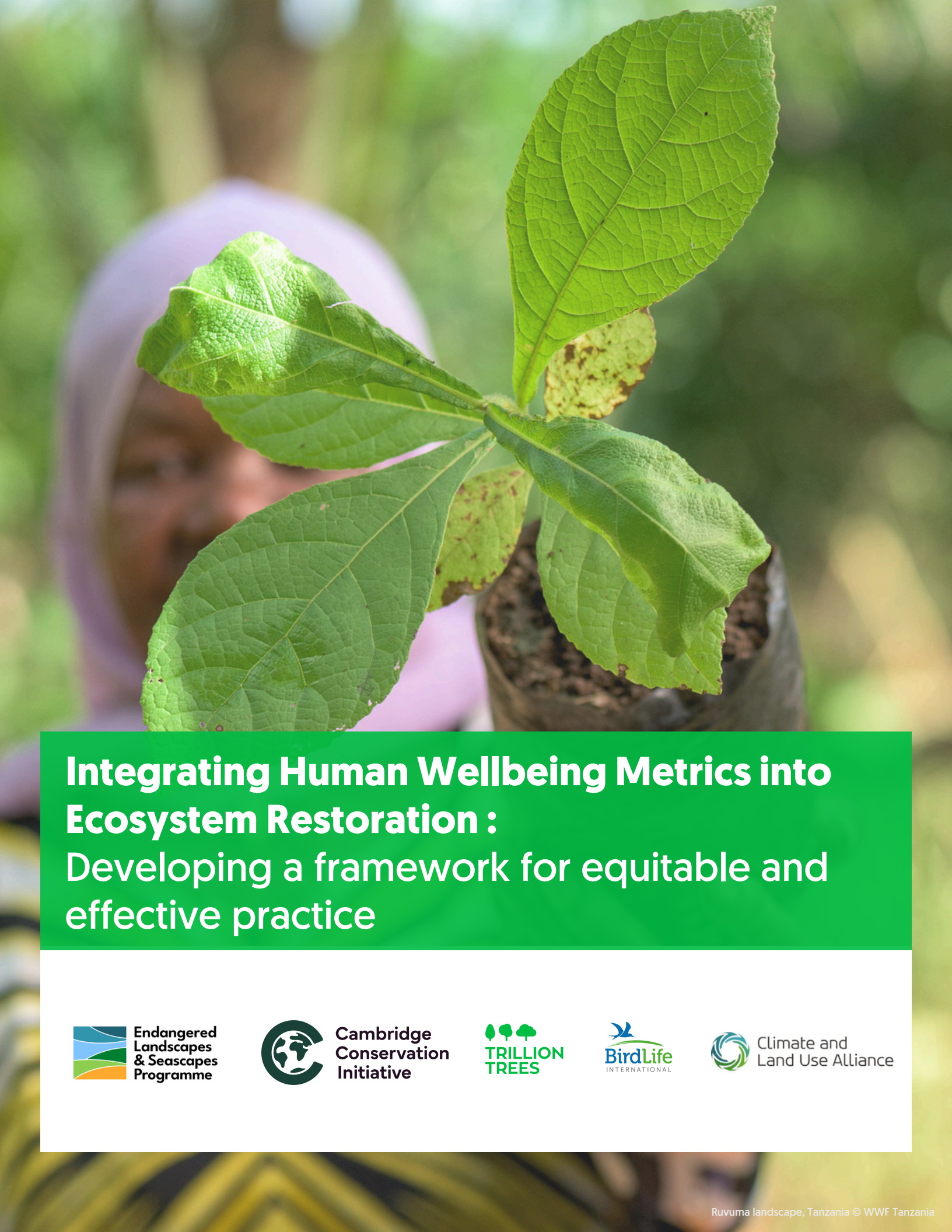

Integrating Human Wellbeing Metrics into Ecosystem Restoration :
Developing a framework for equitable and effective practice

Endangered Landscapes & Seascapes Programme

Cambridge Conservation Initiative

TRILLION TREES

BirdLife INTERNATIONAL

Climate and Land Use Alliance

Ruvuma landscape, Tanzania © WWF Tanzania

Executive Summary

Ecosystem restoration is increasingly recognised not only as a strategy for addressing biodiversity loss and climate change, but also as a pathway to improve human wellbeing. However, the integration of human wellbeing into restoration planning and monitoring remains inconsistent and underdeveloped. Existing approaches often prioritise ecological and biophysical indicators, while social and cultural dimensions are frequently insufficiently captured or considered too challenging to measure.

