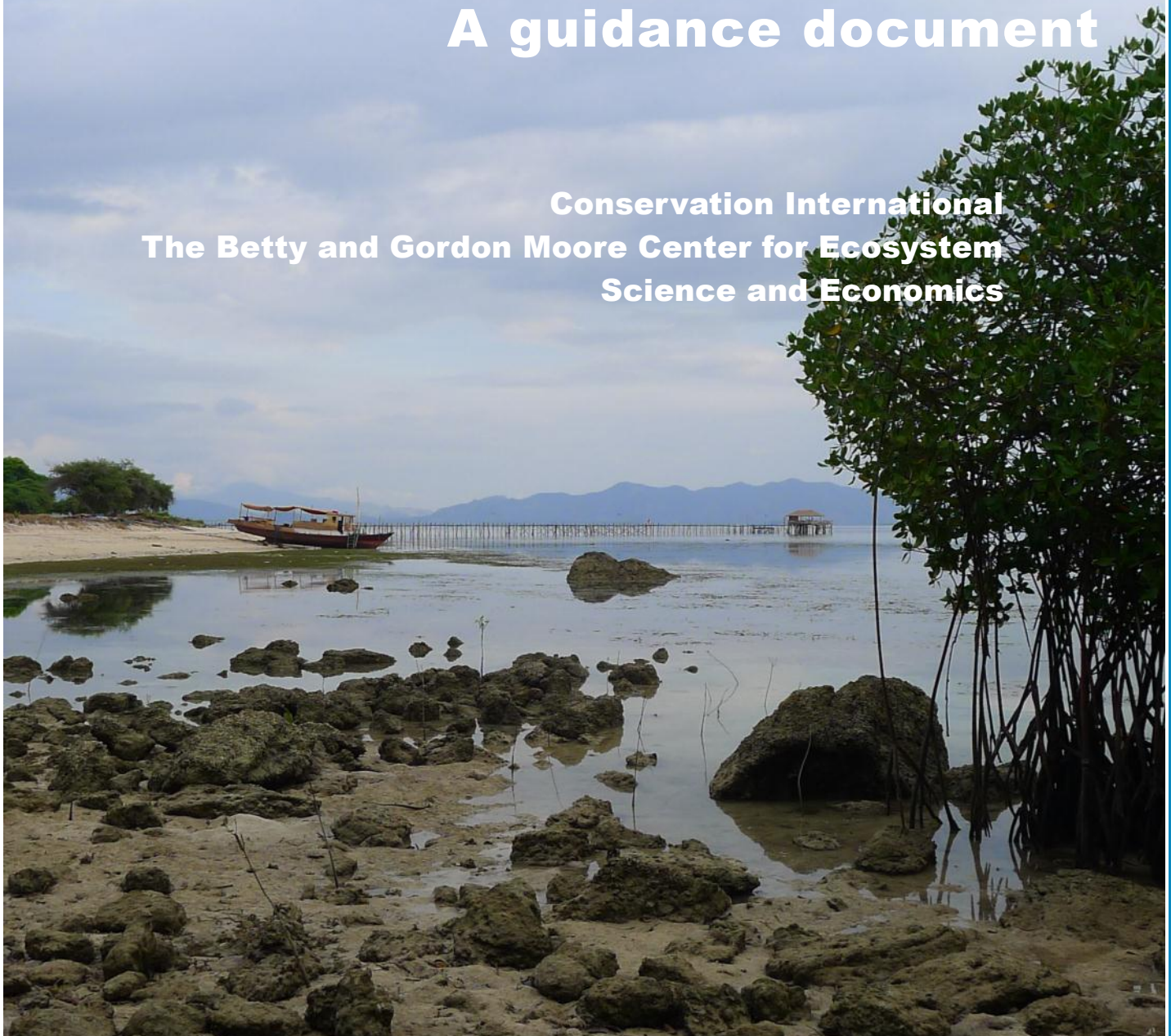


Constructing theories of change for ecosystem-based adaptation projects

A guidance document

Conservation International
The Betty and Gordon Moore Center for Ecosystem
Science and Economics



Federal Ministry for the
Environment, Nature Conservation
and Nuclear Safety

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Introduction

Despite considerable investment of time and resources over recent decades, there is limited knowledge about the overall **impact**¹ of adaptation efforts. This lack of certainty about effectiveness is due to a lack of scientific **evidence** which clearly demonstrates that adaptation efforts lead to desired **outcomes** for biodiversity, and due to little reporting or evaluation to generate better evidence. This issue only increases in importance where adaptation **interventions** seek not only to improve outcomes for human wellbeing, but also for biodiversity and ecosystems. Among such interventions with limited evidence are ecosystem-based approaches to adaptation (EbA²), a key strategy for addressing the adverse effects of climate change on vulnerable human communities through nature-based solutions.

To address this gap in evidence and to facilitate better decision making, consideration of monitoring and evaluation has rapidly increased in prominence across the conservation sector through the adoption of tools, methods and approaches from other sectors, in particular, public health, social work and education. One such tool, borrowed from community-based social change initiatives, is the **theory of change** approach which is a process used to support **project** planning and monitoring. This approach conceptualizes the overall **goal** for a project and the short, medium and long-term outcomes that are required to lead the project to this end.

