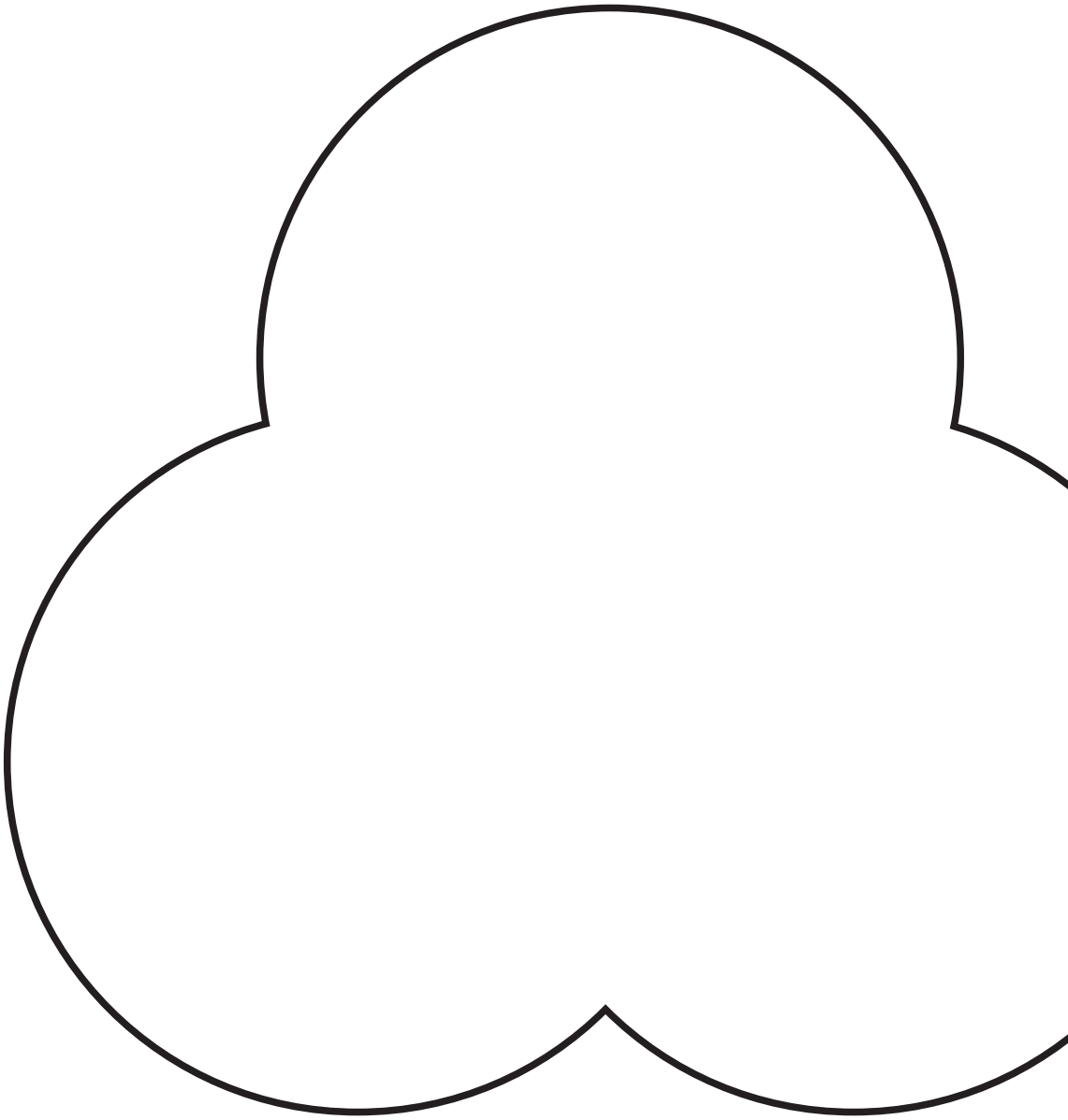

Simplified guidelines for Social Cost-Benefit Analysis of Climate Change adaptation projects on a local scale

Simplified guidelines for Social Cost-Benefit Analysis of Climate Change adaptation projects on a local scale

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Introduction

Why Cost-Benefit Analysis?

Cost-Benefit Analysis (CBA) is one of the major tools used to analyse the relative efficacy and effectiveness of public interventions. Typically, CBA allows the return-on-investment (ROI) of different projects, programmes or policies to be compared in order to determine which of the interventions yields the greater level of benefits in relation to the resources invested. In the case of climate change adaptation interventions as well as development policies, CBA can be used to identify which approach and/or strategies can yield the higher possible returns for a given amount of costs. Given that a variety of adaptation and development approaches are being tested, it is indeed important to know to which of these are the most efficient and effective in generating high benefits for the population and communities. Based on findings of CBA, it is thus possible to determine which interventions should be dropped in the favour of other, more effective, interventions.