This paper presents an approach for embedding human wellbeing metrics into restoration practice, grounded in collective discussions from a workshop held in January 2026 (CCI Dialogue on Restoration and Human Wellbeing). It argues that monitoring wellbeing is not only necessary to evidence the impacts of restoration but is also a critical tool for improving project design, governance, and adaptive management. When effectively integrated, wellbeing metrics can reveal trade-offs, identify unintended harms, and support more equitable outcomes for Indigenous Peoples and local communities (IP&LCs).

A central recommendation presented here is the adoption of a multidimensional approach to human wellbeing that incorporates both replicable and context-specific metrics, supported by a two-tier monitoring framework that distinguishes between short-term, project-level indicators and longer-term societal outcomes. Equally important is the process through which data are collected and used. Participatory approaches, combined with principles of data justice, are essential to ensure that monitoring systems are ethical, meaningful, and aligned with local priorities. By adopting holistic, participatory, and justice-oriented approaches, restoration practitioners can better align ecological objectives with human wellbeing, ultimately strengthening the effectiveness and sustainability of restoration efforts.

Setting the scene for monitoring wellbeing: the need for multidimensional, adaptive and data-just approaches

Over recent decades, ecosystem restoration has frequently been guided by ecological objectives, with success measured through indicators such as vegetation cover, biodiversity recovery, or carbon sequestration. While these metrics remain essential, they provide only a partial picture of restoration outcomes. Restoration interventions are inherently social processes, often involving land-use change, shifts in livelihoods, and evolving governance arrangements that directly affect human wellbeing. Human wellbeing in restoration contexts is inherently multidimensional. It encompasses material conditions such as income, health, and access to resources, as well as non-material dimensions including identity, cultural continuity, social relationships, and a sense of agency. These dimensions are deeply interconnected and shaped by local values, histories, and knowledge systems. As a result, no single metric, or even a fixed set of metrics, can fully capture wellbeing across diverse contexts.

Integrating human wellbeing metrics into restoration is not only about measuring impact, but it also shapes how restoration is designed and implemented. When embedded from the outset, wellbeing metrics can inform decision-making at multiple stages of a project lifecycle. At the design stage, they help to identify local priorities, values, and potential trade-offs, ensuring that interventions are aligned with community needs. During implementation, they provide insight into participation, inclusion, and governance dynamics, enabling adaptive management. Over time, they support learning about broader social and ecological outcomes, including unintended consequences.

The integration of human wellbeing metrics requires consideration of equity and the need to collect and manage the data in a way that can contribute to just restoration. Data are not neutral; they are shaped by power dynamics and can either reinforce or challenge existing inequalities. This is particularly important in the context of wellbeing data, and attention must be paid not only to what data are collected, but how they are produced, governed, and used. A data justice approach emphasises fairness in representation, participation, and outcomes across the entire data lifecycle. This includes research design, data collection, analysis, and governance.

Women's group meeting in Mbeliling, Indonesia © Muhammad Meisa

Designing meaningful monitoring systems through a focus on purpose, capacity-building and feedback mechanisms

The effectiveness of wellbeing monitoring depends as much on process as on technical design. Poorly designed systems risk becoming extractive, burdensome, or irrelevant, while well-designed processes can strengthen relationships, build capacity, and enhance project outcomes. Clarity of purpose is fundamental. Monitoring efforts should be guided by clearly defined objectives, ensuring that data collected are relevant to inform decision making, refine interventions, and improve outcomes over time. Collecting large volumes of data without a clear use risks overwhelming project teams and undermining impact. Minimising the burden on communities is equally important. This may involve limiting the number of indicators, using existing data where possible, and ensuring that participation is appropriately compensated or valued.

Capacity building is a critical enabler. Effective monitoring requires skills in both quantitative and qualitative methods, as well as an understanding of ethical considerations. Investing in training and local capacity not only improves data quality but also supports longer-term sustainability.

Feedback mechanisms are essential to maintaining legitimacy. Sharing findings with communities in accessible formats helps to validate interpretations and demonstrate the value of participation. This, in turn, supports trust and ongoing engagement. Ultimately, monitoring systems should be designed to support adaptive management.

Community awareness meeting, Uganda © WWF Uganda

Designing a practical framework for wellbeing monitoring

A practical approach to wellbeing monitoring must reflect the multiple dimensions (domains) of wellbeing relevant to restoration contexts (outlined in Table 1). These domains should not be treated as rigid categories, but as interconnected aspects of lived experience. In practice, it is often neither feasible nor necessary to measure all domains. A focused selection of two to three domains, based on local priorities and project objectives, can provide a more manageable and meaningful approach. These domains are also not rigid categories, but can be interpreted as interconnected aspects of lived experience.

