Climate Adaptation and Protected Areas Initiative

From Theory to Practice

Strengthening monitoring, evaluation, and learning systems for nature-based solutions for climate adaptation

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1.0 Introduction

Climate change and biodiversity loss are increasingly recognized as interconnected global crises. Rising temperatures, increasingly variable precipitation patterns, and more extreme weather events have long been recognized as key drivers of ecosystem degradation, while the loss of forests, the degradation of marine environments, and the disruption of natural ecosystem functions, among others, continue to challenge our ability to curtail and respond to the climate crisis. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) has identified biodiversity loss and climate change as linked emergencies, emphasizing that degraded ecosystems can weaken nature's capacity to support adaptation and resilience (IPBES, 2019).

Conversely, healthy ecosystems have great potential to support both climate change adaptation and mitigation. They play a critical role in climate adaptation, including by regulating watershed flows, protecting coastlines, stabilizing soils, supporting food security, and strengthening community resilience through well-managed protected landscapes (Cohen-Shacham et al., 2016). However, as global biodiversity continues to decline, the ability of ecosystems to provide these services is reduced.

In response to these two existential crises, NbS present an approach to climate adaptation that works with nature to increase both climate resilience and biodiversity protection. These interventions have been defined as "actions taken to protect, conserve, restore, sustainably use, and manage the natural environment to strengthen the resilience of communities and nature to climate change" (United Nations Environment Assembly, 2022). They can include working with local communities and partners to design and implement activities focused on reforestation, improving local hydrological functions, stabilizing degraded soil, ameliorating coral reef health, strengthening buffer zones for protected areas, improving flood

mitigation, and promoting nature-positive livelihood options, to name a few. According to the International Union for Conservation of Nature (IUCN), NbS can "leverage nature and the power of healthy ecosystems to protect people, optimise infrastructure and safeguard a stable and biodiverse future" (IUCN, n.d.).

Box 1. CAPA Project

This note was developed as part of the Climate Adaptation and Protected Areas (CAPA) project. CAPA is a 3.5-year project (2023–2026) implemented in Belize, Fiji, and the Greater Virunga Landscape (GVL) and Kavango-Zambezi (KAZA) regions of Africa, with financial support from Global Affairs Canada. Implemented by the International Institute for Sustainable Development, the Wildlife Conservation Society, the World Wide Fund for Nature and local civil society organizations and communities, the project sought to increase the resilience of critical ecosystems and the communities that rely on them. It did this by implementing gender-responsive, conflict-sensitive nature-based solutions (NbS) across all four landscapes and integrating NbS into protected areas and landscape management, aiming to strengthen the resilience of their ecosystems, biodiversity, and communities to the impacts of climate change.

Read more about CAPA here.

Measuring the effectiveness and success of NbS interventions requires not only strong design and implementation, but also rigorous monitoring, evaluation, and learning (MEL) systems to measure and improve ecological and social outcomes. MEL systems offer a structured way to monitor an intervention's activities and assess its results while providing a framework for adaptive learning. They also provide evidence to validate the assumptions used to inform intended impacts and to track an intervention's progress and whether it is on the correct path (Beauchamp et al., 2024).

NbS generate impacts that extend beyond biophysical outcomes, such as hectares restored or coastlines rehabilitated. They can also influence how communities perceive climate risks and reshape relationships with nature and protected areas. Many practitioners still face challenges in measuring the social outcomes of these projects. For conservation practitioners working in protected areas—landscapes that are critical to the implementation of NbS designed to address both biodiversity loss and climate change—tracking short-term activities and outputs is an easier task; it is much more difficult to capture how NbS can lead to longer-term changes in ecosystems, resilience, behaviours, agency, and decision making. This is particularly because those outcomes are less observable and are experienced long after the close of NbS projects.