In short, CBA is both an evaluative and a planning tool. It seeks to answer the following questions:

- Has an intervention delivered the intended change for the amount of resources invested?
- Would it be possible to generate more benefits for the same resources if another approach was chosen?
- In the future, should we choose to improve an intervention's approach or choose a different adaptation approach altogether?

Objectives of the guidance

Although CBA is a widely used tool for socio-economic appraisal and evaluation of interventions, there is a lack of capacity to undertake such analyses in developing countries – particularly at a local level. Nonetheless CBA can be a powerful tool for local governments and NGOs in developing countries in order to select, eliminate, or improve climate change adaptation and development approaches at a local and/or community-level. The data collection systems required for CBA can also provide useful information for planning, as well as self-standing indicators.

This guidance intends to build the capacity of local governments and NGOs to undertake such analyses, by presenting a simplified evaluative framework. It focuses primarily on climate change adaptation interventions, but can also be useful for appraising and evaluating development projects more broadly (e.g. health interventions, education programmes, etc.). This guidance follows a case-study approach whereby we present elements of our recent application of CBA to community-based adaptation in Niger in order to illustrate the process step-by-step.

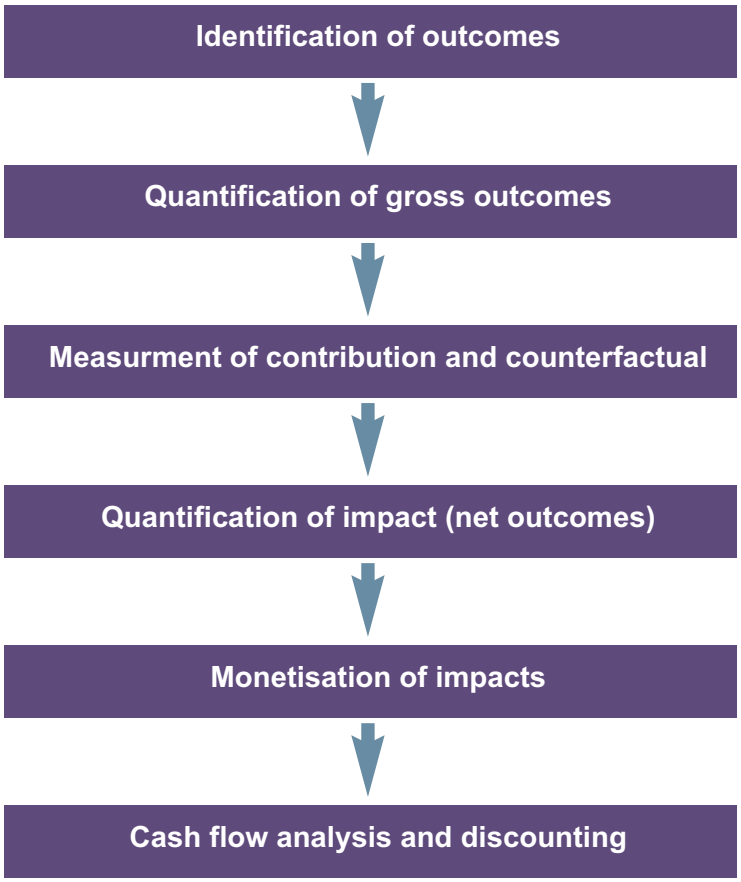
Structure of the guidance

This guidance is structured as follows: first it looks at the definition of a scope for CBA analysis; secondly it presents ways to determine outcomes and impacts (benefits) against which the success/failure of an intervention is to be evaluated and judged; thirdly it focuses on data collection systems required to monitor change of these outcomes in a useful and robust way; finally it presents how the actual quantitative analysis is undertaken.