In this document we provide project managers a step-by-step guide to constructing a theory of change with examples set in the context of Conservation International (CI)'s International Climate Initiative (ICI) project that is designing and implementing EbA interventions in three countries. The theory of change approach potentially has multiple benefits for application to EbA projects, including helping teams balance multiple objectives, understand relationships between different objectives and interventions, and deal with the time lags required to observe ecological and social change.

This document is split into two main parts. The first outlines the basic concept of the theory of change approach and its origins. It describes the key characteristics of the approach and the potential benefits of its application to project planning and evaluation. The second part of this guidance document outlines the steps to constructing a theory of change and practical recommendations for facilitating a workshop for a project team on this process. The steps are illustrated with examples from a project funded by BMU's ICI that is implemented by CI. Further reading and additional resources related to facilitation and development of theory of change models are provided in the Appendices.

¹ Terms highlighted in the text are defined in the Glossary in Box 1.

² Ecosystem-based Adaptation (EbA) integrates the use of biodiversity and ecosystem services into an overall strategy to help people adapt to the adverse impacts of climate change. It includes the sustainable management, conservation and restoration of ecosystems to provide services that help people adapt to both current climate variability, and climate change." CBD (2009)

The Theory of Change approach

Definition and origins

The theory of change approach is a process of project planning and evaluation which maps the relationship between a long-term **goal** of a project and the intermediate and early changes that are required to bring it about. It encourages a project team or group of stakeholders to explain how the project is understood to reach its goals, and the process through which changes will occur. The approach emphasizes the theory and **assumptions** underlying the pathway of change from the implementation of selected interventions and activities to intended **outcomes**.

The theory of change approach originated in the social services sector and was developed to support planning and evaluation of large-scale community change projects such as the delivery and effectiveness of family and child services. Community-based change initiatives often have ambitious goals and a complex set of interventions, and a theory of change approach has helped project managers to understand how and why a program works.

It has broad relevance for natural resource management projects due to its capacity to deal with complex strategies, participatory format and flexibility to address different contexts.

Purpose

A theory of change approach can serve multiple purposes at different stages of the project management cycle including:

- For strategic planning in guiding goal-setting and selection of interventions;
- For validation of existing project plans, to check alignment of stated goals with proposed project activities;
- As a communication tool to explain project priorities and management decisions;
- For evaluation, to assess progress of project interventions towards long-term goals.

Key characteristics

The theory of change approach is characterized by several key features that distinguish it from other planning or evaluation strategies, tools or methodologies:

- A structured and participatory process which guides project teams and/or groups of stakeholders to conceptualize and articulate the changes required to meet their long-term goals;
- Development of an **outcomes framework** - a mapping product that illustrates the intermediate steps required to achieve long-term goals from a set of interventions;
- The identification of **assumptions** that explain what is required to achieve the changes required;
- Elaboration of a set of **indicators** that are specific enough to track changes;
- Elaboration of a set of **activities** required to achieve the intermediate and long-term goals of the project

Box 1. Glossary of key terms

TERMS	DEFINITIONS
Activity	Specific actions implemented to bring about each of the outputs or outcomes on the pathway to change
Assumption	Statements that explain both the connections between the preconditions for long-term change that occur in the early and intermediate stages of the change process, and the expectations about how and why proposed interventions will bring them about
Evidence	Existing scientific information used for supporting decision making
Goal	Statements about what a project aims to achieve
Impact	The overall contribution of outcomes to the achievement of goals that can be attributed to a particular intervention
Indicator	Quantitative or qualitative variables used to assess change or occurrence of outputs or outcomes
Intervention	A process, often composed of multiple activities, implemented to reach the long-term outcomes of a project
Outcome	The effects or changes to ecological or social systems that result from project activities. The occurrence of specific outcomes, or preconditions, might be required before achievement of long-term outcomes is able to occur
Outcomes framework	An illustration which maps the relationships between a variety of outcomes from activities in meeting long term goals. Some outcomes are precursors to achievement of long-term outcomes
Output	Products or events produced by an activity
Pathway to change	A series of changes required to achieve long-term outcomes from implementation of project activities
Project	A distinct strategy planned and designed to meet specific goal(s). It is generally composed of a range of interventions with multiple activities implemented over the project timeframe
Target	A threshold or benchmark used to demonstrate progress or achievement of success
Theory of change	A specific and measurable conceptual model of the goals, interventions, assumptions, and outcomes of a project that forms the basis for strategic planning, on-going decision-making, monitoring and evaluation

