confidentiality cannot be guaranteed. Your personal information may be disclosed if required by law.

**Dissemination:** The primary output of this project is a best practice toolkit for qualitative methods in IA. You may request a copy of this toolkit by emailing any of the research team members (anticipated completion by August 2023). The interviews may also inform the development of training workshops & webinars, peer-reviewed publications, conference presentations, briefing notes, online blogs and magazine articles, and a student thesis.

**Funding:** This study is funded by the Impact Assessment Agency of Canada.

**Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation. The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way. This research has been approved by the Research Ethics Board at the University of Manitoba, Fort Garry campus. If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Officer at 204-474-7122 or HumanEthics@umanitoba.ca. A copy of this consent form has been given to you to keep for your records and reference.**

I consent to the recording of this interview for the sole purpose of generating a transcript for analysis. Note that only audio will be recorded in Zoom and audio-visual will be recorded in Teams.

YES \_\_\_\_\_ NO \_\_\_\_\_

I would like to review my interview transcript before it is included in the analysis (Note: if you select 'yes', you will be given temporary access to the transcript through our project OneDrive account. Any revisions must be completed within two weeks from the date of access). YES \_\_\_\_\_ NO \_\_\_\_\_

I consent to participate in the research project.

Participant's Signature: \_\_\_\_\_ Date: \_\_\_\_\_



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## INFORMATION SHEET

### “Building IA process resilience through advances in qualitative study design”

Welcome to this 90-minute “Quick” World Café! We have placed these information sheets, which you can take away with you, on each table so that you have information about what we’ll be doing in this session and our contact information. The purpose of this IAIA World Café session is to collaboratively identify strategies to address needs and barriers for strengthening the effectiveness of qualitative methods in IA (as identified through our research project “Qualitative Study Design for the Next Generation of Impact Assessment”). Your table group will rotate across six “stations.” At each station, you will brainstorm solutions to the given need/barrier. The only information we take away will be anonymous and consist of any notes recorded by you and/or your table host during the session. Please refrain from including any identifying information in these notes. Given the nature of group discussion, we cannot guarantee that someone will not repeat something you have contributed outside of the room, but we request that everyone respect each other’s confidentiality.

Participation in this session, and in the activities we undertake, is entirely voluntary. You may withdraw from participating without consequence and can leave the session at any time; however, unless you ask the table host to scratch/black out what you have contributed to the discussion notes, it will still be recorded. Choosing to take part in the World Café activity will constitute your consent to participate and for us to use what you contribute in our research. We will put together a summary of our findings of this session, which will be made available on the IAIA website ([iaia.org](http://iaia.org)) within the next year. We may also use the information collected to inform the outputs of our research project (e.g., final report, infographics, academic publications).|

This research has been approved by the Research Ethics Board at the University of Manitoba, Fort Garry campus. If you have any concerns or complaints about this project, you may contact John Sinclair or the Human Ethics Coordinator (HEC) at 1 (204) 474-7122 or email [humanethics@umanitoba.ca](mailto:humanethics@umanitoba.ca). A copy of this form has been given to you to keep for your records and reference.

The session co-chairs’ contact information is as follows:

Dr. John Sinclair, Professor and Director, Natural Resources Institute, Clayton H. Riddell Faculty of Environment, Earth and Resources, University of Manitoba. [john.sinclair@umanitoba.ca](mailto:john.sinclair@umanitoba.ca), 1 (204) 474-8374.

Dr. Heidi Walker, Research Associate, Resources Institute, Clayton H. Riddell Faculty of Environment, Earth and Resources, University of Manitoba. [heidi.walker@umanitoba.ca](mailto:heidi.walker@umanitoba.ca)

## Appendix B: Research Instruments and Materials

### Survey Questionnaire

#### Your Experience in Working with Impact Assessment

1. Have you personally been involved in the development, application, or use of qualitative research applied to Impact Assessment for any of the following?