An overview of CBA process

For the sake of simplicity CBA can be split into 6 distinct steps, as illustrated in Figure 1. Each step consists in the following:

Figure 1: The Cost-Benefit Analysis process



- **The identification of outcomes** (which can be positive or negative) is about understanding the type of changes that are occurring, or have occurred, since the beginning of an intervention (be it policy, programme or project). This exercise can be stakeholder-based (i.e. asking stakeholders to express what is changing and how) or desk-based, in the case one aims to test a pre-defined hypothesis. For example, if one thinks that an intervention should be expected to increase income diversification, then one might test the hypothesis that incomes are diversifying regardless of whether stakeholders identify this change as significant/important to them. However, the most robust identification process is done by engaging with stakeholders who are expected to experience a change.
- **The quantification of gross outcomes** is about measuring the change that has occurred for each outcome separately. This measurement has to be quantitative. If dealing with qualitative change (e.g. gender empowerment), the latter is still expressed in quantitative terms, for instance by using an indicator for that outcome, and measuring it using a scale. For example, in the case of increased agency and participation of women, a scale of 0 to 10 might be used

when asking women to rank the extent to which they feel they participate in community decisions now compared to when the programme started. The quantitative change derived from this second step is a so-called 'gross' change, because it does not take into account the other factors and other actors that might have contributed in generating the change observed.

- The **counterfactual and attribution** must be measured in order to grasp the 'net' change i.e. the change that can be specifically attributed to the intervention you are analysing. The counterfactual is the amount of change that might have occurred anyway, regardless of your intervention. It is also called 'business-as-usual'. Measuring attribution is useful for multi-actor interventions. For instance, an INGO might be working with local partners to implement the intervention in question. Thereafter, the question is how much change can be attributed 1) to the INGO and 2) to local partners. Similarly, an INGO might leverage resources to 'buy in' to a programme. For example, an INGO and the State can reach an agreement for communities to access specific public services or have access to goods, such as improved crop varieties. In this case it is also necessary to understand the amount of the change in agricultural production that can be attributed to the INGO and to the State in question, respectively. Sometimes the counterfactual and attribution are analysed together as a whole. This happens when there are no multiple actors.
- Once you are able to measure the counterfactual and attribution, you can **determine the net change, also called 'impact'**. The impact is equal to the gross change minus the percentage that can be attributed to other factors and actors. You will therefore subtract the figures obtained through the second step in order to obtain the net change, i.e. to determine the impact of the intervention you are analysing.
- CBA requires a comparison between the costs of an intervention and its benefits. To compare both sides of the equation it is necessary to express both in a common unit. The unit used is money. This means that you will need to **translate all impacts into money**, regardless of whether these impacts are already expressed in monetary terms (such as increases in income or production) or not (such as improvements in ecosystem services or general well-being of stakeholders). This is sometimes the most challenging part of the analysis. Further resources are provided in the reference list.
- Finally, you will need to collate all data into a spreadsheet model. This model will **need to account for when in time the costs are borne, and the benefits accruing**. This is done on a year-by-year basis. You will then need to discount all costs and benefits arising into the future on order to obtain the present value of these costs and benefits (see 'Undertaking the quantitative analysis' below as well as the 'Further resources' section at the end of this Guidance). The results of this process will give you the net present value (equal to: present value of benefits minus the present value of costs) and the benefit: cost ratio (equal to: present value of benefits divided by the present value of costs). The criteria for an intervention to be considered effective is for the net present value to be >0 and the benefit: cost ratio to be >1.

The remaining sections of the Guidance deepen the process outlined in this section, by providing further information on how to collect the data required and how to process this data in a CBA model.

Identifying and defining outcomes and impacts

What are commonly referred to as 'benefits' in a CBA are in fact the outcomes and impacts of an intervention. In order to measure the benefits generated it is thus important to first understand – and measure – these outcomes and impacts.

Understanding the change experienced by stakeholders

Benefits can be assessed in two main ways:

(1) Analysts set the outcomes they want to consider in the analysis. In this case, the outcomes considered in a CBA are pre-determined, and the outcome measurement is undertaken only to validate the pre-defined hypothesis. If, for example, one considers that a climate change intervention should be considered to improve the health of stakeholders, then a health outcome (such as reduced morbidity) might be defined by the analyst himself – and subsequently empirically tested in the field.

(2) The alternative is to undertake empirical work and ask stakeholders to identify the changes they have experienced themselves. In this case, the outcomes considered in the analysis are not pre-determined. Taking the previous example, stakeholders might not consider that they have experienced a change in health and thus the latter will not be included in the analysis. This approach is more bottom-up than the first approach.

The two options might respond to different situations. Option 1 might be necessary if a Donor (or the Central government) aims to understand the impact of an intervention relative to a set of pre-defined criteria. However, this option is also more prone to a top-down process which doesn't involve stakeholders in order to identify and understand changes from their point of view. Option 2, on the other hand, may be more useful in order to understand those changes which are not evident at first sight. Indeed, the stakeholder engagement process will often offer a better understanding of local dynamics, i.e. changes that might not have occurred to an analyst.

