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# Contribution analysis: An approach to exploring cause and effect

John Mayne

Questions of cause and effect are critical to assessing the performance of programmes and projects. When it is not practical to design an experiment to assess performance, contribution analysis can provide credible assessments of cause and effect. Verifying the theory of change that the programme is based on, and paying attention to other factors that may influence the outcomes, provides reasonable evidence about the contribution being made by the programme.

## Introduction

A key question in the assessment of programmes and projects is that of attribution: to what extent are observed results due to programme activities rather than other factors? What we want to know is whether or not the programme has made a difference—whether or not it has added value. Experimental or quasi-experimental designs that might answer these questions are often not feasible or not practical. In such cases, contribution analysis can help managers come to reasonably robust conclusions about the contribution being made by programmes to observed results.

Contribution analysis explores attribution through assessing the contribution a programme is making to observed results. It sets out to verify the theory of change behind a programme and, at the same time, takes into consideration other influencing factors. Causality is inferred from the following evidence:

1. The programme is based on a reasoned theory of change: the assumptions behind why the program is expected to work are sound, are plausible, and are agreed upon by at least some of the key players.
2. The activities of the programme were implemented.
3. The theory of change is verified by evidence: the chain of expected results occurred.
4. Other factors influencing the programme were assessed and were either shown not to have made a significant contribution or, if they did, the relative contribution was recognised.

Contribution analysis is useful in situations where the programme is not experimental—there is little or no scope for varying how the program is implemented—and the programme has been funded on the basis of a theory of change. Many managers and evaluators assessing the performance of programmes face this situation. Kotvojs (2006) describes one way of using contribution analysis in a development context, "as a means to consider progress towards outputs and intermediate and end outcomes" (p. 1).

## Conducting a contribution analysis

There are six iterative steps in contribution analysis (Box 1), each step building the contribution story and addressing weaknesses identified in the previous stage. If appropriate, many of the steps can be undertaken in a participatory mode.

### **Step 1: Set out the attribution problem to be addressed**

**Acknowledge the attribution problem.** Too often the question of attribution is ignored in programme evaluations. Observed results are reported with no discussion as to whether they were the result of the programme's activities. At the outset, it

### Box 1. Contribution Analysis

- Step 1: Set out the attribution problem to be addressed
- Step 2: Develop a theory of change and risks to it
- Step 3: Gather the existing evidence on the theory of change
- Step 4: Assemble and assess the contribution story, and challenges to it
- Step 5: Seek out additional evidence
- Step 6: Revise and strengthen the contribution story

should be acknowledged that there are legitimate questions about the extent to which the programme has brought about the results observed.

**Determine the specific cause–effect question being addressed.** A variety of questions about causes and effects can be asked about most programmes. These range from traditional causality questions, such as

- To what extent has the programme caused the outcome?
- Is it reasonable to conclude that the programme has made a difference to the problem?

Care is needed to determine the relevant cause–effect question in any specific context, and whether or not the question is reasonable. In many cases the traditional causality question may be impossible to answer, or the answer may simply lack any real meaning given the numerous factors influencing a result. However, managerial-type cause–effect questions are generally amenable to contribution analysis.

**Determine the level of confidence required.** The level of proof required needs to be determined. Issues that need to be considered are, for example: What is to be done with the findings? What kinds of decisions will be based on the findings? The evidence sought needs to fit the purpose.

**Explore the type of contribution expected.** It is worth exploring the nature and extent of the contribution expected from the programme. This means asking questions such as: What do we know about the nature and extent of the contribution expected? What would show that the programme made an important contribution? What would show that the programme 'made a difference'? What kind of evidence would we (or the funders or other stakeholders) accept?

**Determine the other key influencing factors.** In determining the nature of the expected contribution from the programme, the other factors that will influence the outcomes will also need to be identified and explored, and their significance judged.