Table 1. Dimensions of wellbeing relevant to restoration contexts

Domain	**Domain definition**
Health	Encompassing physical, mental, and emotional health, including connection to nature.
Education	Considered to be context-dependent but highly relevant in many contexts and primarily a long-term indicator set.
Living standards	Encompassing income, assets, time savings, and livelihood diversification.
Safety & security	Encompassing tenure security and food security, as well as physical and psychological safety.
Agency	Encompassing people's capacity to act, participate, and influence the decisions shaping their environment, capturing governance engagement, perceived influence, and social capital.
Social, cultural, & spiritual wellbeing	Encompassing relational, identity, and place-based aspects central to restoration contexts.

Once domains have been selected, a two-tier system is recommended to overcome some of the key challenges identified in monitoring wellbeing in restoration projects:

1. **The first tier comprises a project duration set of indicators focused on processes, activities, and short-term changes that can be detected within standard project cycles**, which capture aspects such as implementation quality, community engagement and agency, perceptions of project relevance, early behaviour changes, and baseline shifts in participation, trust, and inclusion. These are indicators which are feasible within project lifecycles and directly inform adaptive management.
2. **The second tier comprises a core set of long-term indicators suitable for before–and–after comparisons and counterfactual-supported evaluation.** Using these indicators requires either periodic revisits funded by donors or linking project-level data to externally collected (i.e. national) datasets that capture aspects such as socio-economic outcomes, educational attainment, long-term income trajectories, health outcomes, ecological recovery, and land-use change. As attribution of these cannot rely on single project datasets, emphasis should therefore shift from attribution to a contribution approach.

Short-term indicators are essential for adaptive management and provide immediate feedback on implementation quality. Long-term indicators, by contrast, track broader societal outcomes. These are often best monitored through alignment with existing national or global datasets, as this enables continued tracking beyond the life of individual projects. In this context, the emphasis shifts from attribution to contribution, recognising that restoration is one of many factors influencing long-term change.

Through this proposed hybrid approach, core standardised indicators can provide a basis for comparison, while locally-derived measures ensure that monitoring reflects the lived experience of the community affected by the project. This combination allows restoration practitioners to generate data that are both meaningful and actionable.

In addition to consideration of what wellbeing data to collect, it is also important to consider how these data are collected and how choices at different stages, from research design to data governance, could promote justice or injustice. Embedding a data justice approach in wellbeing monitoring can help to ensure that wellbeing data contribute to more effective and equitable restoration, whilst also ensuring that data collection and governance practices do not themselves become sources of social harm. Draft guidance for data practices to support more equitable ecosystem restoration is presented in Table 2. The guidance is deliberately non-prescriptive, recognising that what is perceived as ‘just’ and ‘unjust’ will vary between contexts and stakeholder groups.

Agroforestry management workshop in Pedra D'Antas Reserve Lagoa dos Gatos, Brasil © SAVE Brasil

Table 2. Draft guidance for data practices to support more equitable ecosystem restoration across stages of the data life cycle

Research Design	1. Define a clear positionality and theory of change
	2. Choose wellbeing assessment methods and metrics aligned with this theory of change
	3. Assess potential data risks prior to data collection
	4. Choose scales, sampling strategy and boundaries carefully to reflect a range of experiences
Data Collection	5. Ensure that the scope of justice and fairness extends to data collectors
Data Governance	6. Maintain clear metadata including potential sources of bias and error
	7. Situate findings as part of an ongoing conversation with research participants
	8. Develop a data ownership model aligned with the needs, norms and values of local people and partners
	9. Aim for open access, but identify and protect data which could lead to social harms

Challenges of monitoring wellbeing

Effective, efficient, and representative monitoring of human wellbeing within ecosystem restoration work is challenging for many reasons. The following three key challenges were identified (other challenges are summarised in the Annex):

- **Restoration operates across timescales that often exceed typical project cycles.** While some social changes, such as participation or perceptions of governance, can be observed in the short term, others, such as reduction in child mortality and poverty, emerge over decades.
- **It can be difficult to balance comparability with local contextual relevance when monitoring wellbeing.** Standardised indicators such as income levels are valuable for aggregation, comparison and policy alignment, but they often fail to capture how wellbeing is understood locally. Conversely, locally defined indicators provide depth and relevance but may limit cross-site comparison.
- **Wellbeing-oriented approaches to restoration require recognition of the importance of subjective and non-material dimensions**, which are often overlooked due to perceived difficulties in their measurement. Failure to account for these dimensions risks reinforcing inequities, obscuring trade-offs, and undermining long-term sustainability.