For protected area managers and conservation practitioners, MEL systems are central to understanding and communicating the impacts of NbS for climate adaptation and biodiversity, for informing adaptive management, and for supporting the effective integration of NbS into protected area management plans. This briefing note presents two practical ways that conservation practitioners and managers can strengthen their MEL systems for NbS in protected areas to measure social, ecological and resilience changes:

- using a theory of change (ToC) to enable cross-landscape learnings on outcomes
- measuring social change through Likert-scale surveys and stories of change

The paper also outlines how to integrate gender equality and social inclusion (GESI) into inclusive MEL systems that capture the unique impacts on different groups.

2.0 Using a Theory of Change to Enable Cross-Landscape Learnings on Social Outcomes

2.1 Why a Theory of Change Matters for NbS in Protected Areas

Practitioners can strengthen their assessment of NbS project outcomes by first using a ToC to ground their MEL system, either within or across the landscapes in which they are working.

A ToC is a key part of project management and of MEL systems. It is a structured explanation of how and why a set of activities is expected to lead to a project's intended outcomes and long-term impact, outlining the causal pathways,[1] assumptions, and conditions needed for change to happen (see Figure 1). Using a ToC allows users to assess and compare how different activities unfold in different landscapes, and to better understand which NbS approaches are more effective, under what conditions, and for whom.

For NbS projects implemented in protected areas, a ToC serves several critical functions:

- It articulates the rationale for how climate adaptation interventions reduce climate risks, decrease climate vulnerability, increase resilience, and support biodiversity.
- It guides project design and MEL systems by explicitly demonstrating the logical pathways between project activities and longer-term climate adaptation and biodiversity impacts.
- It enables cross-landscape learnings by allowing multi-country teams to assess and compare how different NbS activities achieve shared outcomes across diverse ecological and social contexts.

Ecological conditions may vary across project sites. For example, what works in a coastal landscape in Belize will be different from the forests of the Greater Virunga Landscape. But partners within these landscapes may be aiming to achieve the same high-level outcomes, such as increased community resilience and biodiversity protection. With a shared ToC in place, each team will have the same guiding star to orient their design and implementation toward outcomes, and how to assess them.

2.2 How to Develop a Theory of Change

When formulating a ToC at the outset of a project, one early, foundational step is to develop an "if–and–then" logic for the overall project design to show how project activities are expected to lead to results. The "if–and–then" logic of a ToC is broken down as follows:

[1] Causal pathways are the step-by-step links showing how specific activities are expected to lead to immediate results, which then contribute to intermediate outcomes and ultimately to longer-term change.

- **IF** we implement the project
- **AND** certain conditions, behaviours, or enabling factors are present (assumptions)
- **THEN** a specific change is expected to occur (impact)

For projects focused on NbS for adaptation, the "if–and–then" logic helps to build your ToC logic and intermediate outcomes, so the desired ultimate outcome is not just a description of the impact, but rather an explanation of how and why the change is expected to occur given the actions implemented. For example, the "if–and–then" logic of an NbS project's ToC could state that:

- **IF** participation of women and other underrepresented groups in NbS is increased,
- **AND** integration of climate adaptation into protected area management is enhanced,
- **AND** adoption of NbS in and around protected areas is enhanced,
- **THEN** communities will have increased resilience to current and future climate change shocks.

Building "if–and–then" statements for a ToC is relatively straightforward (see Box 2). It is important to note that the "if–and–then" logic is based on assumptions (i.e., the underlying conditions or beliefs one believes to be true for a project to be successful); therefore, claims must be confirmed through research and testable by the project team (United Nations Development Group, 2017). For example, the "if–and–then" statement above would rely on the assumption that communities are willing and able to participate in NbS activities. These assumptions need to be tested and confirmed with the targeted audience to ensure a solid ToC.

Box 2. Building IF-AND-THEN statements for a Theory of Change

1. Define the intervention (IF)

- What are the long-term vision, goals, and/or objectives of the intervention?
- Why is the intervention needed?
- Who is involved in the intervention at different levels, including partners?
- Where is the intervention taking place (i.e., in which country, city, and community)?
- What is the scope of the activity or strategy to be implemented?

2. Identify the assumptions (AND)

- What conditions are needed for the change to occur?
- What evidence supports these conditions resulting in positive outcomes?

3. State the expected change (THEN)

- What impact is expected to occur as a result of the intervention?

