3.5.0

SERIES 3
Building Resilience

INTRODUCTION TO COST-BENEFIT ANALYSIS

CLIMATE RESILIENCE FRAMEWORK
ISET-INTERNATIONAL

Contents of Set

3.5.0: Guide

This guide describes what Cost-Benefit Analysis (CBA) is and explores two approaches to CBA: adaptation of a traditional quantitative CBA to climate risk related interventions (Set 3.7); and participatory CBA (Set 3.6). It also discusses the limitations of CBA and how supplementary methodologies can overcome these shortcomings. In these materials, we do not go into detail on how to conduct your CBA—that is covered in the following sets. Instead, this guide provides information on how to determine if CBA is useful to your process and if so, which type of CBA is most appropriate and what the scope of that analysis should be.

IN THIS SET YOU WILL:

- ✓ Be introduced to cost-benefit analysis;
- ✓ Decide whether to do a participatory analysis only, or whether you need both a qualitative participatory analysis and a quantitative analysis; and
- ✓ Learn about both participatory cost-benefit analysis and quantitative cost-benefit analysis and the differences between the two.

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Overview

Cost-benefit analysis is a process in which you compare the benefits (increases in human well-being) and the costs (reductions in human well-being) of implementing a specific project or policy. The use of cost-benefit analysis is to determine the overall economic benefit that would accrue to society if the project or policy were undertaken.

WHY COMPLETE A COST-BENEFIT ANALYSIS?

Cost-Benefit Analysis (CBA) is generally necessary to secure funding for, or justify the implementation of or decision not to implement, a project. Most people use cost-benefit analysis to:

1. Help identify which project, among a collection of proposed projects, will have the most positive impact on society.
2. Determine long-term costs and benefits of a project.
3. Identify key areas of risk.
4. Provide justification to funding entities (private or non-private) that the project you are undertaking has a realizable return either financially or for society.

There are many opportunities to use cost-benefit analysis and many variations that are used in different situations. If you have a number of options and cannot adequately identify a solution, cost-benefit analysis provides a logical way to evaluate the project or projects from multiple angles. In addition, funding agencies often ask funding recipients to justify the payback of their investment. Cost benefit analysis is a systematic, widely accepted approach to generate payback information. However, cost-benefit analysis is most useful in situations where there is a comparison being made. For example, building a raised transportation system for the city could be compared to what it would cost not to raise the transportation system. The value in cost-benefit analysis is to find the best solution and requires analysis of all agreed upon ideas.

It is important to note, though, that CBA should not be used as the only analysis informing your decision-making. Often, impacts to society or the environment, either positive or negative, are not included in the CBA analysis. This is particularly true of quantitative cost-benefit analysis where there is no standard way to identify the financial value of things like a life, a livelihood, or a healthy forest. The value of these things is highly dependent on who you are and how you live. Clearly, this information should be considered when a project is evaluated for implementation.

WHAT TYPE OF CBA?

Most cost-benefit analyses use a quantitative approach. However, this requires a significant amount of data, time, and technical expertise to complete, and is consequently expensive and time consuming to implement. To address the need for a simple way to evaluate cost-benefit in situations where data, time, money or technical expertise is limited and where community input is critical for evaluating social and environmental impacts, ISET has created a participatory cost-benefit analysis. The basic characteristics of each of these approaches are given below:

PARTICIPATORY COST-BENEFIT ANALYSIS

Participatory cost-benefit analysis is a qualitative analysis that captures information that is often unavailable from traditional data sources. It ensures that financial, social and environmental benefits and costs of an activity are identified. It can be implemented quickly and easily, requiring little or no data and instead relying on the knowledge and opinions of the stakeholders that will be impacted by the decision. In working together to complete a participatory CBA, the stakeholders involved not only identify the benefits and costs of proposed options, but also learn about and negotiate the implications of the different options and how those implications should be valued. Participatory cost-benefit analysis can be used to initiate discussions with diverse groups of stakeholders and can be facilitated during shared learning processes. Finally, unlike traditional cost-benefit analyses, a participatory cost-benefit analysis identifies the benefits and costs to most parties impacted by that policy, project, etc. (for more information concerning this see page 4, viewpoints). This is generally not possible in a desk study.