		Yes	No
1	Health Conditions	<input type="radio"/>	<input type="radio"/>
2	Economic Conditions	<input type="radio"/>	<input type="radio"/>
3	Social Conditions	<input type="radio"/>	<input type="radio"/>
4	Environmental Conditions	<input type="radio"/>	<input type="radio"/>

2. In what role is your primary experience in Impact Assessment?

- Academic/ researcher
- Private consultant/practitioner
- Government/ regulatory agency
- Non-governmental organization
- Industry
- Panel member
- Indigenous community/organization
- Professional association representative
- Other [Please specify] \_\_\_\_\_

3. Please rate the extent to which you have used or engaged with the following qualitative methods in Impact Assessment.

	Never	Rarely	Sometimes	Frequently
Interviews	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Focus groups	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Workshops	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Document analysis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Checklists	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Matrices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scenario-based methods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Visual methods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Narrative methods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Values mapping	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Multi-criteria analysis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Network analysis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Systems analysis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Surveys with a qualitative component	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Qualitative GIS methods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Modelling (with qualitative component)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fuzzy Systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Delphi method	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Qualitative data analysis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q-methodology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participatory Rural Appraisal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (Please Specify) _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. We would like to gather more detailed information about your experience with several of the qualitative methods identified.

From the list [above], please choose two methods which you have used or engaged with in Impact Assessment that have contributed the most to the overall IA objectives.

For each selected method, please answer the following:

5. To which impact categories have you applied [Method]? If you work primarily in an IA evaluation or decision-making capacity, to which impact categories have you seen this method applied?

- Environmental
- Social
- Health
- Economic
- Climate change
- Equity (e.g., GBA+)
- Other (Please Specify) \_\_\_\_\_



Ability to be representative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to influence decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to maintain engagement over time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technically simple (does not require special software, equipment)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. Are there other important attributes associated with this method not listed in the previous question? Please describe.

9. What are the main challenges encountered in the application of this method when applied to Impact Assessment? Please describe.

10. What analysis techniques have typically been used when applying this method? Please describe.

**Future of Qualitative Methods in Impact Assessment**

In the following questions we are seeking your opinions on improvements and future directions related to qualitative research applied to Impact Assessments.

11. What do you consider most important to improving the contribution of qualitative research to Impact Assessment?

12. Are there other innovative approaches to qualitative research which you have not yet had the opportunity to apply that you feel will advance the application of qualitative research in Impact Assessment? Please describe.

**Case Studies**

13. We are looking for examples of good case studies where qualitative approaches/methods have been incorporated into Impact Assessment. Can you suggest a case study and provide the following information below? [Asked for name of project, contact information if available, location/region, date, URL link if available, and why this case study is important]

14. Is there anything else about qualitative research in Impact Assessment that you would like to share?

15. In consulting such knowledgeable experts as yourself, we find it helpful to be able to probe some matters more deeply. Would you be willing to participate in a follow-up interview to discuss your views further? [yes/no]

[If Yes] Please provide your name and email address so we can contact you:

Name \_\_\_\_\_

Email Address \_\_\_\_\_

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The following information is gathered to help us understand the context of survey responses and group data. Individual responses will not be identified.

D1. How long have you been involved with Impact Assessment?

- 0–5 years
- 6–10 years
- 11–20 years
- More than 20 years

D2. Approximately how many Impact Assessments have you been involved with?

- 1–5
- 6–10
- 11–20
- More than 20

D3. How would you characterize your primary areas of expertise in Impact Assessment?

- Environmental focus
- Social focus
- Health focus
- Economics focus
- Indigenous focus
- Generalist focus
- Reviewer focus
- Other [Please specify] \_\_\_\_\_

D4. Which gender do you identify with?

- Woman
- Man
- Transgender
- Non-binary
- Prefer not to answer

**Thank you for your time and consideration in completing this survey.**

## Interview Guide

### Warm-up question

Consider warming up by probing the interviewee about an interesting point they made in the survey (e.g., barriers/considerations for the integration of qualitative methods, an innovative approach, etc.).

### Section 1: Exploring specific methods in greater detail

\* Note: To ensure sufficient coverage of all the methods in the interviews, we suggest trying to cover three methods the interviewee indicated that they use sometimes or often, as time allows (e.g., their top two from the survey, plus one other lesser used or potentially innovative method).