4. Research the possible risks and external factors

- Are there external factors beyond control of the intervention and project team?
- Does the intervention put any person or the environment at risk?

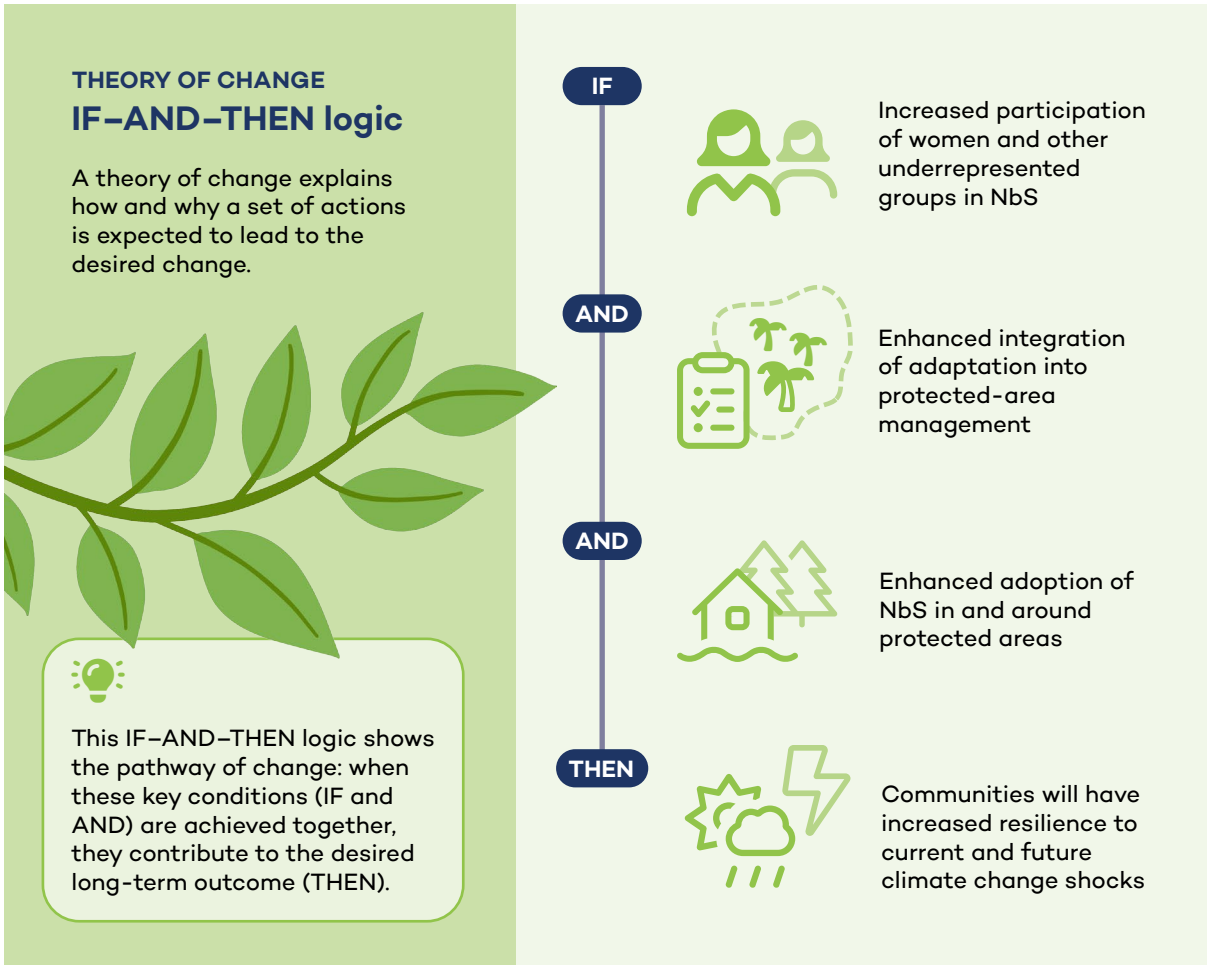
5. Integrate GESI considerations

- What does impact look like for women, youth, and other underrepresented groups?
- How might activities look different for different stakeholders?