Overall, strict quantitative changes (changes in income, health conditions, education etc.) can usually be defined via Option 1. However, in order to understand less tangible outcomes and impacts it is often necessary to engage with stakeholders in order to comprehend the wider changes brought about by an intervention (through Option 2). Engaging with stakeholders can also prevent wasting time on understanding (or collecting data on) outcomes which may not be relevant.

Defining outcomes

Outcomes/benefits of an intervention may be tangible or intangible. Traditional CBA has often focused predominantly on tangible outcomes, such as evolutions of economic capital, such as production; and human capital, such as health and

education. More recently, environmental capital has been taken into account in CBAs undertaken by major donors. However, traditional CBA has disregarded less tangible benefits of interventions, such as social capital, institutional capital, the empowerment of women, and broader well-being (e.g. increased agency, self-confidence, etc.). However, it is acknowledged that adaptive capacity of communities can be heavily reliant on these less tangible components. As such, it is important to include them in a CBA if and when possible.

Table 1: Tangible vs. less tangible benefits

Examples of tangible benefits	Examples of less tangible benefits
Increased revenue	**Improved institutional capital**
Health improvement	**Improved social capital**
Educational improvement	**Empowerment**
Ecosystem improvement	**Agency and participation**
Infrastructure improvement	**Improvements in self-esteem, self-confidence and overall mental health**

Incorporating less tangible benefits into a CBA can be more challenging because there are no straightforward indicators allowing these qualitative changes to be translated in quantitative terms, which is a requirement if wanting to include these in a CBA. The objective of the following section is to focus on the creation and/or selection of outcome indicators.

Building outcome indicators

The outcomes of each intervention need to be benchmarked, so quantitative indicators can be built that will measure change which has occurred since the beginning of the intervention.

When selecting your indicators, it is important to check whether established indicators are already used recurrently in the international literature. It is also important to keep in mind that indicators may not reflect your outcome perfectly. For example, an indicator for improved child health might be the height and weight of children. Height and weight do not necessarily provide a complete illustration of improved health condition but are nonetheless internationally accepted as ‘proxy’ indicators for the health condition of children. Similarly, the number of extra school years gained might not perfectly reflect improved education and schooling but it is nonetheless a useful proxy indicator to reflect educational changes. In most cases, one or more ‘proxy’ indicators are used to evidence an outcome.

Examples of proxy indicators are provided in Table 2. As evidenced in Table 2, a scale was defined for those outcomes which are qualitative. This is done in order to quantify an inherently qualitative process.

Table 2: Examples of proxy indicators used in CBA of community-based adaptation in Niger

Type of outcome	Indicator for data collection
Economic	Net Income (net of indebtedness and investment) derived from agriculture and livestock plus savings. Evolution compared to baseline (year before the intervention starts).
Health	Quality-Adjusted Life Years (QALYs). Evolution compared to baseline (year before the intervention starts).
Education	Number of children attending school > 6 months per year. Empirical data used to estimate extra school years gained. Evolution compared to baseline (year before the intervention starts).
Social capital	Number of persons in the 'solidarity network' of the household. Evolution compared to baseline (year before the intervention starts).
Gender (and institutional capital)	Five-point scale on the extent to which women have an influence on community and household decision-making. Evolution compared to baseline (year before the intervention starts).
Trust in adaptive capacity	Five point scale on the extent to which community members believe in their capacity and knowledge to establish resilience strategies in the future. Evolution compared to baseline (year before the intervention starts).
Avoided deforestation and reforestation	Number of trees planted or maintained since the beginning of the intervention.
Improved land management	Hectares of degraded lands restored since the beginning of the intervention.

The data collection process will assess the evolution of indicators (not outcomes, strictly speaking) since the beginning of an intervention. The survey questionnaire designed to collect this data will use these indicators to ask individuals/households/the community what they have observed (or not observed) about the outcomes. Collecting this data will allow you to measure the outcome evolution since the beginning of the intervention. A critical factor to remember is that CBA requires not only population coverage (such as: % number of households reporting an increase of income) but also the magnitude of the change (such as: how much has average income increased relative to baseline). Similarly, knowing that *x*% of households report an increase in their solidarity network is an insufficient indicator for quantitative techniques such as CBA. You will need to know how many extra persons (relative to baseline) there are, on average, in the solidarity networks of surveyed households. In short an outcome indicator will need to express both population coverage and the magnitude of the change they experience.