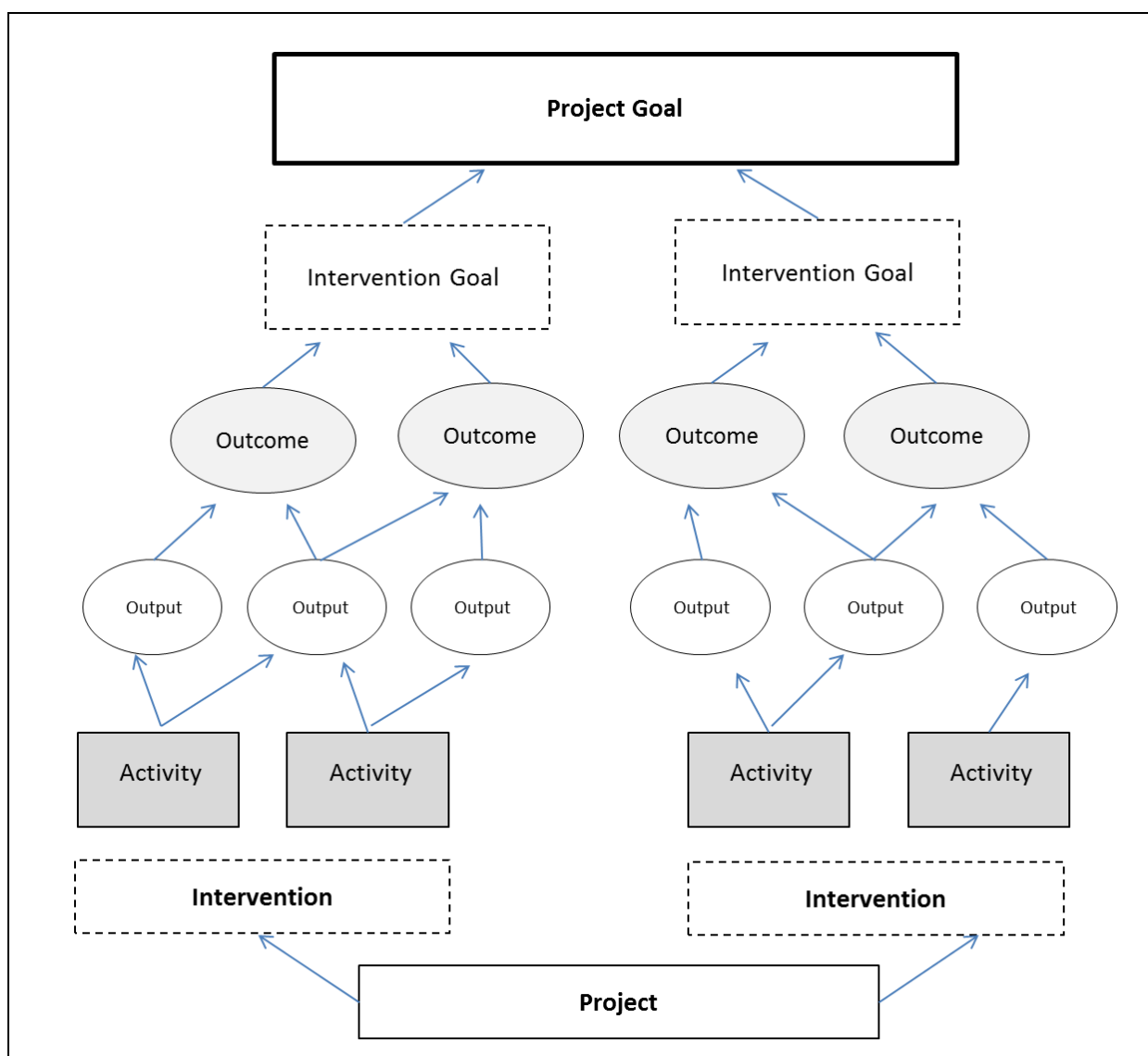


Figure 1. Generic outcomes framework showing key components of a theory of change model

Benefits and limitations

A theory of change approach can be a useful tool for the planning, management and monitoring of complex conservation and development projects. The process of developing a theory of change can be beneficial to the project team above and beyond the products produced through this approach by facilitating sharing of knowledge, developing a common vision of project goals and building a clear road map for how goals will be achieved, that is agreed upon by the whole team. However, the approach also has its shortcomings, including its reductionist view of complex problems and the dedicated time required to develop a theory of change, which project teams should be aware of before embarking on the process. In the section below, we summarize the range of benefits and limitations of a theory of change approach, with reference, in particular, to EbA projects.

Table 1. Benefits of using a theory of change approach across four categories of project management

Participation	Shared understanding of what the project is trying to accomplish
Planning and management	Assess feasibility of reaching goals
	Avoid implementing an activity that is unlikely to be effective
	Estimate length of time needed to reach goals
	Manage expectations about amount of work required to reach goals
	Identify conditions outside the project's control that affect outcomes
Project implementation	Implement appropriate activities at the right time in the right order
	Awareness of resources needed to implement an intervention
Monitoring and evaluation	Explain why an initiative worked or did not work
	Consensus on how success will be documented

Table 1 summarizes generic advantages of constructing theory of change models for project. Specific benefits for EbA projects include:

Balance multiple goals. EbA projects encompass both social and ecological goals which interact and may in certain circumstances conflict with each other. A theory of change model enables a project to illustrate the relationships between different goals and the activities required to achieve overall project success.

Understand uncertainty in decision-making. Evidence to support the key hypotheses underlying EbA is often limited and different methodologies and activities are largely untested. Stating intended results from chosen activities within a theory of change approach allows a project to clearly identify assumptions and the levels of uncertainty surrounding project decisions. This illustration might help a project team identify priorities for in-depth monitoring and evaluation where choices need to be validated.