TRADITIONAL, QUANTITATIVE COST-BENEFIT ANALYSIS FOR CLIMATE RISK REDUCTION

Traditional cost-benefit analysis is a quantitative analysis in which costs related to a certain investment are quantified and compared to total benefit derived from that investment. This is a time consuming and data intensive process. Climate risk reduction cost-benefit analysis adds additional complexity to this process. Although costs are calculated in the same manner as any other investment, benefits are measured in terms of damages avoided if that intervention is implemented. To do this, one needs to: know the historic and projected future frequency of climate hazard events; know the damages associated with various intensities of past events; know the potential intensity of future events; and estimate potential future damages associated with those event intensities. This requires additional expertise, data and analysis time.

Overall, participatory CBA is highly recommended for everyone. It's quick, it's inexpensive, and it usually generates new

Limitations of Cost-Benefit Analysis

Cost-Benefit Analysis is a tool that can support decision-making, but it has many limitations.

It is important that you be aware of these limitations before you use cost-benefit analysis results in your decision process.

Assumptions. Most cost-benefit analyses are based on a series of assumptions. It is important that those assumptions are clearly stated and understood by anyone using the analysis. For example, one assumption might be the timeline of the project. A dam might have a 25-year project life, or a 50-year project life. Both numbers are critical to projected yearly costs and benefits. At fifty years, the payback of the investment might never make it viable. Another example might be how data limitations are handled. For example, data about household losses during a flooding event that are available for only one city might be used to characterize losses for the entire province, which could easily over- or under-estimate losses if applied by someone unfamiliar with actual conditions in the province. These assumptions need to be clearly stated.

Viewpoints. Cost benefit analysis evaluates benefits to society, but "benefit" can be considered from many viewpoints and the cost-benefit analysis is likely to only use one viewpoint. Consequently, it is important to understand from whose view the analysis was completed or whose view the analysis left out.

Data limitations. Cost benefit analysis is data dependent. When data is unavailable, it is sometime left out or not considered. It is important to understand the data requirements of cost-benefit analysis, what data has been used in the analysis, and what details may have been left out.

Valuing non-monetary items. Valuation techniques have been created to identify many non-market items and place them into monetary terms. For example, the value of a state park might be considered as the value one-person is willing to pay to visit that state park. Be aware of how the analyst conducts valuation, whether they have included non-monetary values, and if so, how they have valued them.

Discount rate. This discount rate is a critical item in cost-benefit analysis. It allows the projected year values to be placed into real time information. This discount rate, however, varies and can differ from project to project. The higher the discount rate, usually the lower return. Therefore, understanding the discount rate effect is critical.

information about the project, the project impacts, who will or will not benefit, etc. However, it does not necessarily substitute for a quantitative CBA, though it can add to them. Set 3.6 will lead you through the process involved in implementing a participatory cost-benefit analysis.

Definitions Used in Cost-Benefit Analysis

Net Present Value (NPV) The NPV takes the net benefit (benefit minus cost) each year and discounts these to their present day value. If the result is greater than zero, this indicates that the benefits outweigh the costs. The higher the value, the greater the financial argument for initiating the project. A Project will just have one Net Present Value number. This project can be ranked against the alternatives that also have positive or negative NPVs.

Benefit-Cost Ratio (BCR) The BCR indicates how much benefit will accrue for every $1 of cost. A ratio greater than 1 indicates that the project is worth investing in from a financial perspective; anything less than one indicates a negative return. Projects can also be ranked by BCR.

Internal Rate of Return (IRR) The IRR is the rate of growth participating parties require to make the investment. It is often used when determining economic efficiency, is expressed as a percentage.

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Mr. Fawad Khan, senior economist based in Islamabad, has been collaborating with ISET-International on a number of projects since 2006. Mr. Fawad Khan has extensive experience working on the economics of major policy and implementation projects from his period as a staff member with the World Bank. Along with partners at IIASA he has also played a lead role in the methodology design and implementation of ISET-International's prior research on the costs and benefits of climate related disaster risk reduction interventions for the Risk to Resilience project. Formalities to establish ISET-Pakistan as an independent, sister organization to ISET, are ongoing. ISET's office in Islamabad can be found on the very preliminary website, still under construction: www.isetpk.org

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