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## Evaluating the impacts of global environmental assessments

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### ABSTRACT

There are currently no widely accepted procedures for comparing the performance of global environmental assessments (GEAs) and this may be a barrier to improving their methodology. To encourage greater self-reflection within the GEA community, it is proposed to introduce consistent evaluation approaches. Two elements from current evaluation practice are reviewed here that could be particularly useful for evaluating GEAs. The first are logic models which provide a transparent visual mapping of how activities in a GEA are intended to have impacts on policies. The second are performance metrics. It is proposed that GEAs adopt two kinds of metrics: (i) A common generic set for use in all GEAs to provide a basis for comparing the performance of GEAs, and (ii) a specific set of measureable metrics for each particular GEA derived from/linked to the generic set. Although many issues arise in applying these and other elements from evaluation theory and practice to GEAs, the potential benefits are greater comparability of GEA performance and new knowledge about how to improve them. This Short Communication is part of a Special Issue on solution-oriented GEAs.

### 1. Introduction

Global environmental assessments (GEAs) are a major tool for synthesizing scientific knowledge of particular relevance to global environmental policymaking. In this way they occupy a vital niche at the interface between global environmental science and policy. A pragmatic indicator of their importance are the large sums that governments regularly invest in them (e.g. the Millennium Ecosystem Assessment cost approximately \$25 Million up to 2006; Wells et al., 2006), and the substantial pro bono time invested by the scientific community in this work. It is argued elsewhere (Kowarsch et al., in review) that GEAs are becoming even more important because of the growing demand for more solution-oriented policy assessments.

For such an important and costly process, it is surprising that the degree of self-reflection within the GEA community is relatively modest. There is only a small literature comparing GEAs (Beck et al., 2014; Leemans, 2008; Mitchell et al., 2006a; Rothman et al., 2009) and no agreed-upon procedure or metrics for judging their overall quality. Relatively few evaluations of GEAs<sup>1</sup> have been conducted compared to the number of GEAs, and these have used widely differing approaches making it difficult to compare their results.

One way to raise the level of self-reflection would be for the GEA community to adopt a consistent procedure for impact evaluation. This would allow different assessments to be critically compared and would encourage mutual improvement and development of GEAs. Likewise this would allow the sponsors and stakeholders of recurrent assessments

to obtain feedback for improving GEA performance and establishing GEA accountability.

The aim of this Short Communication is to present selected concepts from evaluation theory and practice that can contribute to evaluations of the impacts of GEAs.

### 2. Programme evaluation

Ideas for evaluating GEAs can draw on an extensive literature of evaluation theory and practice (e.g. Alkin, 2004; Cardin and Alkin, 2012; Stufflebeam and Shinkfield, 2007; Wholey et al., 2010). An “evaluation” in this literature is “the systematic assessment of the worth or merit of an object.” (Stufflebeam and Shinkfield, 2007). Of particular relevance to GEAs are “programme evaluations” (as compared, e.g., to personnel or product evaluations) which are “the application of systematic methods to address questions about program operations and results” (Wholey, 2010). A “programme” in the sense of the evaluation literature is “..a set of resources and activities directed toward one or more common goals, typically under the direction of a single manager or management team” (Wholey, 2010). Defined in this way, GEAs can be seen as a kind of programme, albeit a new kind of programme, in that it is a scientific activity that summarizes rather than develops new knowledge (as in a research programme) with the explicit aim of delivering this knowledge directly to the policy and stakeholder community.

Although there are several alternative approaches to programme

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<sup>1</sup> Examples of GEA evaluations: Anon (2007), Wells et al. (2006).

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evaluation (as reviewed in Hughes and Nieuwenhuis (2005), Stufflebeam and Shinkfield (2007), and Wholey et al. (2010) two elements are common to many different approaches – logic models and performance metrics. Here we focus on these two elements because of their potential value to the task of evaluating GEAs, even if a full evaluation is not performed.

### 3. Logic models

One of the principal aims of programme evaluation is to judge their impact on intended audiences (Bryson and Patton, 2010). “Impact” in this sense means the positive (and negative) effects produced by a programme; both primary and secondary, direct or indirect, intended or unintended (definition adapted from DAC/OECD (2002). A common tool used in evaluation practice for mapping impact is the “logic model” (sometimes called a logical framework or “logframe”), defined as a “plausible and sensible model of how a program will work under certain environmental conditions to solve identified problems” (Bickman, 1987). In plain terms, a logic model is a diagram that aims to transparently link programme activities with their impact. A logic model was used in the evaluation of GEO-4 (UNEP/IUCN, 2007), but they are still relatively rare in GEA evaluations.

