

# **Indicator Choices and Tradeoffs: Facilitating the Success of International Climate Policies and Projects**

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**Abstract**

To inform the question of whether current monitoring and reporting structure under the United Nations Framework Convention on Climate Change (UNFCCC) can effectively support successful implementation of actions and cooperation., this paper surveys the literature on the use of indicators; including debates on metrics that are covered in international development, public administration and governance, energy and climate policy, and science and technology innovation sectors. This literature highlights the usefulness of indicators as a monitoring tool and discusses their design and implementation. To further facilitate cross-sector comparison, we have conducted a survey of indicator users.

**Keywords**

Indicators, metrics, international development, monitoring

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## Indicator Choices and Tradeoffs - Facilitating the Success of International Climate Policies and Projects

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### ISDA Project

This paper is part of the project International Support for Domestic Action (ISDA). Case studies from five developing countries assess the barriers and drivers of actions that shift individual sectors onto low-carbon growth paths. Five cross-cutting papers then explore how international financial mechanisms, technology cooperation, intellectual property aspects, and suitable monitoring and reporting arrangements can enhance the scale, scope and speed of their implementation. The project is coordinated by Karsten Neuhoff, University of Cambridge; individual reports are available at <http://climatestrategies.org/our-reports/category/43.html>

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# Indicator Choices and Tradeoffs

## Facilitating the Success of International Climate Policies and Projects

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### Contents

Executive Summary .....	3
1. Introduction .....	6
2. Review of Experiences with the Use of Indicators .....	6
3. Choices in the Design of Indicators .....	9
3.1 Input to Outcome .....	10
3.2 Scope and Detail of Coverage .....	13
3.3 National and Domestic Reporting versus International Reporting..	16
4. Learning from Indicator Tradeoffs within Sectoral Experience.....	19
5. Conclusions .....	24
Annex I: Survey Methodology .....	27
Annex II: Current International Reporting of GHG Emissions and Mitigation Actions .....	29
Annex III: Examples of Indicator Costs .....	34
References .....	36

### List of Figures and Tables

Figure 1. Respondents who agreed or disagreed that indicators significantly improved programme implementation .....	9
Figure 2. Stage of programme: input, process, output or outcome indicators	10
Figure 3. Indicator frameworks: programme time-frames.....	12
Figure 5. Scope and detail of data coverage .....	13
Figure 6. Level of reporting – nationally or internationally defined indicators .....	16
Figure 7. Reporting aims and levels of indicators .....	19
Figure 8. Coverage of regularly-reported indicators along the renewable energy deployment pipeline .....	22

## Executive Summary

The UNFCCC discussions concerning cooperation with developing countries on climate change mitigation increasingly focus on mechanisms that support mitigation activities through technology cooperation, capacity building and the direct provision of finances. This raises the question of whether current monitoring and reporting structure under the United Nations Framework Convention on Climate Change (UNFCCC) can effectively support successful implementation of actions and cooperation. Non-Annex I Parties are required to “provide a national inventory of anthropogenic emissions... using comparable methodologies”<sup>1</sup>. Thus the reporting requirement is constrained to outcomes of policy action.

To inform this question, this paper surveys the literature on the use of indicators; including debates on metrics that are covered in international development, public administration and governance, energy and climate policy, and science and technology innovation sectors. This literature highlights the usefulness of indicators as a monitoring tool and discusses their design and implementation. To further facilitate cross-sector comparison, we have conducted a survey of indicator users. .

Indicators can facilitate implementation and management of individual programmes, create transparency to attract private sector investment & innovation, identify best practices and foster international learning, provide accountability to domestic constituencies, and provide mutual accountability in the case of international cooperation.

Indicators can measure different stages of programmes, from inputs to outcomes, yielding different information but with different costs, timeframes and opportunities for gaming. Programmes often deploy a range of indicators, although process indicators that measure the implementation of the programme and measure the barriers to a programme’s success are often overlooked. Incorporating intermediate indicators into frameworks containing input and final outcome measures can help to achieve the objectives and improve monitoring.