Track progress towards long-term goals. The time lag between implementing a project activity and being able to observe an ecological or social outcome conceivably ranges from weeks to decades. For example, the restoration or rehabilitation of degraded mangroves may take ten or more years before they reach sufficient maturity (height and/or density) to reduce climate change driven increases in storm surge. A theory of change model enables projects to map short and intermediate-term outcomes in order to bring about more substantive outcomes that might be difficult to demonstrate within the project lifetime.

In describing the steps in constructing theory of change models (see next section), we highlight specific challenges that might be encountered during the process. There are, however, several broader limitations to using this approach which project teams should consider before embarking on a theory of change process.



Photo: Coastline with scattered stands of mangroves

Theory of change models often have a tendency to fit a linear trajectory due to the two-dimensional format of how theories of change are illustrated. In reality, the process of moving through different steps of a project will occur with a series of feedbacks and interactions between different activities and outcomes. Theory of change models are therefore constrained by the tools available to illustrate the connections between various components of the model. The integration of dependencies, feedbacks and overall timing into a linear results chain can therefore be challenging.

On the one hand, the simplicity of a theory of change is seen as a benefit of the approach. On the other hand, critics argue that a theory of change can seem reductionist or over-simplify complex problems.

Inevitably, the quality of the theory of change depends on the strength and quality of the data used to construct it. The theory of change is only an illustrative representation of our current state of knowledge of a system and the factors that influence effectiveness of different activities in bringing about changes.



Photo: Coastal mangrove and coral reef

A step-by-step guide to constructing a theory of change

The following section describes in detail what is needed to prepare a theory of change through a participatory session with a project team and the key considerations required throughout the process. The process of constructing of a theory of change involves five main steps. The process is illustrated here in a linear fashion, but it is recommended to revisit previous steps as new knowledge is gained throughout the process.

Step 1.	Defining long-term goal(s) of project
Step 2.	Mapping the pathway to change: Building an outcomes framework
Step 3.	Identifying indicators to track progress
Step 4.	Selecting a set of activities
Step 5.	Articulating key assumptions

Too often, project teams decide which activities they want to do (Step 4) before clearly defining the goals of the project (Step 1) or how they expect to progress towards these goals through a series of short and intermediate changes (Step 2). In the steps below, we describe the benefits of scoping goals and intended outcomes *first*, before identifying activities intended to achieve these outcomes.

The steps are illustrated with examples from a project funded by BMU's International Climate Initiative (ICI) that is implemented by CI which addresses EbA in three countries including in the context of coastal protection among coastal communities in the Philippines.

Step 1.

Define long-term goal(s) of project

The theory of change approach is essentially an explanation of how a project team and relevant stakeholders expect to reach a commonly understood, long-term goal. The project goal represents the ultimate vision of what the project intends to achieve. Outcomes are changes to ecological or social systems which reflect achievement of stated goals.

In reality, many conservation and development projects have multiple goals or outcome(s), each of which would need to be mapped in the way described in this document. A project funded by BMU's ICI that is implemented by CI for example aims to achieve long-term changes to both social and ecological systems.

Examples of long-term goals for ecosystem-based adaptation projects:

- **Project level goal:** Reduce vulnerability of coastal communities in the Philippines to adverse effects of tropical cyclones
- **Intervention level goal:** By 2017, reduce vulnerability of 15% of smallholder farms to crop damage from storm surges

Goals might be stated quantitatively or qualitatively (see examples above). Whether quantitative **targets** are included, it is desirable for goals to be SMART or Specific, Measurable, Achievable, Realistic and Time-bound. Following SMART principles when setting goals will help frame a project that is not overly ambitious and has a higher likelihood of producing results. Dependent on the complexity of the project, qualitative goals might be set at the project level with more specific quantitative for specific interventions within the overall project. Ideally, goals should be nested as tiers to enable data aggregation and reporting at different scales.

It is often taken for granted that everyone involved in the project is in agreement about what the project goals are, but often in this step, different ideas about the purpose of the project are revealed. This step is therefore important for building consensus around a common vision about what the project expects to achieve. The theory of change approach also encourages the project team to be as specific as possible about their definition of the project's long-term outcome(s). Vague or overly-broad goal statements can make measurement difficult.

Step 2.

The pathway to change: Building an outcomes framework

This is the most time-intensive step in constructing a theory of change. This step involves the identification and organization of all outcomes necessary to achieve the long-term goal(s) defined in the previous step. Outcomes are changes that must occur prior to the achievement of the long-term goal. For example, a sufficient area of mangrove ecosystems in coastal Philippine communities needs to be rehabilitated or restored in order to realistically reduce potential damage to communities from storm surges. They might include **outputs**, which are short-term products or processes occurring during the life of the project. The outcomes framework maps the linear relationship, or **pathway to change**, linking the set of short, intermediate and long-term outcomes over time.

The outcomes framework also depicts relationships between long-, intermediate- and short-term outcomes and the activities applied as part of the project (Figure 2).

