Guideline to the DCED Standard for Results Measurement:
3b Estimating Attributable Changes

Nabanita Sen, June 2018

Where this Guideline fits in the Standard

The DCED Standard specifies seven elements of a successful results measurement system. This guide covers the second part of the third element; estimating attributable changes. For guidance on the first part of the third element (Measuring changes in indicators) and the other six elements of the Standard, visit the DCED website, or see these links.

1) Articulating the results chain
2) Defining indicators of change
3) Measuring attributable change
4) Capturing wider change in the system or market
5) Tracking costs and impact
6) Reporting results
7) Managing the system for results measurement

How to Use these Guidelines

This guideline is for programmes implementing the DCED Standard for Results Measurement in Private Sector Development. The DCED Standard provides a practical framework for programmes to monitor their progress towards their objectives, enabling them to better measure, manage and demonstrate results.

The Standard requires that programmes estimate attributable changes, using good practice. This guide provides advice explaining what that means in practice. The guideline also links to further guidance and resources.

By following this guideline, programmes can strengthen the quality of their results measurement system, and be better able to measure, manage, and demonstrate their results.

These guidelines are an updated version of the original guidelines developed in March 2013. The DCED periodically reviews and updates guidelines. If you have any suggestions or contributions, please email Admin@Enterprise-Development.org

Estimating Attributable Changes

Control Point 3.2: Monitoring information on all key indicators is collected (Must).

Compliance Criteria
- *… Attribution has been assessed.*

Control Point 3.3: Impact assessment is conducted to assess attributable changes in all key indicators in the results chain using methods that conform to established good practice (Must).

Compliance Criteria
- *… Attribution has been assessed.*

Attribution is defined by *Glossary of Key Terms* developed by the OECD DAC Network on Development Evaluation as the *ascription of a causal link between observed (or expected to be observed) changes and a specific intervention. Attribution refers to that which is to be credited for the observed changes or results achieved. It represents the extent to which observed development effects can be attributed to a specific intervention or to the performance of one or more partner taking account of other interventions, (anticipated or unanticipated) confounding factors, or external shocks[1].* In simple terms, attribution refers to the amount of change that is due to a particular intervention out of the total change that takes place. The proportion of the change can then be claimed for an intervention as a result of their work. It is also good practice, for programmes to report the contributions of others to changes.

When a project works in the real world, there are a lot of changes that may occur even without any influence from the project. This can be due, for example, to natural growth in the economy, influence from government, private stakeholders, work of other development initiatives etc. For instance, take a project that is working in the skills development industry with a private training centre to improve its carpentry training course. A student enrolled in the course can improve her skills by taking the training; she could also improve her skills through her own initiative (practice or learning from peers); she can improve by taking other courses offered in the market (other polytechnic institutes); or even by purchasing advanced machinery, which allows her to carve better quality products. These activities may all have a role in contributing to her improved skills and efficiency. However, the attributable change caused by the project is only that which occurred as a result of taking part in the training.

This diagram below further explains attribution. The blue (middle) line shows the change that occurs without the intervention. Using the example above, this is the improvements in the student's carpentry skills if the student did not attend the carpentry course supported by the project. The student's improved carpentry skills might be due to other activities such as the student attending other training and buying advanced machinery. This change that
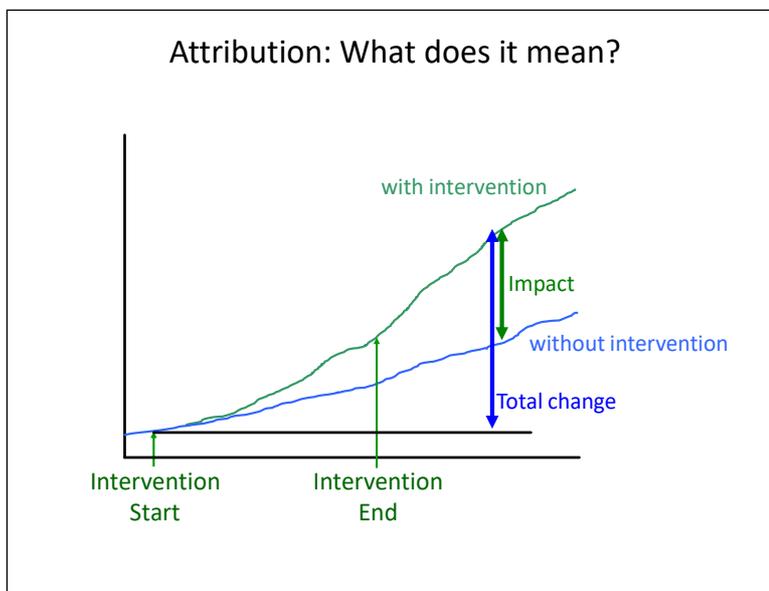
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[1] http://www.oecd.org/development/peer-reviews/2754804.pdf