In the survey, you indicated that you are very familiar with the use of X qualitative method(s) in IA [list method(s) participant indicated high familiarity within survey]. We're interested in learning more about how you applied these methods in the context of IA. The first method you mentioned was [method X].

[For interviews with new participants who did not participate in the prior survey] Which specific qualitative research method(s) have you used or engaged with in the context of IA?

#### a) Details about application of method

- What is the method? (or How do you define this method?)
- When do you use this method?
  - Are there specific IA case studies that could be considered best practice use of this method (with publicly available documentation)?
- Why do you use this method?
- How do you use this method?
  - Prompt on the following topics:
    - Data collection procedures
    - Participant selection/recruiting
    - Data analysis

#### b) Strengths, challenges, and best practice

- What are the strengths of the method?
- What are the challenges and limitations of the method?
- What are best practice considerations for the application of this method?

#### c) Repeat for method #2 (and #3, if time allows)

### Section 2: Perceptions about qualitative research in IA

- What factors must be considered when deciding which qualitative methods are appropriate for specific IA contexts/circumstances? Why?
- How can we strengthen the use of qualitative research in IA?
- Thank you for sharing your time and experience. Is there anything else you would like to say about the use of qualitative methods in IA?



## World Café Discussion Prompts

Each table “station” provided a brief summary of the one of the six needs/barriers for strengthening qualitative research in IA that we identified through our research, with sample quotes that exemplify each need/barrier. The discussion prompts for each station are provided in the table below.

At each station, participants responded to the question:

- **What strategies will meet this need and/or overcome the barrier?** Be as specific as possible. What concrete actions should be taken? Who should take them?

Station Number	“Station” Content
1	<p><b>The need:</b> Elevating the perceived value of qualitative methods in IA.</p> <p><i>Demonstrating the value qualitative research brings to making IA more inclusive, accessible, and people-based. Practitioners need to stop trying to force quantification and see the inherent value of qualitative methods (Survey response)</i></p> <p><b>The barrier:</b> IA is still largely dominated by a biophysical, quantitative “culture” and qualitative methods are often perceived as less valid or scientific than quantitative methods.</p> <p><i>I feel the biggest challenge is mindset—bias against qualitative methods. Practitioners feel the need to quantify the outcomes to make IAs valid. (Survey response)</i></p>
2	<p><b>The need:</b> Enhanced qualitative research skills and training in IA</p> <p><i>Impact assessors often come from a natural science background and are not familiar with social science methodology [...] There must be a focus on including qualitative methodology—in mastering, applying and analysing it. It results in really rich data. (Survey response)</i></p> <p><b>The barrier:</b> Insufficient qualitative research expertise to meet the broadening scope of sustainability-oriented IA</p> <p><i>There are currently not enough qualified practitioners to meet the demand created by the new IAA [Impact Assessment Act of Canada]. Practitioners with a foundation in qualitative data collection and analysis techniques are not necessarily a given, and it reduces the rigour that should be applied to analysis and outcomes. (Survey response)</i></p>
3	<p><b>The need:</b> Using qualitative methods to meaningfully influence IA processes and outcomes.</p> <p><i>Using the research purposively to meet the aims at relevant stages of impact assessment (Survey response)</i></p> <p><b>The barrier:</b> Current IA practice and constraints can disincentivize the use of, and experimentation with, qualitative methods in IA.</p> <p><i>The bottom line is that in a cost-competitive situation, you wind up trying to do it as cost effectively as possible and that leaves absolutely no room for experimentation [...] And you’ve got this huge, huge inertia that’s keeping the system going the way it is and doing a research project on new qualitative methods isn’t really going to have any effect on that until such time as things like terms of reference change, budgets change. (Interview)</i></p>