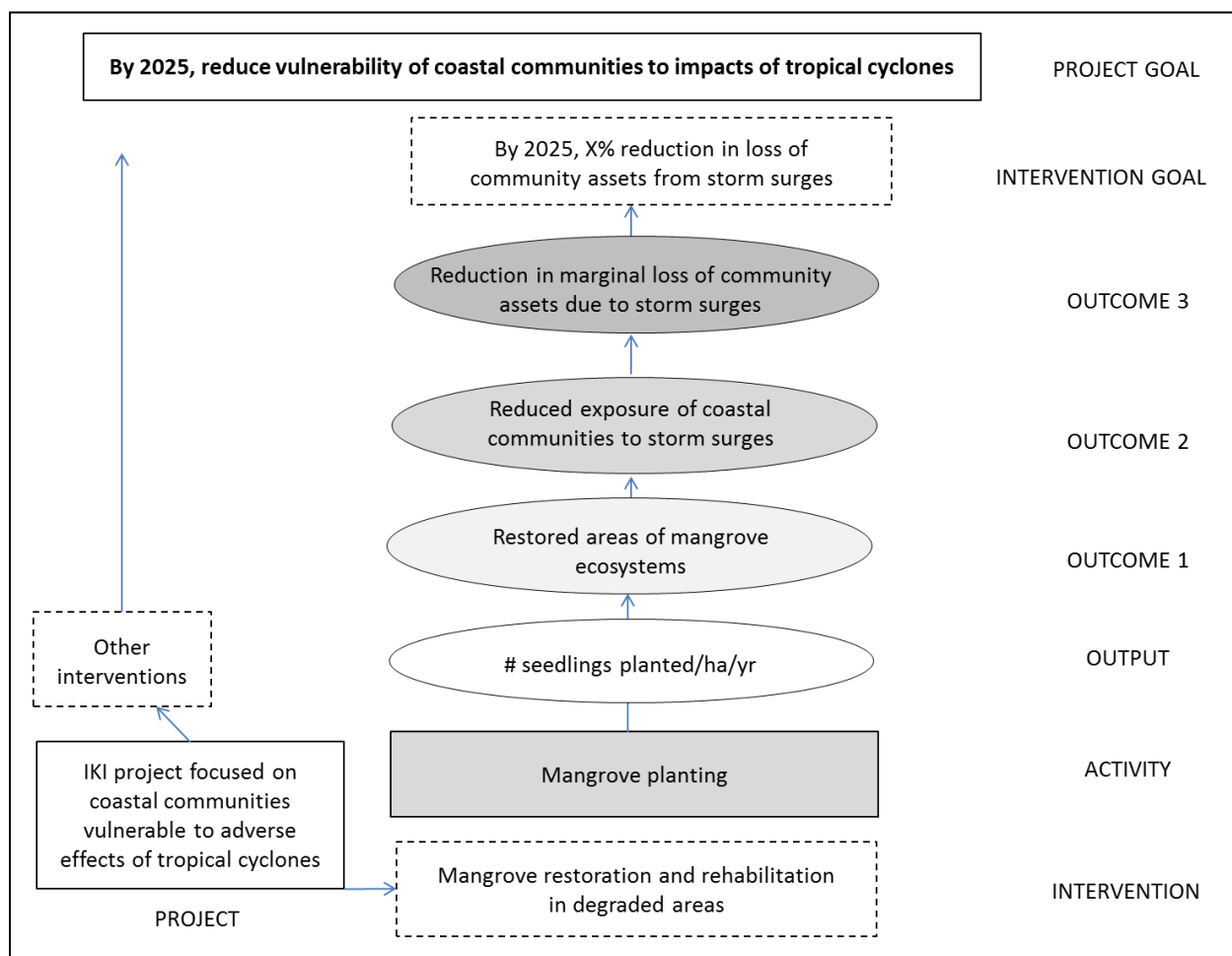


Figure 2. Outcomes framework for an IKI EbA project in the Philippines

It shows how outcomes are related to each other over the lifespan of the project. In the development of the pathway-to-change, it is useful to provide examples to help project teams understand the range of necessary and sufficient preconditions.

A step-by-step process called “backwards mapping” is ideally used to create the outcomes framework. In this process, the project team imagines that they are starting at the end of the project – with the successful achievement of the project goal – and walking backwards in their minds to the beginning – asking the following question over and over: “What are the preconditions required for the outcomes at this stage?” All outcomes illustrated in the framework are required to reach the project’s ultimate goals; without each in place, we assume that the project goals cannot be reached.

There are several advantages to identifying outcomes first rather than activities, as many projects usually do. First, the project team is able to see the big picture quickly which helps the team see how their early achievements eventually lead to longer term outcomes. Second, it enables the team to visualize what must change or be produced to reach goals before thinking about how to actually do it. Finally, projects are driven by the goals they seek to achieve, rather the activities they think they need to do. This approach helps the team to plan activities that bring about desired changes while being realistic about available resources.



Photo: Fishing boats in the Philippines

Step 3.

Identify indicators to monitor progress

For each outcome, the project team must ask “what evidence will we use to show that this outcome has been achieved?” Indicators are specific qualitative or quantitative variables used to track progress towards outcome achievement and to determine success of the project (Table 3). Outcomes monitoring, or the process of tracking indicators, differs from measurements of outputs alone (e.g., number of people attending a workshop; the production of a map). Measuring outputs tells us about what we do and who we reach, but not what difference we made. Outcomes monitoring therefore helps the project understand what changes occurred.