happens without the intervention, shown by the blue, middle line is also known as the 'counterfactual;' i.e. the change that would have happened even without the intervention.

The green (top) line denotes the change that takes place as a result of the intervention. This is the change that occurs due to the student taking the carpentry course funded by the project. Thus, the total attributable change or impact of the intervention is the difference between the change that happens with the intervention and the change that would have occurred without the intervention.

Attribution: What does it mean?

with intervention

Impact

without intervention

Total change

Intervention Start

Intervention End

Contribution and Attribution

'Attribution' refers to the direct link between activities and outcomes; for instance X activity implemented by the project caused Z outcome to occur. 'Contribution' describes a link between an activity and outcomes but recognizes that other factors may have also contributed to the outcome, for instance X activity implemented by the project + Y activity not implemented by the project caused Z to occur. Determining attribution or contribution requires analysis of the relationship between an activity and an outcome, taking into account other factors that may have influenced the achievement of the outcome.

In the complex world of private sector development, attributing outcomes and impacts to activities can be challenging. Nonetheless, the DCED Standard proposes that programmes address the question of attribution to the extent possible. This is important, to demonstrate that the intervention was worth doing.

The Standard does not require scientific proof of attribution, such as that required in trials of new medicines, as this is not practical in development and within the resources of programs. Rather, the Standard advocates for a sensible approach, based on assessing changes at each step of the results chain and establishing if there are plausible causal links between each step using qualitative and quantitative evidence. Estimating what part of change is attributable to the program becomes important when external influence is likely. The Standard requires practical research to be conducted, which yields a reasonable estimate of attribution.

A related concept is that of 'additionality' - commonly used to refer to the question of whether the partner only implemented the intervention because of the programme. In a sense, therefore, it is attribution of changes of behaviour at the partner level, in contrast to attribution at the beneficiary level. The Standard requires programmes to address the

question of additionality, or attribution at the partner level. More on additionality can be found under DCED's 2014 guidance on [Demonstration Additionality in Private Sector Development Initiatives](#).

The starting point for assessing attribution must be a spirit of honest inquiry where a programme genuinely wants to find out to what extent changes have been due to an intervention and to what extent changes have been due to other factors. In other words, all programmes must provide a convincing case to justify why their beneficiaries would not have done equally well, if not better, without the intervention.

In order to measure attribution, a programme has to develop a strategy to show why change is happening.

Validating change steps in a results chain

The first step towards determining the attribution of a programme is to examine the different levels of change in a results chain[2] and whether the change that occurred was triggered by programme activities (see diagram). The results chain articulates how different activities conducted by a programme are expected to lead to different levels of change, ultimately leading to development impact.

Attribution: What to measure?

Questions:

To what extent did change 3 take place? To what extent was change 3 due to change 2?

To what extent did change 2 take place? To what extent was change 2 due to change 1?

To what extent did change 1 take place? To what extent was the change due to programme activities?