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*Assess the plausibility of the expected contribution in relation to the size of the programme.* Is the expected contribution of the programme plausible? Assessing this means asking questions such as: Is the problem being addressed well understood? Are there baseline data? Given the size of the programme intervention, the magnitude and nature of the problem and the other influencing factors, is an important contribution by the programme really likely? If a significant contribution by the programme is not plausible, the value of further work on causes and effects needs to be reassessed.

**Step 2: Develop the theory of change and the risks to it**

**Build a theory of change and a results chain.** The key tools of contribution analysis are theories of change and results chains. With these tools the contribution story can be built. Theories of change (Weiss, 1997) explain how the programme is expected to bring about the desired results—the outputs, and subsequent chain of outcomes and impacts (impact pathways of Douthwaite et al., 2007). In development aid, a logframe is often used to set out funders' and/or managers' expectations as to what will happen as the programme is implemented. The theory of change, as well as simply identifying the steps in the results chain, should identify the assumptions behind the various links in the chain and the risks to those assumptions. One way of representing a theory of change including its assumptions and risks is shown in Figure 1.

**Determine the level of detail.** Logic models/results chains/theories of change can be shown at almost any level of detail. Contribution analysis needs reasonably straightforward, not overly detailed logic, especially at the outset. Refinements may be needed but can be added later.

**Determine the expected contribution of the programme.** Making statements about the contribution of programmes to outputs is quite straightforward, but it is considerably more challenging to make statements about the contribution that programmes make to final outcomes (impacts). Three 'circles of influence' (Montague et al., 2002)

are useful here:

- *direct control*—where the programme has fairly direct control of the results, typically at the output level;
- *direct influence*—where the programme has a direct influence on the expected results, such as the reactions and behaviours of its clients through direct contact, typically the immediate outcomes and perhaps some intermediate outcomes; and
- *indirect influence*—where the programme can exert significantly less influence on the expected results due to its lack of direct contact with those involved and/or the significant influence of other factors.

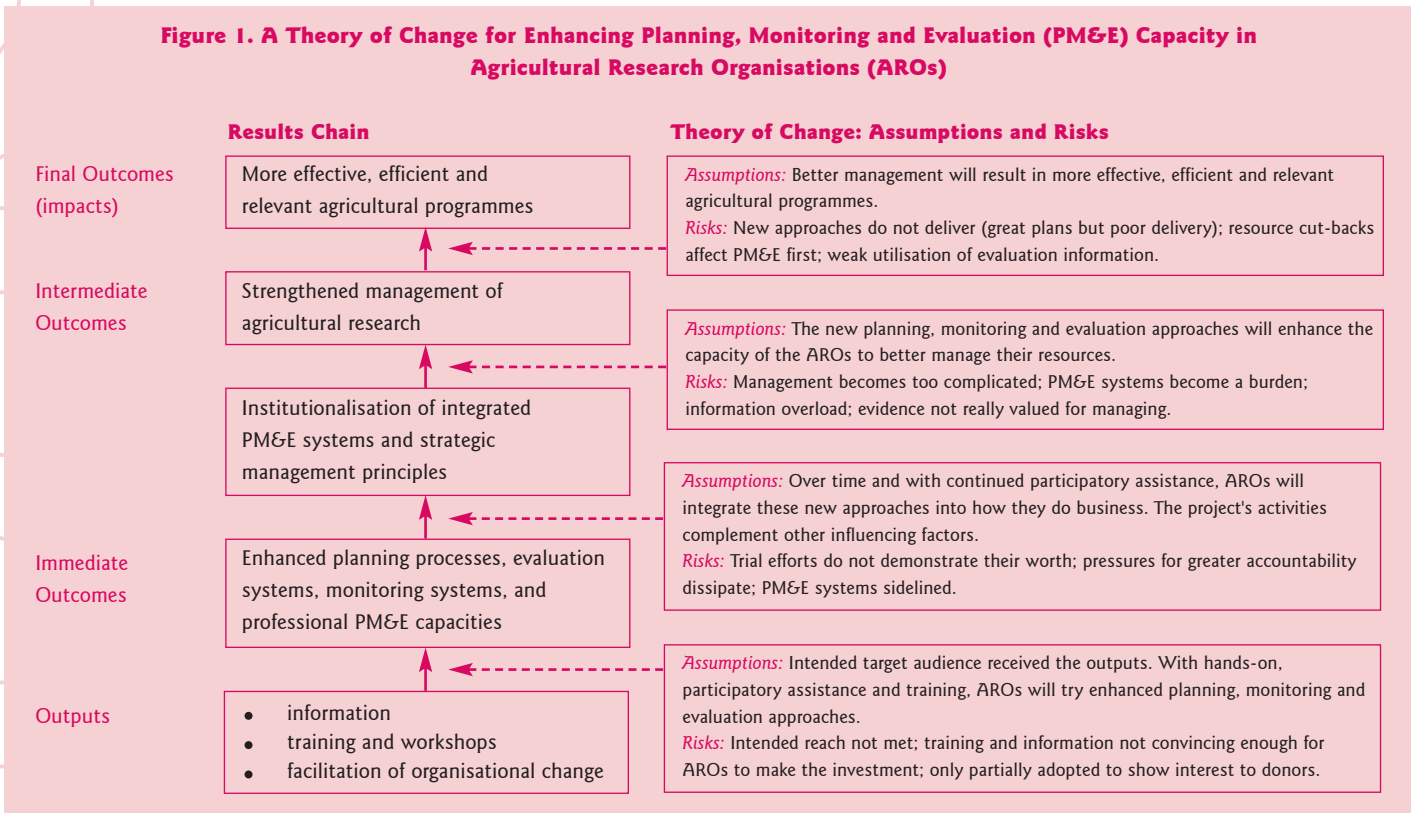
The theory of change is probably much better developed and understood—and expectations are clearer—at the direct control and direct influence levels than at the level of indirect influence.