Logic models come in different forms, but usually include at least a depiction of the activities of a programme, the outputs and outcomes produced by these activities, and the short-, medium- and long-term impacts of these outputs and outcomes. In some cases outputs or outcomes directly generate impacts (e.g. when an assessment report is quoted by a government delegation); in other cases there may be a linear chain of impacts in which short-term impacts generate medium-term impacts, and so on (e.g. when assessment results are first discussed within a government and eventually lead to policy changes in the government). A proposed generic logic model for GEAs is shown in Fig. 1. Note this model includes all the components mentioned above, plus an additional one called “assessment processes”. It is argued below

that not only outcomes but also processes have an impact on the target audiences of assessments.

A general drawback of logic models is that they tend to be superficial (Stufflebeam and Shinkfield), despite the fact that they should be underlain by a “program theory” of how impacts occur (Chen and Rossi, 1983). In practice, developers of logic models more often than not lack the knowledge or theoretical construct to credibly specify the cause and effect of impacts (Newcomer et al., 2010). This is understandable given the complexity of the impact process and its dependence upon the problem setting (Coryn et al. (2011) Weichselgartner and Kasperson, 2010).

Given this drawback, why bother with logic models? The first reason is that they provide a template, albeit imperfect, for making intended assessment impacts visually explicit. Secondly, through this visualization, it becomes easier for evaluators to understand the intended impacts and to discuss them with assessment scientists. Thirdly, developing a logic model forces planners or evaluators of GEAs to make explicit the kind of impacts expected of the assessment. And finally, because of the first three reasons, logic models facilitate comparisons of impacts between assessments, and enable the learning that should come from these comparisons.

Of course, logic models could also be developed in the planning phase of a project (as was done in the Millennium Ecosystem Assessment and Emission Gap reports) to help guide project activities. A logic model developed in the planning phase of an assessment can later be taken over and used as part of an *ex post facto* evaluation.

### 4. Performance metrics

The second element of programme evaluations reviewed here are “performance metrics,” defined as “important outcome[s] characteristic [s], attribute[s] or variable[s] of the processes being evaluated” (Hughes and Nieuwenhuis, 2005). Performance metrics (sometimes called “indicators” or “criteria”) provide a transparent means of

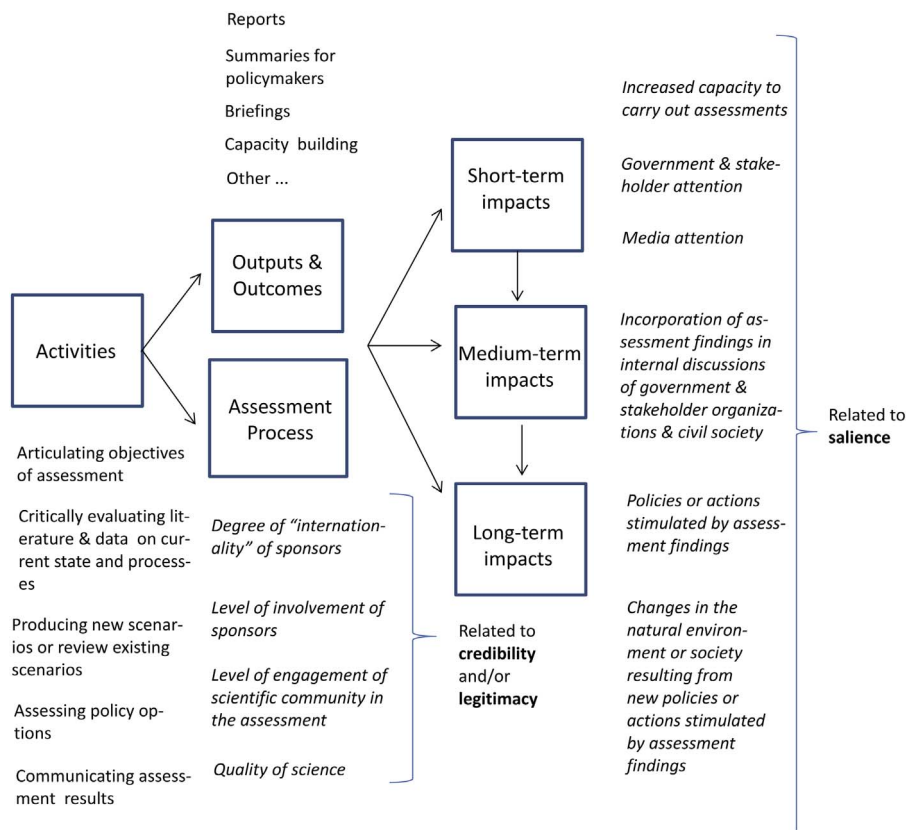


Fig. 1. A suggested generic logic model for global environmental assessments, with generic performance metrics in italics.

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