4	<p><b>The need:</b> Consistent implementation of standards for qualitative methodological rigour in IA</p> <p><i>...qualitative data is as rigorous and as reliable as quantitative data as long as you follow the rules, as long as you do what is expected of you as a qualitative researcher. There are different rules, they are different methods, but there should be an equal amount of rigour in the research. (Interview)</i></p> <p><b>The barrier:</b> Lack of recognition of, or inattention to, established standards of methodological rigour in qualitative research in IA. An enduring notion that results must be quantified to be valid.</p> <p><i>I think there is a deficit of esteem in qualitative work among the “numbers” people who make the decisions. In part this is from a lack of recognition of the methodological underpinnings and norms/markers of quality in such work. (Survey response)</i></p>
5	<p><b>The need:</b> Greater community and Indigenous inclusion, leadership, and control over information gathering processes.</p> <p><i>...empowering impacted parties themselves to conduct this research, rather than having them be the subjects of research by a third party (Survey response)</i></p> <p><i>More acknowledgement that qualitative research methods should be culturally appropriate and led by Indigenous peoples is needed (Survey response)</i></p> <p><b>The barrier:</b> Current IA structures mean that certain players often have the greatest power in decisions about IA processes and methods, which commonly leads to an emphasis on quantitative data.</p> <p><i>Right now, you have three big circles and a couple of smaller circles off to the side. The three big circles are the government agencies responsible, the proponents, and big consulting firms. Each of them has a formula for how they do what they do, and it tends to focus on the things that the people running the show are comfortable with, which is about physical environment and quantitative data. On the outside looking in are Indigenous people and any other interested Canadians and they’re in the small circles. And those circles... that focus of power really needs to shift. (Interview)</i></p>
6	<p><b>The need:</b> Adequate attention to ethical considerations when using qualitative methods to involve people in IA processes.</p> <p><b>Ethics!!</b> It is so important to ensure that those conducting qualitative research participate in some sort of ethics approval or have an ethical requirement to ensure that the data is collected and used in an ethical matter (Survey response)</p> <p><b>The barrier:</b> A lack of clear ethical standards and protocols for using qualitative methods in IA practice risks harm to individuals and communities who contribute information, knowledge, and concerns to these processes.</p> <p><i>...impact assessment practitioners may not have any experience applying qualitative methods to the IA process. Without oversight, these practitioners can harm people and communities. (Survey response)</i></p>

## Appendix C: Qualitative Study Reporting — Quality Checklist<sup>1</sup>

_____	Purpose/objectives statement	Purpose and objectives of the qualitative study, with a clear indication of how the qualitative study aligns with the broader IA objectives.
_____	Researcher characteristics/ reflexivity statement	Who conducted the study and how their background/characteristics shaped the methodological choices and interpretations of the findings.
_____	Context	The setting/sites where the study took place, including any relevant contextual information.
_____	Sampling strategy	How and why the study sites, participants, and/or documents were selected; how participants were invited to participate.
_____	Ethical considerations	How the safety, confidentiality, and privacy of participants was protected (e.g., How was free, prior, and informed consent to participate obtained from participants? What was done to protect confidentiality, ensure data security, etc.?)
_____	Data collection procedures	Detailed description of the data collection procedures; types of data collected; research instruments (e.g., interview guide, survey questionnaire); time required (e.g., average interview length); procedures for documenting/recording data.
_____	Participant/sample characteristics	Number of participants, documents, and sites involved in the study; any pertinent characteristics (e.g., demographic attributes); the nature of participant involvement in the study
_____	Data processing and analysis	How the data was prepared for analysis (e.g., transcription procedures, storage, anonymization, etc.); detailed description of analysis procedures (e.g., coding strategy, software used, process by which themes were identified, etc.)
_____	Validity and reliability	Multiple techniques used to ensure validity and reliability or “trustworthiness” of analysis and interpretation (e.g., member checking, triangulation, external auditing)
_____	Results/findings	Clear presentation of main findings (e.g., core themes, interpretations); main findings supported by evidence (e.g., quotes, photographs, document excerpts, diagrams, etc.)
_____	Integration with IA information	Explanation of how key findings from the qualitative study relate to, support, build upon, or challenge other components of the IA; how the findings have contributed to conclusions and/or recommendations made in the IA statement.
_____	Limitations	Limitations of the study and its findings
_____	Conflicts of interest	Real or potential perceived influences on the study and how they were managed
_____	Funding	Funding source included, if applicable

<sup>1</sup> Table adapted from O'Brien et al. (2014) and Creswell & Creswell (2018)