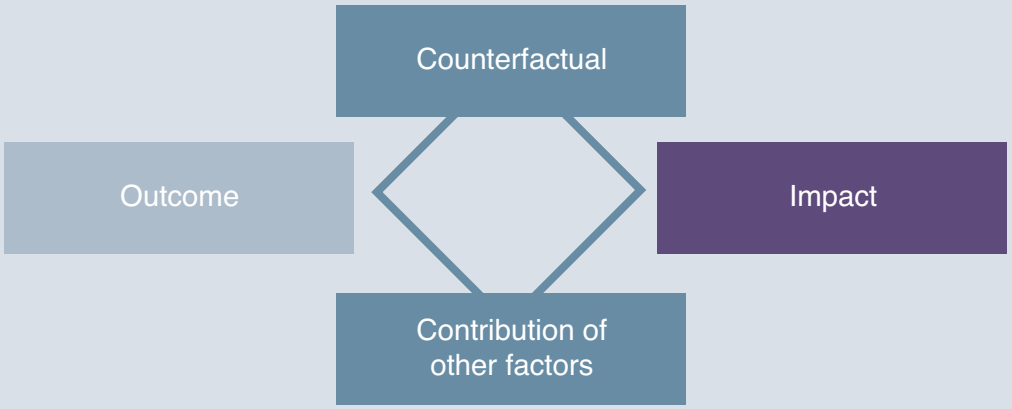
Finally, it is worth noting that you needn't analyse the outcomes of each one of your interventions separately (e.g. income increase as a consequence of warranting vs. income increase as a consequence of introduction of drought resistant crop varieties). You can also use aggregate outcome indicators, thus evaluating the mix of your activities in total – rather than the sub-components of your project or programme.

Understanding impact and additionality

The evolution across your outcome indicators will be able to show you the magnitude of change having occurred. However, the change having occurred is not necessarily down to your intervention (project or programme). Indeed, other factors and other actors might have contributed to the change you observe. It is thus necessary to capture the contribution of other factors and actors in creating this change for determining your net impact.

Box 1: Visual representation of outcomes vs. impacts

Impact is equal to outcome minus counterfactual minus the contribution of other actors



Outcomes can be defined as gross impacts (a simple evolution across time), while impacts as 'additional' benefits, i.e. benefits that are over and above the change that would have happened anyway, and factoring for the contribution of other actors (organisations, NGOs) in generating the observed change. In order to understand your impact, you will thus need to understand:

- What is the counterfactual scenario for the different types of outcomes considered in your analysis
- What is the contribution of other actors (e.g. other INGOs, local NGOs, community organizations etc.) to this outcome

Consider the example of agricultural revenue. In our work on ALP's impact in Niger, we found that agricultural revenue had increased by a total of USD 153,000 for our sample of four communities, since the beginning of the intervention. It is subsequently necessary to determine other factors that might have contributed to this evolution. Climatic factors, which influence agricultural yields, as well as other actors, such as other policy-makers, can contribute to this increase.

Capturing the counterfactual

There are four main approaches you can use to capture the counterfactual:

- **The hypothetical approach.** This approach simply uses extant data and literature available on a national level or regional/local level, to investigate the overall macro trend in which the intervention is being undertaken. This macro

trend can be, for example, a regional rate of deforestation, national/local rate of soil degradation, national/local rate of per capita GDP evolution, etc. When data is available, this is the easiest way to measure an assumptions-based counterfactual. The problem with this approach is that national data might be quite different to from local trends. In this case, a macro average will not be directly applicable to the communities in which you operate. This means you need to be careful when setting out your assumptions.

- **The before-and-after approach**. At the point when baseline data is collected, stakeholders are asked not only about their circumstance at that moment, but also about their past circumstance, say a year before. Consider an example whereby you are applying a baseline questionnaire in order to capture some key indicators, such as the number of livestock each future beneficiary has in his possession. In this case, you can also ask the beneficiary the number of livestock that he had one or two years before. This will provide you with a 'dynamic' trend, i.e. you will manage to capture an evolution happening before your organization enters the stage. The evident pitfall of this approach is that trends can change. For this reason, it is wiser to use this approach only for short-term purposes, e.g. for two- or three-year time spans.

- **The stakeholder-based approach**. Using this approach, you can ask stakeholders to tell you directly about the extent to which the changes observed are down to improvements brought about by your intervention or can be attributed to other factors. Using the example of agricultural revenues, these could be determined by, for example: (1) improvements in agricultural practices induced by your intervention; (2) weather conditions since the beginning of your intervention; (3) food prices prevailing since the beginning of your intervention. Box 2 shows an example of question which could be asked of stakeholders in order to gauge the % impact that the intervention might have had in increasing agricultural revenue. This approach has evident limits: it depends on stakeholder judgement, and thus assumes that respondents have all the available knowledge and information to answer accurately.