6. Validate the logic with evidence

- Document all research that supports the intervention logic (documented research, experiences, stakeholder perceptions, etc.)

Figure 1. Theory of Change: If–and–then logic example



Source: Adapted from CAPA's Project Theory of Change.

2.3 Applying a Theory of Change to MEL Systems

Once implementation begins, the ToC can be translated into approaches, indicators, and methodologies as part of the MEL system, starting with the project's logical framework or performance management framework. The MEL system allows practitioners to track if activities have been delivered, and whether and how they are contributing to the achievement of the project's outcomes (please see the International Institute for Sustainable Development's MEL Toolkit for more information on building your MEL system). Since the ToC states how change can happen, the logical framework (also called logic model) is one way the project can provide details on the project's outcomes (what it aims to achieve), the outputs (the activities to be implemented to achieve the intended objectives) and the intended results described in the ToC (see Box 3) (Beauchamp et al., 2024).

Grounding the MEL system in a shared ToC across project sites or landscapes is crucial for learning, as it provides the basis to better understand how different ecosystems respond to particular NbS activities, and how different stakeholders, such as communities and governments, or women and youth, successfully implement and adopt NbS. The same is true for GESI activities; GESI high-level impact goals can be the same across sites, even though GESI activities may look different and be contextualized to each landscape or seascape.

Box 3. Essential MEL terms

Output: Includes products, services, or goods resulting from an intervention or project.

Activity: The planned activities to be implemented to achieve the output.

Outcome: The changes that occur because of outputs. This can include short-, medium-, and long-term changes. Outcome-level changes often include behavioural, attitudinal, and institutional changes that take time to occur.

Impact: The ultimate result or change because of your intervention or project. This can include impact that was intended or unintended, both positive and negative.

Definitions adapted from Beauchamp et al. (2024).

3.0 Measuring Social Change Through Likert-Scale Surveys and Stories of Change

NbS deliver both ecological and social benefits, making them a powerful approach to climate adaptation. However, their adoption depends on more than just changes to the natural environment—it also requires a shift in how communities, climate change actors, and decision-makers understand and perceive the role of nature in addressing climate risks, as these perceptions can increase support for and uptake of NbS (Spyrou et al., 2022). These perceptions also influence the policy, planning, and investment decisions needed to implement NbS. As communities, climate change actors, and decision-makers increasingly recognize ecosystems as effective solutions to building resilience, NbS can be scaled up and mainstreamed into adaptation strategies (United Nations Environment Programme, 2020).

A second way practitioners can strengthen the measurement of intended outcomes for NbS projects in their MEL systems is by using appropriate methods to measure social changes alongside biodiversity outcomes. This requires that MEL systems apply a balanced approach to data collection, combining both quantitative and qualitative methods to appropriately capture the less tangible social outcomes of NbS projects. Together, quantitative and qualitative data can tell a story of impact that better reflects long-term outcomes. This is particularly important in NbS interventions where ecological, social, and behavioural changes are closely interconnected (Deutsche Gesellschaft für Internationale Zusammenarbeit, 2017).

Quantitative data (such as the number of hectares restored or people trained) helps track the scale and reach of NbS projects. However, on its own, quantitative data provides limited insight into how stakeholders experienced change across the project or whether project activities have led to lasting impact.

Qualitative data plays a critical role in filling this gap. While it is often self-reported and reflects individual perspectives, it provides valuable insights into stakeholder attitudes, behaviours, and capacities. It helps explain how people perceive NbS interventions; whether they are adopting new, lasting practices; whether they have changed their behaviours; and what factors influence their decisions. Table 1 presents some ways that quantitative and qualitative data can be applied to NbS MEL systems.

Measuring changes in attitudes and behaviour can be a challenge in any MEL system, but it is important to assess how people think and act to gauge how project activities can be sustainable in achieving longer-term mindset shifts and increasing the uptake of NbS. This is even harder with short project timelines; changes in behaviour (i.e., changes in how your audience behaves) can take a long time to emerge and often rely on self-reported data, which relies on stakeholder perceptions.

