A probabilistic framework for the cost-benefit evaluation of restoration outcomes in Northern Ethiopia

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Introduction

Decision-makers face two important types of decisions:

- Prioritizing decisions
- Resource-allocation decisions

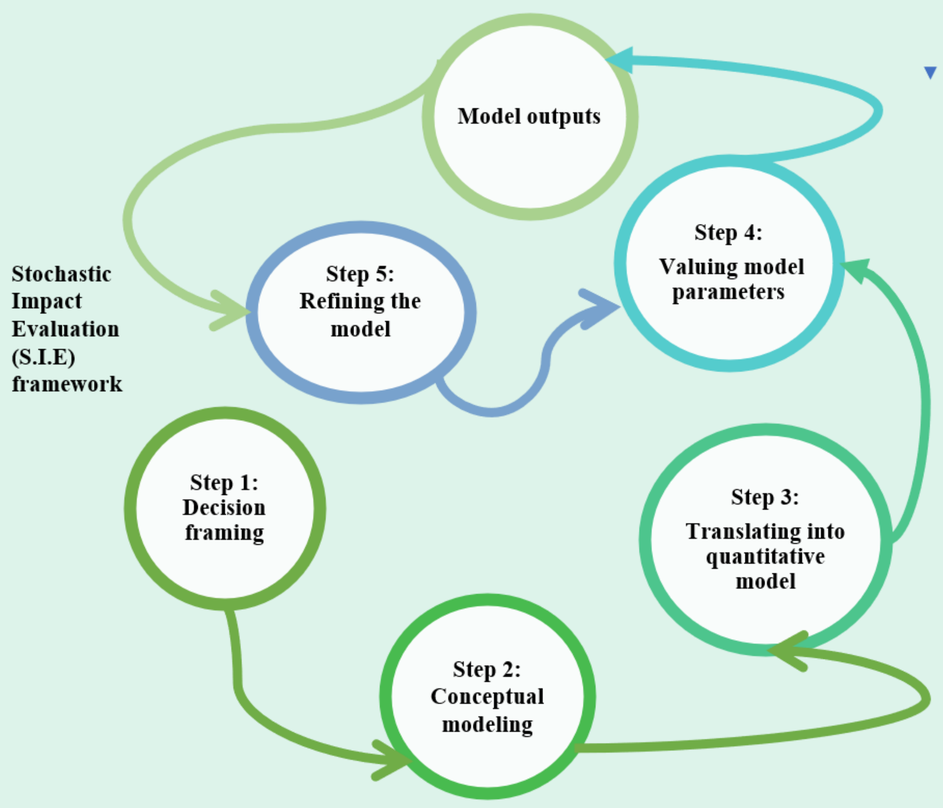
Decision quality is affected constrained by complex, data-poor environments.[1]

How can decision makers manage uncertainty and risk in their resource allocation decisions?

Methods

The goals of our study were to:

- Predict restoration outcomes
- Identify knowledge gaps and critical uncertainties
- Provide insights for adaptive management of FLR efforts



Principles of the SIE framework [2,3]

- Account for uncertainties with probabilistic tools
- Use of subjective estimates as model inputs
- ‘With’ and ‘Without’ scenario modeling
- Risk analysis with Monte Carlo simulations
- Measure ‘intangibles’