Box 2: An example of stakeholder-based counterfactual exercise

Please indicate by how much each of these factors have influenced your agricultural revenue since the beginning. Allocate 100 points among the following factors:

Factors	Points
The programme:	
Good weather conditions:	
High food prices:	
Other…	

The points allocated to other factors than the programme can be considered to be your counterfactual. It is the % of the change which would have happened anyway.

- **The comparative approach.** This approach consists of having a control group, for instance a nearby community, or non-targeted beneficiary groups within a same community. In this case, you will need to apply a questionnaire to the control group in order to elicit how it ranks relative to the same outcomes you are observing in your target group. This method, albeit more sophisticated, is not without problems. Firstly, there is an ethical (and equity) question mark over whether one should use other communities (non-beneficiary groups) as 'guinea pigs' for evidencing outcomes to your beneficiaries. Secondly, comparing two population groups can only be made completely robust by testing for other factors that could influence the results of your analysis. Are your beneficiaries better off because they participate in your intervention or is it because of other peculiarities and characteristics that they do not share with your comparison group? Answering this question can require statistical analysis (econometrics) for an elaborate answer.

Capturing the contribution of other actors

The most common way to measure the contribution of other actors in generating the outcomes you have identified is to combine the stakeholder-based counterfactual approach with an attribution exercise, as presented in Box 3. As a general rule, stakeholders are asked to list the organizations and factors they think have contributed to the outcome(s) in question.

Box 3: Combined stakeholder-based counterfactual and attribution exercise

Please indicate by how much each of these factors and actors have influenced your agricultural revenue since the beginning. Allocate 100 points among the following factors:

Factors	Points
The programme:	
Good weather conditions:	
High food prices:	
State support:	
Other INGO support:	
Other local NGO support:	
Etc.	

The points allocated to your programme can be considered to be the net benefit you have created, or put differently, your 'additional' impact.

This exercise entails inevitable biases, as it relies on the awareness of, and information available to, stakeholders. The alternative to this exercise is to estimate the amount of funds each actor had invested in the community or stakeholder group in question. Each actor will then be attributed the fraction of

benefits corresponding to the fraction of the investment made. However, this is also an imprecise way to understand contribution. Indeed, a high investment might be ineffective in affecting change, in the same way that a more modest (better designed) investment can create high benefits. Whichever approach is chosen, you will need to be aware of the limitations of respective exercises.

Setting data collection systems to measure and monitor change

Collecting outcome data

Collecting data for CBA can be done either by starting from the beginning of the intervention on an ongoing year-by-year basis, or in a retrospective way. Starting data collection at the beginning of the intervention on **an ongoing basis** can allow you to:

- Monitor change: an inherently useful process both for evaluating an intervention and planning the next steps in an intervention.
- Match baseline and evaluation data: this enables comparable data for the circumstances and outcomes of the stakeholder at the beginning of the intervention and after the intervention, which allows progress to be monitored.
- However, it renders a co-design of outcomes with stakeholders more difficult. Indeed, as change does not occur at the beginning of an intervention, stakeholders are not apt to identify it hypothetically.

It is worth mentioning that although baseline data is often collected at the beginning of an intervention, this does not mean the data is well-tailored to be used in a quantitative analysis such as CBA. As such, an on-going data collection system is synonymous with merging both exercises at the beginning of an intervention in order to have 1) data for planning purposes as well as 2) data for a subsequent socio-economic evaluation. Equally, whilst many organizations use impact assessment, the data used in these is rarely tailored for use in a CBA. Indeed, most impact assessments analyse outcome coverage (% of stakeholders reporting that…) rather than the outcome extent (% change experienced by the % of stakeholder reporting that…). If impact assessments were tailored to analyse both coverage and the 'distance travelled' by those experiencing the change, then duplication of data collection can be avoided.

A **retrospective ('before-and-after') analysis** is conducted when the outcomes are not monitored since the beginning of an intervention. In this case, you will need to ask stakeholders to answer retrospective questions relative to their condition prior to the intervention. You will then compare this with the answer to the same question at the time when applying the questionnaire (after the intervention has taken place).

Box 4: Retrospective stakeholder questions

	Questions to understand 'distance travelled' retrospectively	Outcome
Before	*On a scale of 0 to 10, how confident did you feel expressing your opinion in public prior to the intervention?*	*Improved agency and participation of women*
After	*On a scale of 0 to 10, how confident do you feel expressing your opinion in public today?*	

Further information on how to design and apply a retrospective questionnaire is available in the final section of the Guidance document ('Further resources').