Table 1. Quantitative and qualitative data in an NbS context

	Quantitative data	Qualitative data
What is it?	Numerical, easily measured	Non-numerical, descriptive
Question type	How much? How many?	How? Why?
Purpose	Track scale and coverage (measurable change)	Understand experience and drivers of impact
Example indicators	• Hectares restored • Number of people trained • Number of NbS strategies promoted • Number of new jobs in NbS	• Community knowledge of NbS • Community perceptions of NbS effectiveness • Descriptions of changes in households because of NbS • Stories of change
Strengths	Comparable across time; tracks against targets; real-time results	Provides contextual impacts; reveals unintended impacts; leverages stakeholder perceptions
Limitations	Can lack context; less detailed	Harder to aggregate; sometimes subjective

Source: Authors, adapted from Deutsche Gesellschaft für Internationale Zusammenarbeit et al., 2020.

However, given the difficulty of measuring long-term impacts from short-term projects, particularly for NbS projects dealing with natural processes (e.g., tree growth, reef recovery) that are often inherently quite slow, measuring changes in attitudes and behaviours may be a more reliable indicator of longer-term resilience outcomes.

Two practical and grounded approaches can be used for assessing stakeholder perceptions of change in NbS projects: Likert-scale surveys and outcome-level stories of change. While using Likert-scale surveys requires specific statements about the expected changes to assess, stories of change instead are guided by the respondent's experience and can help reveal both unintended positive and negative impacts of the project.

3.1 Using Likert-Scale Surveys to Measure Attitudinal Change

One way to measure social changes in a short time frame is to consider changes in behaviour and changes in attitudes separately. Typically, a change in stakeholder attitude (their belief or feelings) needs to occur before a change in behaviour (their actions) can occur (IPBES, 2024). Looking at how your target audience thinks or feels about NbS is the first step in understanding how your audience might act or behave differently with regard to NbS in future.

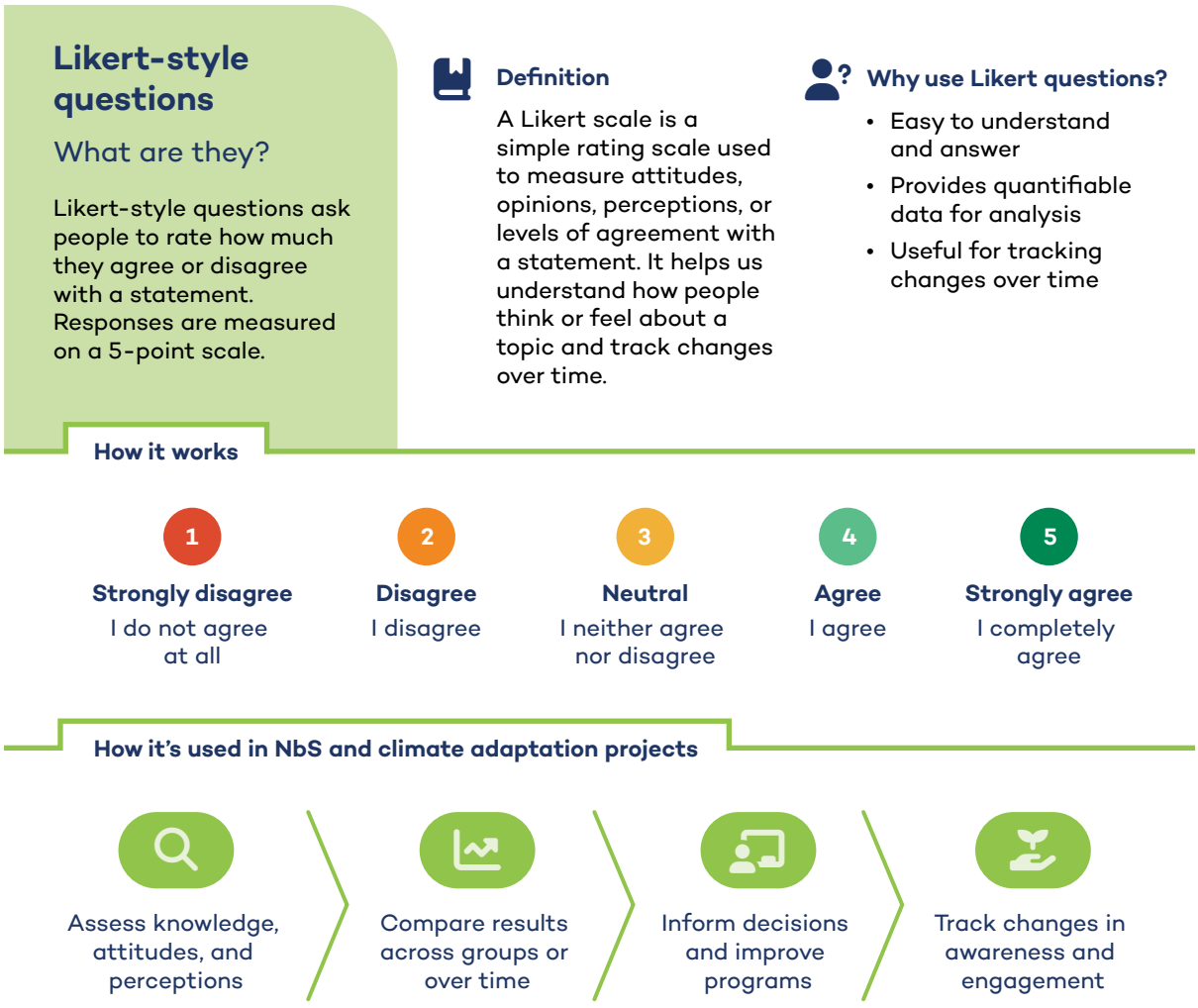
For NbS projects, MEL systems can incorporate Likert-scale survey questions as a practical method to measure attitudinal change to understand how much your audience agrees or disagrees with statements. Likert-scale survey questions, such as "I understand the role of protected areas in climate change adaptation," use a simple scale of 1 to 5 to measure attitude,