Change 3 ← Other influences

Change 2 ← Other influences

Change 1 ← Other influences

Activities

The diagram shows the project activities at the bottom and then the different tiers of change that were expected to occur. Attribution can be assessed by checking whether the chain of changes have indeed occurred as a result of project activities. If one level of changes has not occurred, and in effect the chain is broken, then even if there is a higher level of change cannot be attributed to the programme.

For example, a programme works with government extension workers, to improve the advice that they give to small-scale farmers. It is expected that the farmers will change their behaviour, as a direct result of the improved advice, and adopt better farming practices, which in turn will lead to an improvement in their productivity and hence an increase in their profits.

The programme needs to first show that the government extension workers are indeed giving improved advice to farmers, as a direct result of their activities. Then the programme needs to show that, after getting this improved advice from the extension workers, the

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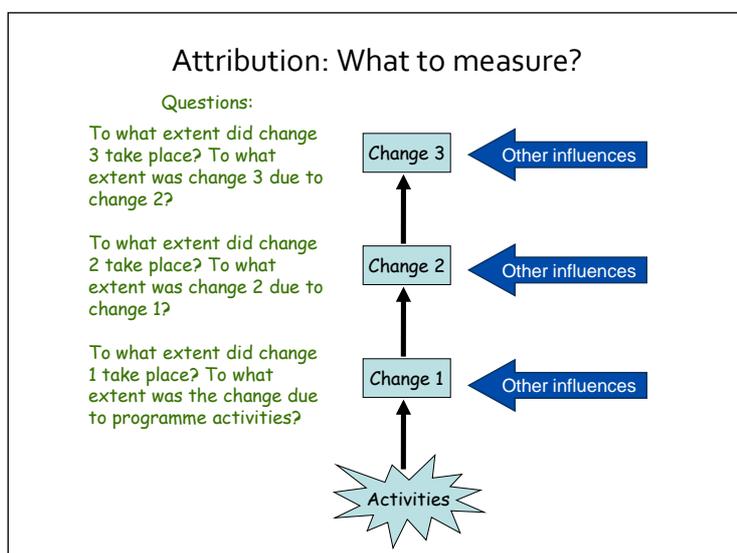
[2] For more details on results chains, refer to the DCED's Guide to Making Results Chains document: www.enterprise-development.org/wp-content/uploads/1_Implementation_Guidelines_Results_Chains.pdf

farmers change their behaviour, again as a direct result. Then the programme needs to show that the farmers achieved higher productivity and higher profits, again as a direct result of the changed behaviour.