Collecting counterfactual data

A simple stakeholder-based approach to collecting combined counterfactual and attribution data has been provided in the previous section. However, you might want to collect additional counterfactual data which is not based on stakeholder perceptions, especially in the context of climate change adaptation interventions.

Consider the following scenario: throughout the past three years, a programme has generated a 50% increase in agricultural production through the introduction of drought-resistant crops. You will need to know whether other factors have contributed to this increase. The factors can be: 1) food prices across these years; 2) rainfall across those years; 3) prices of agricultural inputs across those years; 4) locust invasion across those years. Sometimes, data collected by ministries of local governments can be available. However, more often than not, this data might represent aggregate national or regional conditions rather than local ones. As such, it might be important to monitor these evolutions at a local level (e.g. rainfall across these years at a community level). Recording these can then allow you to isolate these factors in order to grasp the % increase in production which is down to the intervention, over and above what would have happened anyway.

This type of hard data is difficult to obtain retrospectively if systems have not been in place since the beginning of the intervention. If primary data is unavailable you will need to rely on secondary data sources – which might not reflect well the local conditions across those years (e.g. average rainfall across the period etc.).

Even if choosing to use a stakeholder-based approach for analysing the counterfactual (as presented in the previous sections) these types of data might be useful in order to describe the evolution of climate and broader economic conditions across the period.

Undertaking the quantitative analysis

Once impacts (outcome changes net of counterfactual and contribution of other actors) are measured, you will need to 1) identify how these impacts are distributed across time on a year-by-year basis and 2) record all costs involved for delivering the intervention, including how these costs are distributed in time. These costs can be strictly financial (budget for delivery) or non-financial. The latter refers to costs to the community, for instance if beneficiaries are inputting resources into the intervention (such as purchasing seeds etc.). Ideally all costs should be recorded. However, if such information cannot be recorded then one can stick to financial costs only.

Recording how impacts (benefits) and costs are distributed across time will give you the cash-flow broken down by type of benefits and type of costs (see Figure 1). You can then calculate the total benefits and total costs across time. As mentioned above, CBA rests on the assumption that benefits and costs brought about after year 0 (the moment when the intervention starts) need to be discounted in order to reflect their present value (see 'Further Resources' at the end of this document for further explanations of the principles of discounting). In order to measure the present value, you can use an Excel formula.

As in the example below (see Table 3), you will create a final new column ('total present value'), and in each row you will select the cell and insert the following formula:

=NPV(discount rate, year 1, year 2 etc.).

The discount rate is expressed in form of a percentage (e.g. 3%, 5% etc.). It is good practice to test a variety of discount rates, as explained in the document available in the 'Further Resources' section below. You will then highlight the cash-flow for each benefit (or cost) component from the first year to the last year. Once you close the bracket in the formula and press enter, you will obtain the Present Value of the benefit (or cost) you are looking at. Once you repeat the same exercise for all benefits and costs, you can sum up respectively all the Present Value of benefits and all the Present Value of costs. Finally, dividing the Present value of the sum of benefits by the Present Value of the sum of costs will give you the Benefit-Cost Ratio (BCR). The BCR tells you how many $ are generated by the intervention for each $1 invested. In the example below the results tell us that for each $1 invested, $1.5 of benefits is generated by the intervention in question – across a time span of ten years.