with 1 defined as strongly disagree (at the bottom of the scale) and 5 defined as strongly agree (at the top of the scale), and 3 being neutral. This five-point scale helps evaluators understand how a respondent feels about various topics and can be re-evaluated over time to see how their perceptions change over time (see Figure 2).

When undertaking Likert-scale surveys, keep in mind the diversity of your respondents; intersectional data that reflects different ages, genders, levels of ability and other lived experiences can provide rich insights in impact reporting, while enhancing a MEL system's credibility and relevance.

These questions can provide simple insights into how people are thinking and can be repeated to see how their attitudes (i.e., beliefs or feelings) are shifting over time. In an ideal scenario, these questions would be asked at the outset of the project, even before project interventions begin, to establish a baseline, and then asked annually or semi-annually to track how responses are changing over time. This provides a straightforward way to see how attitudes are changing.

Figure 2. Likert-Scale survey questions: What are they?



Examples of Likert-style statements	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I am familiar with biodiversity, ecosystems, and ecosystem services and how they are linked to climate change.	○	○	○	○	○
I understand the role of protected areas in climate change adaptation.	○	○	○	○	○
I understand the importance of involving women, youth, and underrepresented groups in NbS in my community.	○	○	○	○	○

Keep statements clear, simple, and relevant to your context.
Use the same questions at different points in time to track changes.

Source: Authors, adapted from American Psychological Association, 2023; Beachamp et al., 2024; and Deutsche Gesellschaft für Internationale Zusammenarbeit et al., 2020.

To further strengthen a MEL system and provide more confidence in self-reported data, practitioners can complement Likert-scale surveys with objective proxy indicators such as training attendance that help verify whether self-reported perceptions correspond to actual project participation. For example, a MEL system might track both

- **Likert-scale survey results**, for example, "90% of surveyed stakeholders report they have increased their awareness and understanding of NbS."
- **proxy indicator results**, for example, "among survey respondents, the project shows high attendance rates for NbS trainings, with the same stakeholders often attending more than one training."