Table 3. Potential indicators for monitoring a specific outcome for an EbA project focused on mangrove restoration and rehabilitation

Outcome	Indicators	Unit of measurement	Frequency of monitoring
Restored areas of mangrove ecosystems	Growth rate of mangrove plants	Height (cm)	Quarterly
	Geographic extent of mangrove forest	Area (m ²)	Annual
	Rate of fuelwood collection by community	Volume (tons)	Annual

Actual measurement of indicators is often more difficult than identifying indicators. Often, teams choose indicators based upon the types of available data rather than the variable that is likely to tell them the most about whether the program was successful. As described in Table 3, in some circumstances it might be easier to monitor change in the rate of threatening processes (e.g., unsustainable harvesting of mangroves) rather than the conservation feature directly. Selection of indicators should not be constrained by data, but rather based upon the best way to document success.

The following questions might be considered in the development of an appropriate and measurable indicator:

Who or what is the target of the indicator?

e.g., stands of mangrove; households; fish population

How many will change?

e.g., extent of project area (hectares)

How much will it change by?

e.g., height of mangrove required to reduce storm surge

When will it change?

e.g., time required for sufficient regrowth of mangrove

How will we monitor the indicator?

Methodology: transect lines of planted areas of mangrove

Data collected: height of mangrove plants, density of mangrove stands

Timing: Annual monitoring

Staffing: Monitoring conducted by local community group

The types of indicators defined in a theory of change approach go beyond predicting an increase in something good or a decrease in something undesirable – instead these indicators try to define a level of detail that will be meaningful to the program stakeholders as benchmarks of progress. These details help the project team communicate in very specific ways how much change, how many people, and what timeframe will be useful as measures of a successful outcome.

Setting a quantitative target for each indicator, which represents a threshold demonstrating a meaningful change in specific variables targeted by the project, is important for demonstrating the effectiveness of activities and tracking progress towards longer term goals. Achievement of high-level outcomes might not occur for many years, and therefore more short-term milestones, represented by targets might help promote support for the project among stakeholders or help leverage further funding from donors. On the other hand, project teams can be hesitant to set quantitative targets which might be arbitrary or uninformed by data; yet without such a target it is unclear how project success is defined.

Step 4.

Select a set of project activities

Interventions are project-specific processes (e.g., mangrove restoration and rehabilitation), that might include one or more activities to bring about each outcome in the outcomes framework, required to achieve the project goals. Interventions might include a single activity or be as complex as an entire program (Figure 3). Activities include processes, actions or methods that are implemented to bring about specific measurable changes.

The theory of change approach focuses first on identifying all the outcomes for reaching a long-term goal. Only after these conditions have been identified and laid out in a change pathway can the appropriate actions be developed to bring them about. The outcomes depicted will drive the choice of activity as opposed to the other way around.