In the field of development assistance indicators have been used extensively at programme level, country level (Poverty Reduction Strategy Papers (PRSPs) and internationally (Millennium Development Goals (MDGs)). Experience here has highlighted the difficulties in only identifying outcome-based indicators and the lack of early information on program performance, e.g. from measuring performance of ongoing activities with process indicators. Although such measures have been used sporadically in some PRSPs their use is more widely seen in developed countries. In the energy sector, for instance, and particularly in the management of renewable energy deployment programmes, ‘process’-based indicators are becoming more widely used to both manage

STAGE OF PROGRAMME			
←			→
INPUT	PROCESS	OUTPUT	OUTCOME
<ul style="list-style-type: none"> <li>• Provides information on resources spent on activities</li> <li>• Easy to measure</li> <li>• Available on short timeframes</li> </ul>	<ul style="list-style-type: none"> <li>• Early warning signals for barriers</li> <li>• Facilitates tailored responses</li> <li>• Improves accountability of programmes</li> </ul>	<ul style="list-style-type: none"> <li>• Used to report success / failure of programmes</li> <li>• Creates clear linkages with inputs</li> </ul>	<ul style="list-style-type: none"> <li>• Illustrates whether a programme is achieving its long-term goals</li> <li>• Useful for international comparability and mutual accountability</li> <li>• Create flexibility for countries to pursue ‘own’ solutions</li> </ul>

<sup>1</sup> UNFCCC (2004) Guidelines for NAI National Communications

implementation of policies and support international comparison and learning. Lessons from the UK public sector suggest that a range of indicators, including outcome-based indicators in combination with input, output and process indicators, create a successful implementation framework. This framework also suggests that the use of both multiple short-term annual measures and longer-term performance plans increased the burden of data collection significantly. Tailored locally designed indicator frameworks can provide policy stability for national government action while incentivising action to produce annual monitoring of specific change.

Indicators can be based on large data sets and incorporated into large sets, or can be reported and used individually. Limiting the number of indicators reduces collection costs, while making it easier for policymakers to analyse and manage the data and can reduce the costs of any ex-post verification. Increasing the number of indicators allows more of the programme’s development to be demonstrated, and reduces the potential for indicators to be selected using criteria such as ease of achievement rather than being chosen for the usefulness of information they provide. Increasing the amount of data that indicators are based on improves the accuracy of the measures but increases collection and verification costs. Building on existing capacity and data sets can reduce these costs and allow greater coverage of monitoring.



Indicators for reporting of international cooperation on climate change mitigation actions could be defined and reported at different levels. There may be an international agreement on which indicators are used and reporting may take place through a body such as the UNFCCC. This creates greater comparability and accountability of domestic action. It also reduces verification costs. Allowing countries to choose and report indicators that are suitable for each action at a national level creates greater ownership among policymakers and allows for better assessments of individually successful actions. A hybrid of these two options, where indicators are defined nationally by categories that have been stipulated internationally, can be useful for international learning and can help to identify country specific measures and barriers.



Mitigation actions comprising projects, programs and policies are likely to differ greatly between countries and sectors and involve different international support mechanisms.

Indicators are likely most effective to manage implementation and provide information on barriers, if tailored to the specific circumstances.

It might be necessary to require internationally harmonised reporting of a sub-set of these indicators:

- International learning about actions to facilitate a rapid shift towards low-carbon allows third parties to accelerate their decarbonisation. This will not necessarily be reflected in the discussions of indicator design by domestic actors. The UNFCCC framework might therefore require the monitoring and reporting of indicators necessary to facilitate international learning. International financial support for the necessary actions might be necessary to improve interest in cooperation and willingness to contribute.
- Experience from bilateral and multilateral development assistance points to slow reporting of failures of projects and programs, as typically none of the actors involved have substantial interests in emphasising difficulties to the public. However, in order to facilitate learning, and to ensure actions that contribute to effective decarbonisation, early and transparent reporting will be valuable. The UNFCCC reporting framework, therefore, could require reporting of indicators that allow early identification of outcome delays and implementation problems to ensure mitigation is delivered and international learning is enhanced.