By linking these two data sources, the project can more confidently attribute the change in awareness and understanding to those who attended multiple trainings. This strengthens the credibility of self-reported data by grounding it in documented participation.

3.2 Using Stories of Change to Harvest Outcomes

Stories of change are another practical method for assessing social changes in NbS projects, and particularly qualitative narratives of change. These stories are generated through outcome harvesting: a method that aims to identify changes in behaviours, attitudes, and capacities by examining those changes recognized by the project's stakeholders and then working backwards

to determine how the project contributed to those changes (United Nations Development Programme, n.d.).

This method is useful to understand all the impacts of a project, both intended and unintended, as it provides self-reported evidence on what has changed. When assessing social outcomes in NbS projects, it is important to look at how change is perceived by different stakeholders, especially women, youth, and underrepresented groups, who are often left out of decision-making processes. This is because impacts are not experienced uniformly: different groups may benefit from, contribute to, or be disadvantaged by NbS interventions in different ways (Caswell, 2024). Story-based approaches help surface these varied perspectives, making it possible to understand not only what changes occurred, but for whom, how, and why it matters.

When coupled with stories of change, outcome harvesting can help identify the following:

- **Who** experienced the change (individuals, groups, communities, government, etc.)
- **What** specifically changed (actions, attitudes, behaviours)
- **When and where** the change occurred (local communities, ecosystems, environment)
- **How** the change happened (attributing activities/inputs from the project)
- **Why** the change matters (why is this significant to the respondent)

Stories of change can use semi-structured interviews and focus groups to identify perceived project outcomes by stakeholders. Once an outcome is identified in the words of the project's stakeholders, outcome harvesting can then be used to validate whether the change can be attributed to the project.

Qualitative approaches serve as valuable tools for understanding the impacts that project NbS have had on stakeholders in their own words. Using broad-based questions puts the interview in the stakeholder's hands and offers them a chance to speak to their experience directly, supporting an inclusive approach to data collection by giving stakeholders autonomy in data collection.

When developing stories of change, it is important not to ask leading questions, as these can influence how a stakeholder responds. For example, a question like "Please tell me how the NbS training positively impacted your household" implies that the training was impactful and the training's impact was positive. Instead, asking "What has changed as a result of the project?" directs the respondent to tell their own story of change, and they can share which activities were impactful for them and how.

4.0 Conclusion

NbS projects operate within complex and dynamic systems, where ecological and social changes are deeply connected. The impact of reforestation or coastal restoration activities cannot solely be measured in hectares; these efforts also shift how communities living in the area perceive climate risks and reshape their relationship with nature and protected areas.

As a result, MEL systems must move beyond measuring only project activities and outputs to understanding and learning how and why lasting ecological and social change occurs. As NbS continues to gain traction in climate adaptation policy, the need to showcase credible, nuanced, and inclusive evidence of impact is growing. MEL systems built on a robust ToC and equipped to measure social change through Likert-scale surveys and stories of change are not just tools for project accountability—they are the foundation for building the evidence base that will justify scaled-up, long-term investment in NbS as an effective way to support people and ecosystems' resilience.

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CLIMATE ADAPTATION AND PROTECTED AREAS (CAPA) INITIATIVE

The Climate Adaptation and Protected Areas (CAPA) Initiative seeks to promote nature-based solutions (NbS) to strengthen climate resilience and protect biodiversity in and around protected areas and critical ecosystems. The CAPA Initiative, funded by Global Affairs Canada, will work with local communities, traditionally underrepresented groups, women's groups, and national and local authorities in Belize, Fiji, the Greater Virunga Landscape, and the Kavango–Zambezi Landscape to implement site-specific activities that respond to the risks, vulnerabilities, needs, and priorities of local communities and ecosystems, as identified through comprehensive assessments of the climate, gender, biodiversity, and conflict contexts. The CAPA Initiative is led by the International Institute for Sustainable Development (IISD), the Wildlife Conservation Society (WCS), and the World Wide Fund for Nature (WWF).

To learn more, visit https://www.iisd.org/capa.

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