By validating each of these links in turn, the programme can convincingly demonstrate that the change in farmers' income was related to the programme's actions. If the programme only measured farmers' profits, it would be difficult to argue that the link between the programme's activities and farmers' profits was influenced by the programme rather than by other factors, such as an increase in product prices, or a fall in input costs.
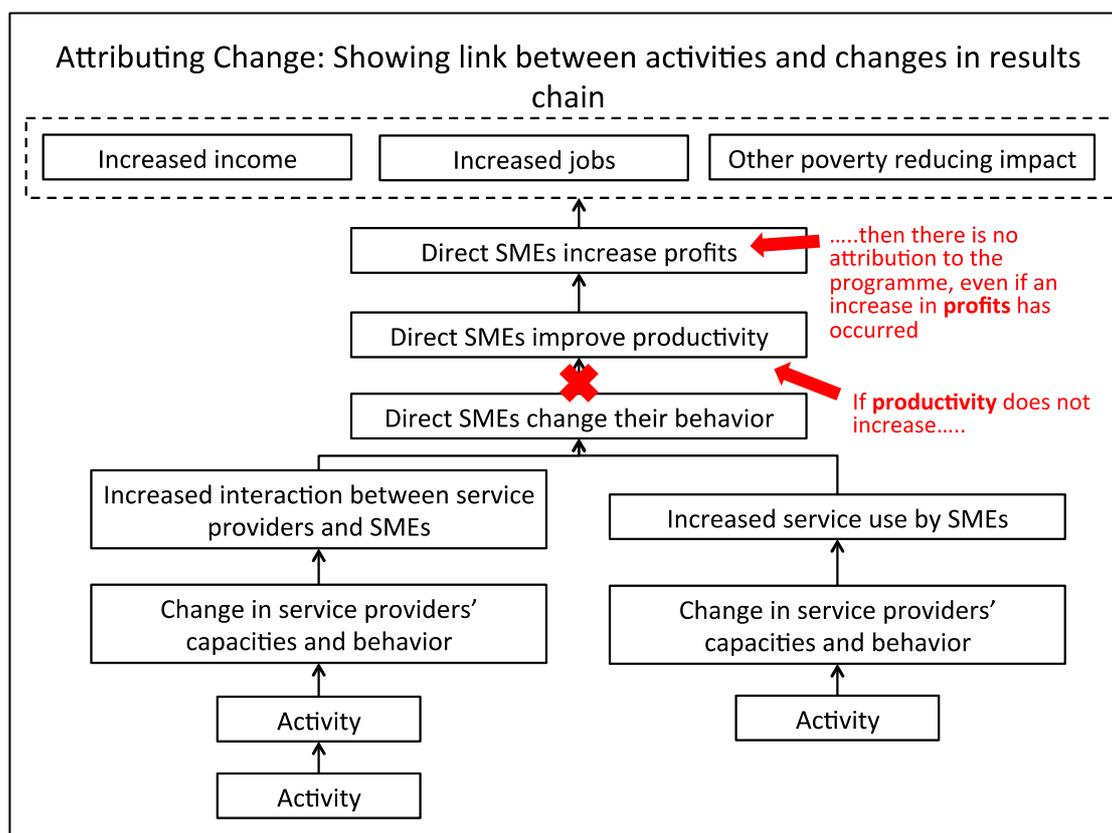
Determining the counterfactual

The Table below summarises some of the options that programme staff have, to address the counterfactual (what would have happened without the intervention) at each step in the results chain. Different circumstances will determine which options are appropriate. The options are not mutually exclusive and a mix or combination is usually necessary; programmes should have a clear understanding of when, how and for which steps in the results chain each method will be used.

Approach	How it is done	Application	Advantages	Disadvantages	Example Cases
Interviews with key informants	key informant's are interviewed and questions seek their opinion on what factor/s caused a change and also how influential each factor was.	When key change is driven by one person (e.g. politician changing a policy) or a innovation or new technology. Useful for assessing attribution at lower levels of the results change, i.e. at the level of partner or service provider.	Relatively low cost, depending how many people are interviewed; Can generate information to understand changes that have occurred and also the reason for them	Quality of data collection and analysis can be influenced by competence and biases of interviewer; interviewees may say what they think the interviewer wants to hear. If open questions are used, they can generate a lot of data which take time to analyse	
Observation	The observer visits the field to observe whether an occurrence is happening. This process is ideally assisted by the use of an observation guide, check-list or rating scale (to collect quantitative or qualitative data). May involve a moderation process if there is more than one observer.	When there are 'observable' changes such as farmers adopting good agricultural practices or fertiliser company marketing new products.	Provides data beyond self-reported; useful for triangulation of interview data	Observations are normally time-consuming. Covert observation may not be ethical while overt observation may influence the 'subject' being observed Need highly competent observers, often content experts	