Such reporting has to go beyond the reporting of sector level CO<sub>2</sub> emissions, as emission levels often respond with long delays to policy actions. International reporting of the remaining (non-harmonised) indicators can facilitate learning about policy experiences and can serve as commitment for reliable reporting towards domestic stakeholders.

## 1. Introduction

The UNFCCC discussions concerning cooperation with developing countries on climate change mitigation increasingly focus on mechanisms that can support developing countries in their implementation of mitigation actions. This raises the question whether the current monitoring and reporting structure under UNFCCC provides the necessary information. Non-Annex I Parties are only required to “provide a national inventory of anthropogenic emissions... using comparable methodologies”<sup>2</sup>. Annex 2 summarises additional, voluntary, reporting activities that are often periodic and limited. The mandatory information requirement, on the current state of emissions, is insufficient for identifying and managing intermediate programme opportunities. To improve the situation, UNFCCC discussions on monitoring, reporting and verification provisions (MRV) are devoting increasing, but arguably insufficient, attention to the idea of including non-GHG indicators in MRV provisions at both a sector and national level. 32 out of 56 side-events that discussed MRV at recent discussions included the topic.

The opportunity to design indicators that offer additional information raises the question of what purpose such indicators aim to achieve. Surveying the different options listed in the literature, the following four objectives seem to be most relevant in the context of international cooperation on climate change:

- Facilitate implementation and management of individual programmes and actions
- Identify best practices and foster international learning
- Provide accountability to domestic stakeholders (including private sector investors)
- Provide mutual accountability in the case of international cooperation.

To achieve these objectives, the design of policy indicators requires choices that often involve trade-offs. To inform these choices, section 2 reviews literature on the use of indicators. Section 3 then explores the tradeoffs and choices for policy makers to evaluate the development and application of indicators. More specifically, it provides: a typology of indicator types, their strengths and weaknesses, a discussion of the appropriate level of coverage relative to costs, and a discussion on issues regarding the level of harmonisation. In the fourth section, experience with developing indicators for environmental, energy and development policy, as well as public sector governance, are presented, allowing for a review of the ways in which indicators have been selected, measured and reported in practice. As only limited guidelines for developing and using indicators exist, the examples illustrate the degree to which indicators can vary in terms of methodology, calculation approach, and their integration into programme management. The report also presents results from a survey we conducted, which aimed at gathering experience of individuals across some of the key sectors, charged with the responsibility of designing and using indicators. A more in-depth analysis of the survey findings is offered in Annex I. Lessons gathered from experiences in different sectors have highlighted the overall benefits of incorporating indicators into programmes. Furthermore, experience with developing indicators has helped to identify the key choices and trade-offs that are made when designing them. This literature offers a broad range of lessons and experiences, with differing relevance across circumstances and domestic environments; there are no hard and fast rules for good indicator choice, but a range of options and trade-offs are discussed within this paper for programme implementation to enable tailored indicator design.

## 2. Review of Experiences with the Use of Indicators

### *Indicator Methodology and Literature*

The OECD defines an indicator as a “parameter, or a value derived from parameters, which points to, provides information about, describes the state of a phenomenon/environment/area, with a significance extending beyond that directly associated with a parameter value” (OECD 1998). In

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<sup>2</sup> UNFCCC (2004) Guidelines for NAI National Communications

other words, *indicators* are representations of quantitative or qualitative data, which can be used to understand the state of a problem, and illustrate the progress made towards obtaining a solution.