Table 3: Calculating the total benefits and total costs across time

	Outcome	Indicator	Outcome incidence	Deadweight	Attribution	Net outcome incidence	Description of monetary proxy	Monetary value	TOTAL IMPACT PER ANNUM	0	1	2	3	4	5	6	7	8	9	10	PRESENT VALUE (0%)	PRESENT VALUE (3%)	PRESENT VALUE (10%)
ECONOMIC BENEFITS	Agricultural revenue	Net evolution of revenue	$153,274	0.27	0.53	$21,857	n/a	**n/a**	$21,857	$0	$21,857	$21,857	$21,857	$21,857	$21,857	$21,857	$21,857	$21,857	$21,857	$21,857	$65,572	$56,688	$46,873
	Livestock revenue	Net evolution of revenue	$74,398	0.27	0.53	$10,609	n/a	**n/a**	$10,609	$0	$10,609	$10,609	$10,609	$10,609	$10,609	$10,609	$10,609	$10,609	$10,609	$10,609	$31,828	$27,516	$22,752
	Total Savings (stock)	Stock of savings (money and nature/livestock)	$30,312	0.27	0.53	$4,323	n/a	**n/a**	$4,323	$0	$4,323	$4,323	$4,323	$4,323	$4,323	$4,323	$4,323	$4,323	$4,323	$4,323	$12,968	$11,211	$9,270
SOCIAL BENEFITS	Health	Quality Adjusted Life Years gained	$71	0.27	0.53	$10	Statistical value of life (average GDP per capita)	**$234.50**	$2,368	$0	$2,368	$2,368	$2,368	$2,368	$2,368	$2,368	$2,368	$2,368	$2,368	$2,368	$7,103	$6,141	$5,077
	Education	School-years gained	$93	0.27	0.53	$13	Average private returns to education (*) by income per capita	**$85.20**	$1,131	$0	$1,131	$1,131	$1,131	$1,131	$1,131	$1,131	$1,131	$1,131	$1,131	$1,131	$3,393	$2,933	$2,425
	Social capital	Additional funds provided to other community members	$60,014	0.27	0.55	$8,913	Value of goods donated to community per annum	**n/a**	$8,913	$0	$8,913	$8,913	$8,913	$8,913	$8,913	$8,913	$8,913	$8,913	$8,913	$8,913	$26,738	$23,116	$19,113
	Empowerment	Increased confidence in making adaptation decisions	$0	0.27	0.55	$0	Value of time spent for making community decisions (OC of time)	**$91.25**	$2,523	$0	$2,523	$2,523	$2,523	$2,523	$2,523	$2,523	$2,523	$2,523	$2,523	$2,523	$7,568	$6,543	$5,410
	Gender empowerment	Decision-making capacity within household	$0	0.27	0.55	$0	WTA exercise	**$487.50**	$5,660	$0	$5,660	$5,660	$5,660	$5,660	$5,660	$5,660	$5,660	$5,660	$5,660	$5,660	$16,982	$14,681	$12,139
ENVIRONMENTAL BENEFITS	Avoided land degradation	Hectares under improved land management	$1,576	0.27	0.60	$256	Average yields per hectare	**$77.79**	$19,890	$0	$19,890	$19,890	$19,890	$19,890	$19,890	$19,890	$19,890	$19,890	$19,890	$19,890	$59,670	$51,586	$42,654
	Avoided deforestation	Number of trees planted or maintained	$34,649	0.27	0.60	$5,623	Value of timber and fodder per tree + value of tCO2eq sequestrated	**$0.40**	$2,265	$0	$2,265	$2,265	$2,265	$2,265	$2,265	$2,265	$2,265	$2,265	$2,265	$2,265	$6,795	$5,874	$4,857
COSTS	Programmatic costs									$10,022	$13,102	$12,823	$10,449	$10,449							$46,395	$41,102	$35,160.
	Management costs									$1,503	$1,965	$1,923	$1,567	$1,567							$6,959	$6,165	$5,274

Useful resources and further reading

On social CBA and SROI

- Cost-benefit analysis (CBA) is the predominant tool used by economists to assess whether or not a project or policy should be undertaken. This briefing looks at how social considerations are incorporated into cost–benefit analysis, and describes the theory of Social Return on Investment (SROI) – a framework for incorporating 'wellbeing' impacts into such analyses.
  http://s.bsd.net/nefoundation/default/page/file/ff182a6ba487095ac6_yrm6bx9o6.pdf

On environmental valuation

- Unlike mainstream economics (which often disregards the environment's central role in our economy), both environmental and ecological economics argue that economic processes cannot be detached from the natural environment in which they operate. In this briefing, we discuss the different approaches that exist towards valuing nature, and the challenges inherent in doing so.
  http://s.bsd.net/nefoundation/default/page/file/d2e4b5d5f652b5428b_dxm6bn7nw.pdf

On discounting

- Cost–benefit analysis (CBA), social CBA and Social Return on Investment (SROI) do not simply involve listing the costs and benefits of a project over time and adding them up. They also involve considering how much the future impacts of a project are worth to us now – which is often a very different matter.
  http://www.neweconomics.org/page/-/publications/Economics_in_policymaking_Briefing_5.pdf

On retrospective data collection systems

- 'Pre and post: What's the difference?'
  http://www.human.cornell.edu/pam/outreach/parenting/research/upload/What-s-20the-20Difference-20Post-20then-20Pre-20and-20Pre-20then-20Post.pdf

- Retrospective data and measuring effectiveness:
  http://www.sageperformance.com/sites/default/files/kcfinder/4/files/Downloading/ProgramEffectiveness(1).pdf