Participatory approaches (focus groups etc.)	Similar to key informants and experts interview. Difference is that research is done with a group (e.g. community members) who analyse and reflect on information generated.	Useful for verification of trends of change in behaviour. For example a community of farmers showing behaviour change, e.g. using packaged seeds instead of retained seeds	Fast to conduct, May be the only way to show attribution in some cases	May be subjective, open to bias (e.g. high subsidies may attract positive ratings, even though not sustainable)	
Before and after Comparison (BACO)	Comparing scenario after intervention to what happened before intervention. A range of data collection and analysis methods could be used to make this comparison. However, it is important to use the same methods for the before and after.	Useful for cases where there are no external influences. Otherwise needs to be used in combination with another tool as explained below.	Easy to conduct	May be difficult to visit same respondents over a period of time; recall bias if respondents are questioned about previous seasons (if done only at one point of time). Not suitable if impact is influenced by other factors.	
Before and after Comparison with Opinion OR with verification through participatory approaches	Comparing scenario after intervention to what happened before intervention. Data verified by seeking opinions of respondents or through other participatory	Useful in cases where impact is influenced by one or two other factors too. These other factors can be isolated based on qualitative information			Market Development Facility's (MDF's) Acelda case.

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	approaches.	gathered through opinions or participatory approaches.			
Randomised Control Trial (RCT)	The study design randomly assigns participants to a control group or a target group For instance, one group is given packaged seeds (target group) and another given retained seeds (control group).	When samples are large enough. For measuring changes attributable to one step in the results chain When treatment can be randomised, preferably in a blind way	Held by statisticians to be the most reliable way to measure results (albeit based mainly on experiences with simple / single treatments)	Difficult to design and administer if the treatment group is self-selecting (e.g. buying a service). In that case, a randomised sample would need to be refused a service they tried to purchase. Can be considered unethical as it is denying access.	
Quasi-experimental design (difference of difference - comparing before and after for treatment and control groups) (QED)	The before and after change of the target group is compared to the before and after change of a control group. Here the control group is a similar group of potential beneficiaries who did not have access to the intervention.	Often appropriate for measuring attributable changes for different groups influenced by interventions (e.g. service providers, target beneficiaries).	Reliable method of assessing attribution. More approximate, in acknowledging that the control group is not an exact control	Cheaper than randomised controlled trials, but still expensive. Careful design and measurement needed to ensure accuracy. Not valid when the target group is unique, as is often the case with large urban clusters, or	Samarth NMDP's ginger case.

				when interventions can influence the control group as well as the treatment group.	
Comparison groups (CG)	Similar to Quasi Experimental design above, except that respondents are only assigned to control or target group after intervention (as it is not known in advance who will benefit and who will not benefit.	Same as above.	Method of assessing attribution when it's hard to know who will benefit in advance.	Self selection bias when potential beneficiaries decide to apply or use product/service supported through intervention, while others decide not to apply. Also same as above.	Propcom Mai-Karfi tractor intervention.
Regression Analysis	A statistical process for estimating value of a variable (dependent) by analysing and modelling other more independent variables (predictors). E.g. yield of a crop is the dependent variable, and price of seeds, amount of fertilizer used etc. are the independent variables.	Where a wide range of data can be accurately gathered.	Can be reasonably accurate if well designed and executed.	High level of skill needed; accuracy relies on identifying and gathering data on other significant factors contributing to the change. Big samples required so can be expensive.	
Extrapolation of attribution found in pilot	Findings of previous studies are extrapolated or applied	Where funds are not available for large-	Low cost, relatively convincing	Needs periodic verification by other	

or case study	to similar interventions instead of doing another study.	scale measurement		means (e.g. through surveys or additional case studies)	
Comparing Trends (CT)	Using historical data to predict pattern and impact.	Where other, larger trends are very significant, and trends can be reasonably tracked and estimated	Takes into account larger economic and market trends; relatively low cost	May assume that the identified trends are the only (or main) ones applicable; best used, therefore, in combination with other methods.	

Selecting appropriate approaches to measure attribution

The selection of appropriate methods to measure attribution depends on several factors including type of intervention, maturity, available budget, importance of intervention etc. The diagram below shows a selection aid that can be used to assess attribution (Figure developed by Hans Posthumus and Phitcha Wanitphon for the DCED case study on Measuring Attribution: a practical framework to select appropriate attribution methods). It is important to keep in mind that these tools should be used to complement each other or triangulated to validate findings.