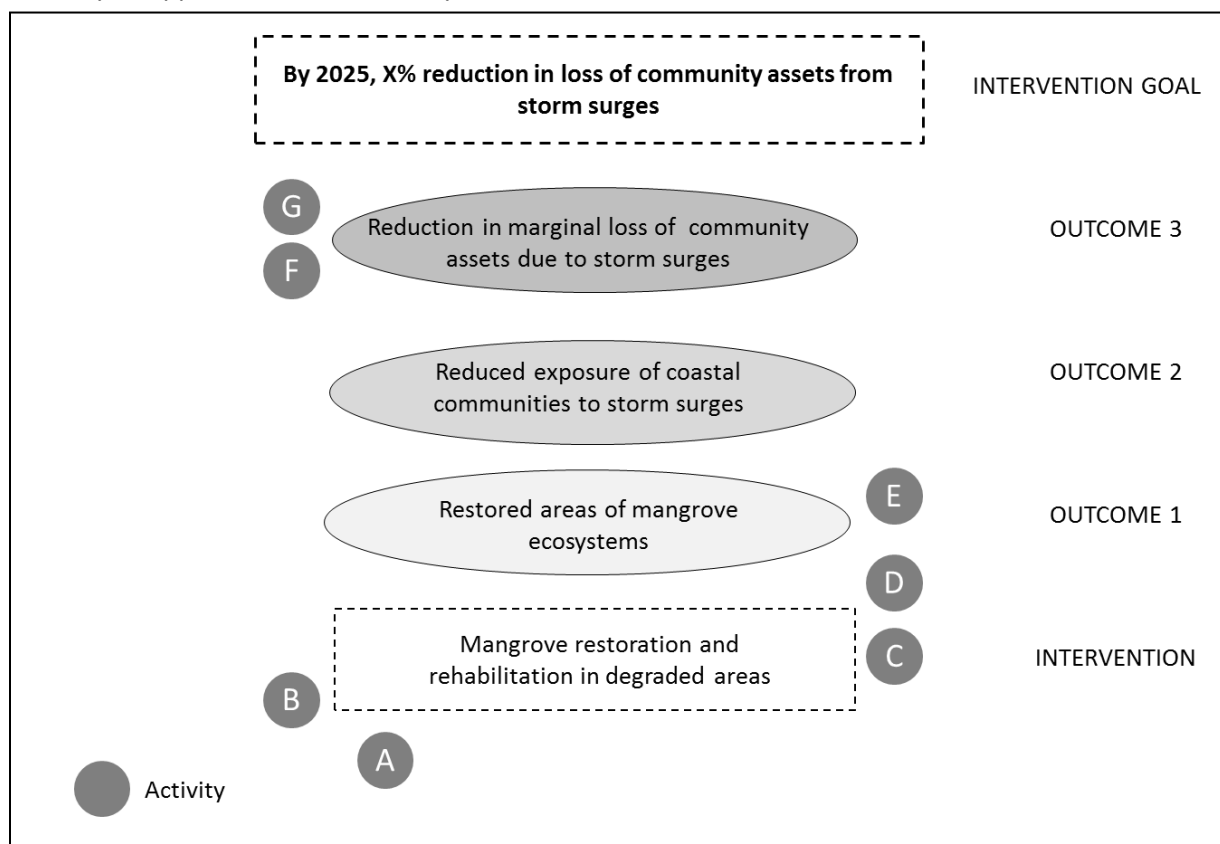


Figure 3. Outcomes framework outlining the range of activities required to implement a mangrove rehabilitation and restoration intervention in the Philippines. Different activities are highlighted as shaded circles and occur at different points in time. A list of corresponding activities is provided below.

Activities (shaded circles in Figure 3)

- A. Conduct vulnerability assessment to determine project site and project goals
- B. Baseline assessment of community assets including housing, cropland and livelihood resources
- C. Identify suitable areas within the site for mangrove planting
- D. Select appropriate species for planting
- E. Implement mangrove planting in selected areas
- F. Maintain planted areas (remove debris, monitor status annually)
- G. Monitoring of damage and asset loss following storm(s) year to year

Each activity in a theory of change must be linked to required outcomes and must not conflict with the assumptions that have been articulated. Monitoring is therefore need to test our assumptions about the effectiveness of an activity in achieving an outcome.



Photo: Fisherman in coastal mangroves, Philippines

Step 5.

Articulate key assumptions

Assumptions explain the underlying logic behind our expectations of the connections between different components of the pathway-of-change. They represent a set of beliefs that guide decisions – and ideally should be supported by scientific research, best practices or expert knowledge.

Assumptions describe both the relationship between activities and the long-term changes that occur in the early and intermediate stages of the change process, and the expectations about how and why proposed activities will bring them about. In addition, they also substantiate the claim that all of the important preconditions for success have been identified.

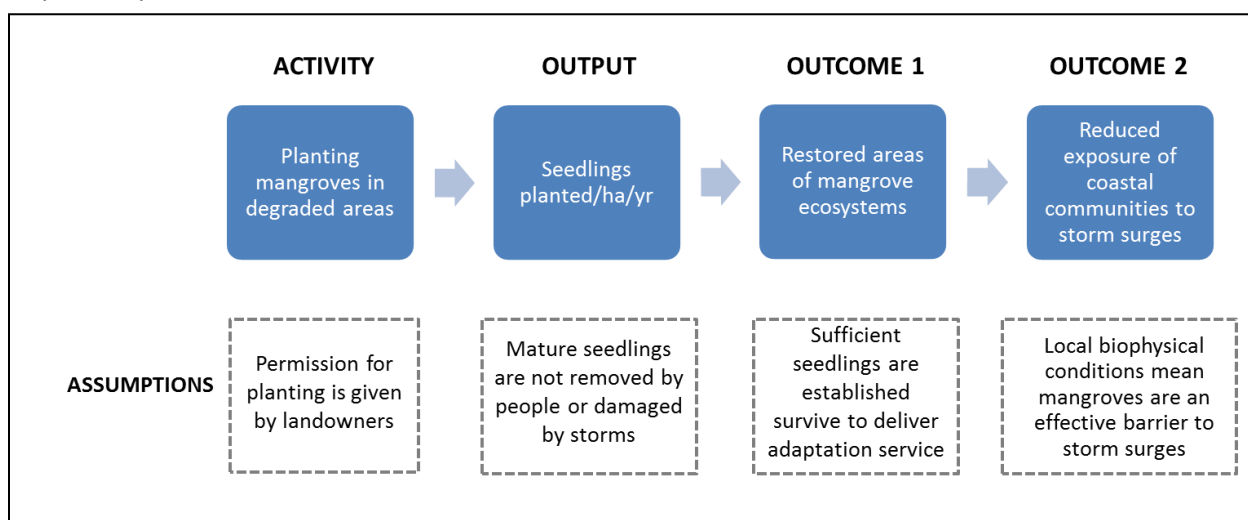


Figure 4. Assumptions made in constructing theory of change with examples from an EbA project in the Philippines

Assumptions are used to justify the choice of planned activities intended to bring about the outcomes in the path and to articulate constraints in the environment that may hinder or promote the achievement of the long-term goal(s). Assumptions should tell the story about how and why planners expect change to occur as depicted in an outcomes framework. Assumptions draw on theory from academic research or practice (Box 2) and their articulation is particularly important where the success of an intervention relies on often complex and sometimes poorly understood relationships between, for example, social and ecological systems. It is also possible to test assumptions with field research, depending on funding and time constraints. Types of assumptions might be related to the presence of necessary resources or conditions required for activities to be effective (e.g., adequate budget to implement mangrove planting at all sites), or that progress in achieving long-term outcomes can be tracked quantitatively (e.g., biophysical service provided by mature mangrove plants in reducing storm surges is measurable year to year).