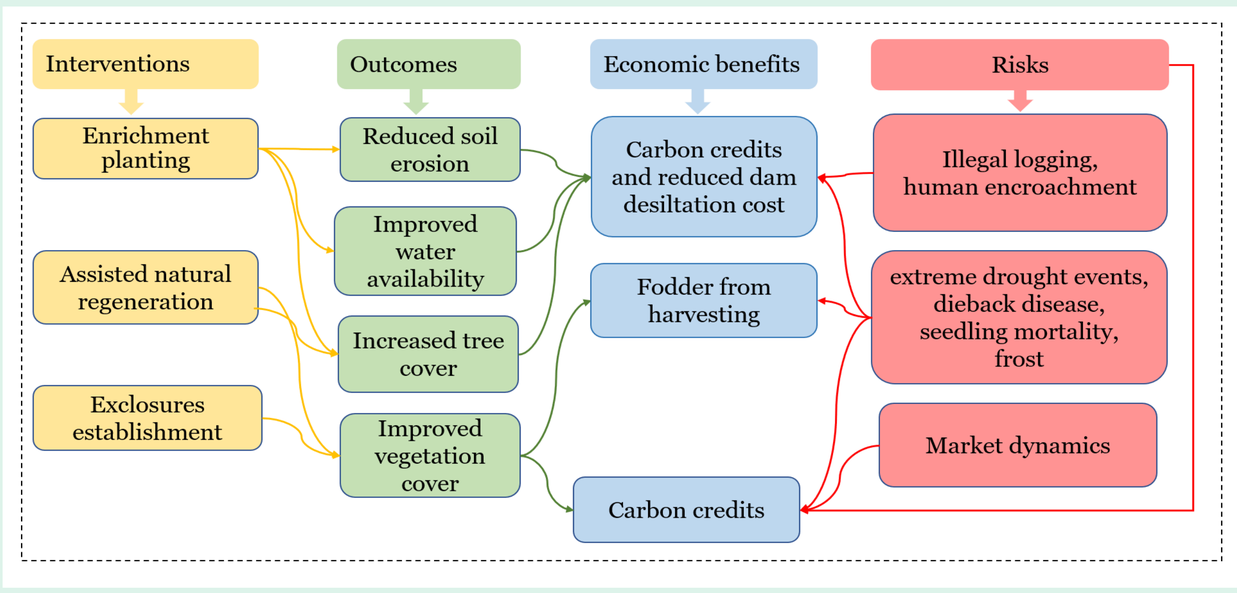
Results

Stakeholder-identified benefits of restoration

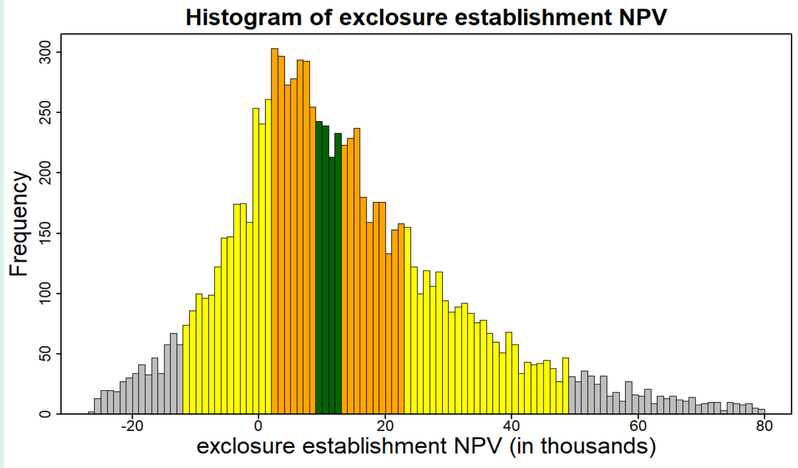
- Communal revenue from sale of carbon credits
- Soil and water conservation
- Improved tree and vegetation cover

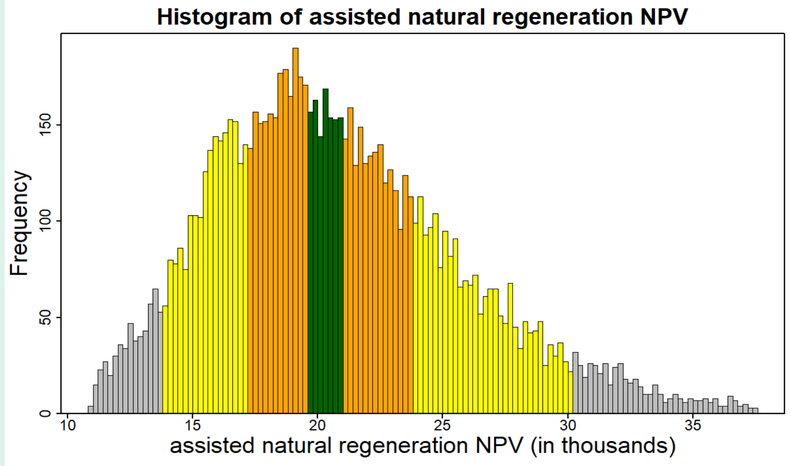
Stakeholder-identified risks of restoration

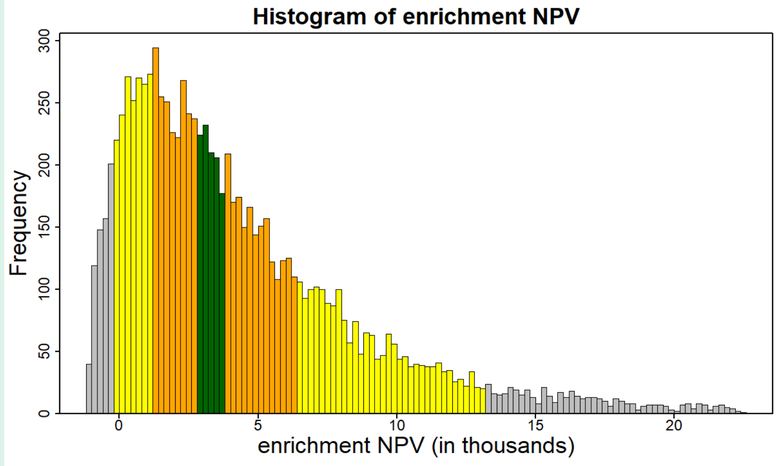
- Anthropogenic risks
- Carbon market risks
- Natural risks



Conceptual model of the interventions’ impact pathways highlighting the benefits and risks variables of FLR which were identified in consultation with local stakeholders.







Projected returns (Net Present Value; NPV) from grassland exclosure management, assisted natural regeneration and enrichment planting in a 25-year horizon showed a greater than 77% likelihood of success for all 3 cases.

Implication: We found a high likelihood of success in reversing degradation in the long-term. However, we also projected net losses in the short-term due to high initial costs of mobilizing communities, strengthening social governance structures and capacity building.[2]

FLR actors need significant upfront financial support to see their interventions through to the medium and long term.

References

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