**List the assumptions underlying the theory of change.** Typical logic models focus on the results expected at different levels, i.e., the boxes in the results chain in Figure 1. But a theory of change needs to spell out the assumptions behind the theory, for example to explain what conditions have to exist for A to lead to B, and what key risks there are to that condition. Leeuw (2003) discusses different ways of eliciting and illustrating these behind-the-scenes assumptions.

**Include consideration of other factors that may influence outcomes.** A well thought out theory of change not only shows the results chain of a programme but also how external factors may affect the results. In Figure 1, other influences (not shown) might be pressure from donors and/or a government-wide initiative to improve PM&E. Although it is not realistic to do primary research on external factors that may affect results, reasonable efforts should be made to gather available information and opinions on the contribution they might have.

**Determine how much the theory of change is contested.** Views may differ about how a programme is supposed to work. If many players contest the theory of change, this may suggest that overall understanding of how the programme is supposed to work is weak. If,

**Figure 1. A Theory of Change for Enhancing Planning, Monitoring and Evaluation (PM&E) Capacity in Agricultural Research Organisations (AROs)**



Adapted from Horton et al. (2000).

after discussion and debate, key players cling to alternative theories of change, then it may be necessary to assess each of these—specifically the links in the results chain where the theories of change differ. The process of gathering evidence to confirm or discard alternative theories of change should help decide which theory better fits reality.

### **Step 3: Gather existing evidence on the theory of change**

**Assess the logic of the links in the theory of change.** Reviewing the strengths and weaknesses of the logic, the plausibility of the various assumptions in the theory and the extent to which they are contested, will give a good indication of where concrete evidence is most needed.

**Gather the evidence.** Evidence to validate the theory of change is needed in three areas: observed results, assumptions about the theory of change, and other influencing factors.

#### *Evidence on results and activities*

Evidence on the occurrence or not of key results (outputs, and immediate, intermediate and final outcomes/impacts) is a first step for analysing the contribution the programme made to those results. Additionally, there must be evidence that the programme was implemented as planned. Were the activities that were undertaken and the outputs of these activities, the same as those that were set out in the theory of change? If not, the theory of change needs to be revised.