Attribution selection aid:
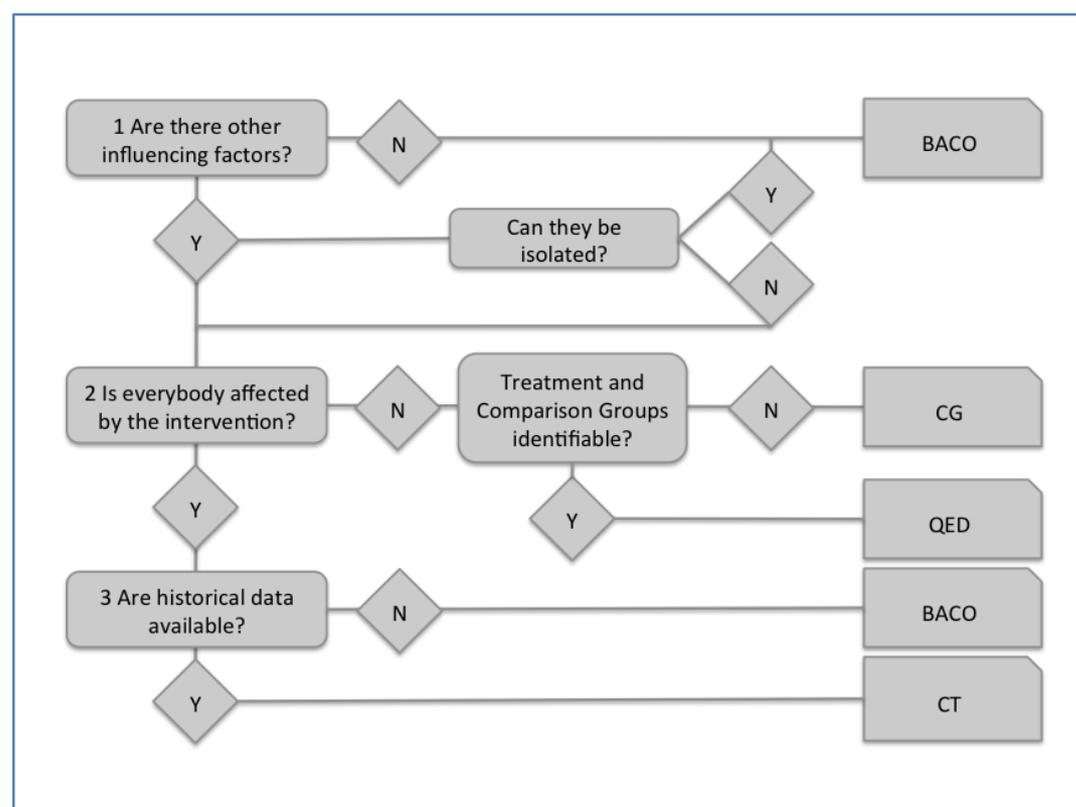
1. The first question to answer is: '**Are there other influencing factors** besides the intervention?'.

> *If the answer is no*, there aren't other influencing factors, or they have a very minor influence, the most appropriate attribution method is the Before and After Comparison with Opinion (BACO). Read about the practicalities when applying a BACO in the case study 'The intervention of MDF with Acelda in Timor Leste'.

> *If the answer is yes*, there are other influencing factors, then the next question is '**Can these factors be isolated**?' If they can be isolated by putting these factors on hold or freezing them, the most appropriate attribution method is still the Before and After Comparison with Opinion (BACO), holding the external factors constant in the assessment calculations. If they can't be isolated, we have to answer the second main question.