Key Recommendations

Integrating human wellbeing metrics into ecosystem restoration requires both conceptual shifts and practical action. The following recommended actions can support this transition:

1. Embed wellbeing considerations from the **earliest stages** of restoration planning.
2. Adopt **multidimensional frameworks** that reflect both material and non-material aspects of wellbeing (as in Table 1).
3. Invest in **qualitative methods to capture subjective and non-material dimensions.**
4. Implement **two-tier monitoring systems,** aligned with the theory of change, to address both short- and long-term wellbeing outcomes.
5. Combine **standardised and locally defined indicators** to balance comparability and relevance.
6. Apply **data justice** principles to ensure ethical and equitable data practices (as in Table 2).
7. Prioritise **co-design and meaningful participation** of local communities.
8. Focus on a **manageable and feasible set of high-quality indicators** aligned with decision-making needs.
9. **Strengthen capacity** for data collection, analysis, and interpretation.

We recommend a multidimensional, context-specific conception of wellbeing, co-defined with relevant stakeholders, and operationalised through a two-tier monitoring framework that distinguishes between short-term, project-level indicators and longer-term societal outcomes. How data are collected, interpreted, and used is as important as what is measured: participatory methods, combined with principles of data justice, are necessary to ensure monitoring systems are ethical, meaningful, and aligned with local priorities. By adopting holistic, participatory, and justice-oriented wellbeing monitoring, restoration practitioners can better align ecological objectives with human wellbeing, thereby strengthening the effectiveness, legitimacy, and sustainability of ecosystem restoration efforts.

Acknowledgements

This paper summarises the key messages of the workshop report of the three-day CCI Dialogue on Restoration and Human Wellbeing, held in Cambridge, UK, in January 2026. Thanks are extended to all participants, reviewers, and organisers for their valuable contributions:

Adam Heal, Alejandra Pizarro Choy, Aleksandre Mikeladze, Alexandre Chausson, Alix Syder, Amy Duthie, Ana E. Lambert, Anna Macphie, Billy Fairburn, Bryna Griffin, Catriona Maclean, Charlegne Rambanapasi, Christina Van Winkle, Cleo Cunningham, David Thomas, Estefania Liehr, Eylul Dizdarogl, Francesca Edralin, Heidi Kretser, Jack Hayes, Johan Oldekop, Kristin Olsen, Laura D'Arcy, Liza Zogrib, Luke Howard, Manuelita Montaño, Mary McEvoy, Melissa Annetts, Mercy Kariuki, Michael Padmanaba, Nancy Ockendon, Neil Dawson, Perpetua Masanja, Rachel Carmenta, Rachel Garret, Robin Loverage, Rodrigo Soria, Rose Pritchard, Sam Lucas, Sérgio Rosendo, Tim Rayden, Vanessa Ospina Lopez and Vittorio Canessa.
This project was supported by the Endangered Landscapes and Seascapes Programme, managed by the Cambridge Conservation Initiative in partnership with Arcadia, with additional funding from the Climate and Land Use Alliance (CLUA).

Annex

Table 3. Overview of the main challenges of monitoring wellbeing

Theme	Summary
Resources, time and inclusion	Limited resources and time constrain outreach and inclusive data collection, often resulting in a focus on easily accessible groups (e.g. landowners) and measures whilst overlooking harder groups and measures. Long timescales for ecological and wellbeing impacts further complicate sustained monitoring.
Power dynamics	Power imbalances can lead to biased data, elite capture, unequal participation, and exclusion of marginalised groups.
Contradictory priorities	Local understandings of wellbeing may conflict with restoration objectives.
Capacity constraints	Project teams may have limited capacity to collect, analyse, and interpret wellbeing data, with risks of insufficient attention to ethics or purpose.
Attribution and causality	It is difficult to isolate the specific contribution of restoration to wellbeing outcomes amid broader social, economic, political, and environmental drivers.

Annex (Con't)

Theme	Summary
Aggregation	Aggregating wellbeing data across sites and scales is challenging if local context is considered. Standardised indicators risk losing local nuance, while locally tailored indicators limit comparability.
Assumptions about wellbeing	Project proponents may embed unexamined assumptions about wellbeing, wealth, or poverty. It is critical to challenge those assumptions, recognise community dynamics, and contextualise wellbeing.
Oversimplification of wellbeing	Reliance on single or easily quantifiable indicators risks overlooking the multidimensional and subjective nature of wellbeing, and highlights tensions between aspirational and practical measurement.
Buy-in	Limited prioritisation of wellbeing within organisations and among donors, who may not view wellbeing as central to conservation or restoration outcomes.
Fatigue	Communities may experience project and data-collection fatigue, especially when findings are not shared back in accessible, meaningful ways, leading to disengagement and weakened relationships.
Technology constraints	Lack of interoperability between data systems and misalignment between technical tools and local capacities or contexts.