#### *Evidence on assumptions*

Evidence is also needed to demonstrate that the various assumptions in the theory of change are valid, or at least reasonably so. Are there research findings that support the assumptions? Many interventions in the public and not-for-profit sectors have already been evaluated. Mayne and Rist (2006) discuss the growing importance of synthesising existing information from evaluations and research. Considering and synthesising evidence on the assumptions underlying the theory of change will either start to confirm or call into question how programme actions are likely to contribute to the expected results.

#### *Evidence on other influencing factors*

Finally, there is a need to examine other significant factors that may have an influence. Possible sources of information on these are other evaluations, research, and commentary. What is needed is some idea of how influential these other factors may be.

Gathering evidence can be an iterative process, first gathering and assembling all readily available material, leaving more exhaustive investigation until later.

### **Step 4: Assemble and assess the contribution story, and challenges to it**

The contribution story, as developed so far, can now be assembled and assessed critically. Questions to ask at this stage are:

- Which links in the results chain are strong (good evidence available, strong logic, low risk, and/or wide acceptance) and which are weak (little evidence available, weak logic, high risk, and/or little agreement among stakeholders)?
- How credible is the story overall? Does the pattern of results and links validate the results chain?
- Do stakeholders agree with the story—given the available evidence, do they agree that the programme has made an important contribution (or not) to the observed results?
- Where are the main weaknesses in the story? For example: Is it clear what results have been achieved? Are key assumptions validated? Are the impacts of other influencing factors clearly understood? Any weaknesses point to where additional data or information would be useful.

So far, no 'new' data has been gathered other than from discussions with programme individuals and maybe experts, and perhaps a literature search. At this point, the robustness of the contribution story, with

respect to the attribution question(s) raised at the outset, is known and will guide further efforts.

### **Step 5: Seek out additional evidence**

**Identify what new data is needed.** Based on the assessment of the robustness of the contribution story in Step 4, the information needed to address challenges to its credibility can now be identified, for example, evidence regarding observed results, the strengths of certain assumptions, and/or the roles of other influencing factors.

**Adjust the theory of change.** It may be useful at this point to review and update the theory of change, or to examine more closely certain elements of the theory. To do this, the elements of the theory may need to be disaggregated so as to understand them in greater detail.

**Gather more evidence.** Having identified where more evidence is needed, it can then be gathered. Multiple approaches to assessing performance, such as triangulation, are now generally recognised as useful and important in building credibility. Some standard approaches to gathering additional evidence for contribution analysis (Mayne, 2001) are:

- Surveys of, for example, subject matter experts, programme managers, beneficiaries, and those involved in other programmes that are influencing the programme in question.
- Case studies, which might suggest where the theory of change could be amended.
- Tracking variations in programme implementation, such as over time and between locations.
- Conducting a component evaluation on an issue or area where performance information is weak.
- Synthesising research and evaluation findings, for example using cluster evaluation and integrative reviews, and synthesising existing studies.

### **Step 6: Revise and strengthen the contribution story**

New evidence will build a more credible contribution story, buttressing the weaker parts of the earlier version or suggesting modifications to the theory of change. It is unlikely that the revised story will be foolproof, but it will be stronger and more credible.

Contribution analysis works best as an iterative process. Thus, at this point the analysis may return to Step 4 (Box 1) and reassess the strengths and weaknesses of the contribution story.

Box 2 illustrates some of the steps in contribution analysis in one evaluation and makes suggestions about what else could have been done.

### **Levels of contribution analysis**

Three levels of contribution analysis lead to different degrees of robustness in statements of contribution:

**Minimalist contribution analysis.** At this level, the analysis (1) develops the theory of change, and (2) confirms that the expected outputs were delivered. Statements of contribution are based on the inherent strength of the theory of change and on evidence that the expected outputs were delivered. For example, in a vaccination programme, if the outputs (vaccinations) are delivered, then the outcome of immunisation can be assumed based on the results of previous vaccination programmes. The weaknesses of this level of analysis are any perceived weaknesses in the theory of change.