2. The second question to answer is: **'Is everybody affected by the intervention?'**

> *If the answer is no*, not everybody is affected by the intervention, ideally we can search for the most appropriate comparison group to estimate the counter-factual. The next question to be answered is then: ' **Are the treatment and comparison groups identifiable at the start?'** If we are able to construct a treatment group that will have access to and use the new service or input and we are able to construct a comparison group that will not have access at the start of the intervention, then we can opt for the Quasi Experimental Design (QED) method. If this is not feasible, then we can opt to apply the Comparison Group method, allocating respondents in either the user-group or non-user- group after the intervention and at the time of the end-line survey. In both cases, the impact is estimated using the Difference-in-Difference logic. The pros and cons of each method are described under 2.3 and 2.4 respectively.

> *If the answer is yes*, we have to answer the third question.

3. The third question to answer is: **'Are historical data available?'**

> *If the answer is yes*, there are reliable and sufficiently detailed data available, we could Compare Trends (CT) to assess whether there is credible causality between the intervention and the visible change in trends.

> *If the answer is no*, we may have to resort to a Before and After Comparison with Opinion not because it is an appropriate method for this intervention, but because there are no other appropriate alternatives. It does however imply that we have to understand, and communicate, the limitation of the applied attribution method. The quality and credibility of the reported impact will be dependent on the skills and degree of conservatism applied when estimating the influence of other factors and thus the correction in terms of impact.

<u>When to measure attributable change</u>

It is important to start as early as possible, and preferably before the treatment or activity has had any effect on the target beneficiaries. If possible, a control group should also be identified: a group of people who are as similar as possible to the target beneficiaries, but who will not benefit from the treatment. In both the treatment and control group, a baseline survey is needed before activities have started, to build a picture of the status of both groups with respect to the most important indicators in the results chain.

After the intervention is implemented, it is important to time the collection of additional data carefully, to measure changes as soon as they are likely to occur (often after one agricultural or business cycle). The longer the gap between baseline and follow-up measurement, the greater the chance that other factors affect the changes – such as natural growth, work of other development initiatives, public spending, etc. The use of a control group can help to filter out the effects of these other factors, but still, careful timing is key.

<u>Attribution in Practice</u>

The DCED Standard requires that staff are familiar with the broad methodology used estimate attribution, and how those methods conform to established good practice. Some staff however need to know the technical details of how data are collected and analysed and attribution estimated, together with the strengths and weaknesses of the approach taken. For example, in a project using a control group to assess attribution, staff should be aware of the existence and composition of the control group, and how to use it to establish attribution. It is not necessary for all staff to understand the details of how the control group was constructed, or the statistical techniques used to detect differences.

Measures of attribution frequently depend on calculations and assumptions. At the most basic, a programme might find that there has been an increase of 10,000 jobs and estimate that 10% of them are attributable to the project. The project will then claim to have created 1,000 jobs. In this situation, the project should explain why it selected to attribute 10% of the change to the project, and make the calculation explicit. The attribution is an estimate; it is not an absolute measure of the programme's result. The key test is whether the estimate would convince a reasonable, but sceptical observer.

Resources

- Hans Posthumus and Phitcha Wanitphon, Measuring Attribution: a practical framework to select appropriate attribution methods. This includes four sub cases:
  - The intervention of MDF with Acelda in Timor Leste, illustrating the use of a before and after with opinion method
  - Samarth-NDMP intervention in the ginger sector in Nepal, illustrating the use of a quasi-experimental method.
  - Propcom Mai-Karfi (PM) intervention in the tractor market in Nigeria, illustrating the use of comparison groups.
  - The Alliances Lesser Caucasus Programme (ALCP) in Georgia, illustrating how a single impact asssessment could be used to assess attribution for multiple interventions
- DCED case study on palm oil production in Thailand with GTZ
- Oldsman and Hallberg. 2002. Framework for Evaluating the Impact of Small Enterprise Initiatives; p17-24
- World Bank: Addressing the Attribution Problem. This is a more technical resource, which explains experimental methods and techniques in a reasonably clear way.
- John Mayne: Making Causal Claims. This explains the difference between contribution and attribution, and the basics of 'contribution analysis'.
- Better Evaluation – Understanding Causes
  http://betterevaluation.org/plan/understandcauses - see linked resources