Long-term goals for EbA projects might only be achieved well beyond the project lifespan, since many changes to ecological and social systems are likely to occur with lengthy time lags. For example, mangrove forests may take a decade or more to reach maturity and provide 100% of their coastal protection services, meaning that an articulated goal of reducing vulnerability to storm surge will be delivered incrementally over that time period, rather than being an immediate and absolute consequence of a mangrove restoration and rehabilitation intervention. Clearly articulating assumptions about how long-term impacts are expected to occur, based on the choice of interventions and early and intermediate outcomes, is a critical step in facilitating monitoring of the contribution of an EbA project after the project activities are complete.

During the process of creating the outcomes framework, participants are required to articulate as many of their assumptions about the change process as they are able (e.g., assumptions for interventions, outputs and outcomes), so that these can be examined and even tested to determine if any key assumptions are hard to support (or even false).

Box 2. Existing evidence supports assumptions about effectiveness of marine reserves

There is a widely held belief that marine reserves yield ecological benefits. The assumption exists that the establishment of a marine protected areas leads to reduced rates of overharvesting and greater persistence of fish stocks. This assumption has recently been supported by evidence from research into the effectiveness of marine protected areas. A review of 89 studies, for example, show that on average four biological measures (density, biomass, size of organisms, and diversity) are significantly higher inside reserves compared to outside (or after reserve establishment vs. before) (Halpern 2003). This evidence suggests that establishment of a marine reserve (intervention) is likely to lead to an improvement in one or more biological measures (outcome). Yet, there are further assumptions related to this evidence in terms of the design or size of the reserve for example.

Halpern, B. S. 2003. The impact of marine reserves: do reserves work and does reserve size matter? *Ecological Applications* **13**:S117-S137.



Photo: Turtle Islands Heritage Protected Area, Philippines

Conclusions

In this document, we have briefly outlined the key steps to constructing a theory of change model. A theory of change is a useful approach for planning, managing and monitoring the progress of a project towards its long-term goals. Application of a theory of change in supporting EbA projects is beneficial due to the complexity and uncertainty involved in implementing this conservation strategy. The theory of change approach generates a conceptual map which illustrates the pathway to change from activities to short-term outputs, intermediate and longer-term outcomes, and finally to goals. The process of articulating a theory of change by a project team can be as informative as the product itself by building consensus, improving knowledge of how activities link to results and providing clarity about assumptions being made. After going through the process, the project team should be on the same page about what the project intends to achieve, which activities are required, and what indicators are helpful for measuring and tracking progress towards long-term goals. Given the limited resources for ecosystem conservation and the urgent challenge of climate change, sound project planning and management, supported by a theory of change, is critical for achieving desired impacts.



Photo: Fishermen in the Philippines

Appendix 1. Additional resources

Anderson, A.A. 2004. Theory of change as a tool for strategic planning: A report on early experiences. The Aspen Institute: New York, NY.

Anderson, A.A. 2005. The Community Builder's approach to Theory of Change: A practical guide to theory development. The Aspen Institute: New York, NY.

Margoluis, R., C. Stem, N. Salafsky, and M. Brown. 2009. Using conceptual models as a planning and evaluation tool in conservation. *Evaluation and Program Planning* **32**:138-147.

Spearman, M. 2011. Making Adaptation Count: Concepts and options for monitoring and evaluation of climate change adaptation. World Resources Institute: Washington, D.C.

The Theory of Change Community - www.theoryofchange.org

Learning for Sustainability – www.learningforsustainability.net/evaluation/theoryofchange.php

Appendix 2. Managing a theory of change process

The process of developing a theory of change is often viewed to be as important as the products itself. Generally, the construction of a theory of change occurs during a series of structured, facilitated sessions with members of the project team. The purpose of these participatory sessions is to generate information, ask questions and build consensus about how the theory of change is conceptualized.

The steps laid out in this document encourage a participatory process rather than development in isolation of a theory of change by just one or two team members. The benefits of a more inclusive process are : 1) a shared vision for the project; 2) input of knowledge from different members - particularly important for complex, multi-objective or interdisciplinary projects; 3) a common understanding about what the project intends to do and how progress might be measured.

To facilitate a smooth and informative process, we have provided a few key tips on managing a participatory theory of change process:

1. Engage a facilitator, experienced with theory-of-change, to run the workshop, keep the team on track and help the team consider questions at each stage;
2. Circulate background information on theory-of-change (such as this document or those listed in Appendix 1) to the project team. It is preferable if the team (or at least some members) are familiar with the theory of change concept prior to involvement with the process;
3. Prepare any available project documents, such as original proposals, presentations and background literature, which might be useful for informing discussion and clarifying the scope of work
4. Provide a training session on theory of change to the project team ;
5. If the project team is large, develop the outcomes framework with a small subset of the team and then present to larger project team for their feedback and input

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Photo: Fishermen, Turtle Islands Heritage Protected Area, Philippines

Contact:

Name: Madeleine McKinnon

Mailing address: 2011 Crystal Drive, Suite 500 Arlington VA 22202 USA

Tel: 1(703) 341-2400

E-mail: m.mckinnon@conservation.org

Web: www.conservation.org

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