**Contribution analysis of direct influence.** This level of analysis starts with minimalist analysis and gathers and builds evidence that (1) the expected results in areas of direct influence of the theory of change were observed, and (2) the programme was influential in bringing about those results, taking other influencing factors into consideration.

Statements of contribution are based on (1) observed results, (2) confirmation that the assumptions about direct influence are supported by factual evidence, and (3) the inherent strength of the theory of change in areas of indirect influence. An example of where this level of analysis would be appropriate is an intervention to get an agricultural research organisation to work collaboratively to solve complex problems—an approach, say, that has proven effective elsewhere. If there is evidence that the research organisation has indeed adopted the new approach (the desired behavioural change) as a result of the intervention, the subsequent benefits may not have to be demonstrated, as they will have already been established from previous research.

**Contribution analysis of indirect influence.** This level extends the analysis into the more challenging area of indirect influence. It measures the intermediate and final outcomes/impacts (or some of them) and gathers evidence that the assumptions (or some of them) in the theory of change in the areas of indirect influence were borne out. Statements of contribution at this level attempt to provide factual evidence for at least the key parts of the entire theory of change.

**Box 2. Contribution Analysis in Evaluating Capacity Development in Planning, Monitoring and Evaluation**

**In the evaluation of the project on evaluating capacity development in planning, monitoring and evaluation (Figure 1) outlined and described by Horton et al. (2000), a number of steps in contribution analysis were undertaken:**

- A theory of change was developed.
- There was clear recognition that the project activities were not the only influences on adoption of PM&E approaches—other influencing factors were identified, such as the general pressure for public sector reform and pressure from donors.
- Surveys asked explicitly for views on the nature and extent of the project's contribution to enhanced capacity, and attempts were made to triangulate the findings.
- The lessons learned on how future projects could enhance their contribution represent de facto refinements of the theory of change.

**Additional contribution analysis steps that might have been useful include:**

- A more structured approach to assessing contribution from the outset.
- More analysis of the other influencing factors, perhaps through clearer articulation up front, comparisons with similar organisations not part of the project, and through asking about the relative contribution of the project efforts.
- More attention to the risks facing the project.

**Further reading**

Douthwaite, B., Schulz, S., Olanrewaju, A.S. and Ellis-Jones, J. 2007. Impact pathway evaluation of an integrated *Striga hermonthica* control project in Northern Nigeria. *Agricultural Systems* 92: 201-222.

Horton, D., Mackay, R., Andersen, A. and Dupleich, L. 2000. Evaluating capacity development in planning, monitoring, and evaluation: a case from agricultural research. Research Report no. 17. Available at <http://www.ifpri.org/isnararchive/Publicat/PDF/rr-17.pdf>

Kotvojs, F. 2006. Contribution analysis: a new approach to evaluation in international development. Paper presented at the Australian Evaluation Society 2006 International Conference, Darwin. Available at <http://www.aes.asn.au/conferences/2006/papers/022%20Fiona%20Kotvojs.pdf>.

Leeuw, F.L. 2003. Reconstructing program theories: methods available and problems to be solved. *American Journal of Evaluation* 24: 5-20.

Mayne, J. 2001. Addressing attribution through contribution analysis: using performance measures sensibly. *Canadian Journal of Program Evaluation* 16: 1-24. Earlier version available at [http://www.oagbvg.gc.ca/domino/other.nsf/html/99dp1\\_e.html/\\$file/99dp1\\_e.pdf](http://www.oagbvg.gc.ca/domino/other.nsf/html/99dp1_e.html/$file/99dp1_e.pdf)

Mayne, J. and Rist, R.C. 2006. Studies are not enough: the necessary transformation of evaluation. *Canadian Journal of Program Evaluation* 21: 93-120.

Montague, S., Young, G. and Montague, C. 2003. Using circles to tell the performance story. *Canadian Government Executive* 2: 12-16. Available at <http://pmn.net/library/usingcirclestotelltheperformancestory.htm>

Weiss, C.H. 1997. Theory-based evaluation: past, present, and future. *New Directions for Evaluation* 76(Winter): 41-55.

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