Indicators are used in international development, public administration and governance, energy and climate policy, and science and technology innovation sectors. Boyle provides a comprehensive review of the development of indicators for public sector governance (2005). Other examples are provided by Key Performance Indicators (KPIs), which are used in business to measure and improve the successfulness of firms (Parmenter 2007), and by organizations such as the International Organisation for Standardisation (ISO) who develop and apply metrics to facilitate the achievement of firm-level goals<sup>3</sup>. The nature of these indicators may be fundamentally different from those used in the public sector, as civil servants face a variety of different incentives and achievement goals (Propper and Wilson 2003).

Indicators are also used within monitoring and evaluation schemes (Booth and Lucas 2002b; OECD 2007a; Prennushi et al 2001; UNDP 2003) to evaluate programmes ex-ante, mid-term and ex-post. Such approaches are common within development literature, where indicators are evaluated in relation to poverty reduction and development strategies (Booth and Lucas 2002b). The use of indicators in this context has mainly been to inform Results Based Management strategies. These strategies can be implemented across various organisational levels – from individual projects and bottom-up approaches to institutional top-down schemes (GEF 2007); within such schemes key indicators are employed at each level to monitor progress towards results.

The use of indicators in connection with targets is widely discussed, including questions of institutional gaming, perverse incentives and policy learning for both indicators and targets<sup>4</sup>. Questions of indicators often link metric design to explicit target trajectories<sup>5</sup>, raising the issue of the value of target-based policy reform. The aspects of these lessons that are directly relevant for indicators will be discussed in the following trade-off sections.

Lastly, it is important to differentiate between the study of individual indicators and the application of multiple indicators, or *indicator sets*. Several such frameworks are well-known, particularly in the field of sustainable development. For instance, the Driving Force, Pressure, State, Impact, and Response (DPSIR) framework by the EEA<sup>6</sup> – evolved from the OECD's Pressure, State, Response (PSR) model – is often used to structure the indicators used to report on environmental topics. Other examples include the socio-economics indicators for renewable energy (EurObserv'ER Report 2008), energy indicators for sustainable development (IAEA et al 2005), science, technology and innovation indicators of the OECD (2007b), agri-environmental indicators (OECD 2008a), and various biodiversity monitoring schemes<sup>7</sup>. They provide structure to define indicators that can measure the impact of specific programmes on various environments, but they do not attempt to measure the implementation process of these programmes directly. This is also evident in other sectors. For example, the OECD globalisation indicators (OECD 2005) and the Human Development Indicators of the UNDP (2007) are useful for the development of specific policy actions, but less so for monitoring the progress of such actions upon their formation.

On the other hand, methodological literature provides a good basis for understanding how indicator sets could be incorporated into decision-making processes and progress monitoring<sup>8</sup>. Hák et al (2007) depict the indicator-creation process, using six steps to linking indicators to projects or policies. These are: 1) to agree on a story; 2) to list policy questions; 3) to select indicators; 4) to define and

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<sup>3</sup> <http://www.iso.org/iso/home.htm>

<sup>4</sup> For example; Bird et al 2005; Boyne and Law 2005; Communities and Local Government Department 2008b; Hood 2007; House of Commons Public Administration Select Committee 2003; Propper and Wilson 2003.

<sup>5</sup> See Burgess et al 2002 for a review of experience supporting the use of performance management; and Smith (1990) for critical review.

<sup>6</sup> See Hák et. al. (2007) for a review.

<sup>7</sup> Switzerland offers a good example, see <http://www.biodiversitymonitoring.ch/english/aktuell/portal.php>

<sup>8</sup> Amongst others; Audit Commission 2000; Boyle 2005; European Commission 2007; Cust 2009; and Lester and Neuhoff 2009.



compile data; 5) to interpret the indicators; and 6) to modify, adapt, update, and iterate conclusions (EEA 1999). Hák's depiction of the indicator creation process<sup>9</sup> illustrates how the selection of indicators is often preceded by the establishment of policy questions (Lehtonen 2009; Marr 2006; Parmenter 2007). The creation of an indicator to express the state of a problem or activity is thus based on a precise understanding of and tailored to the policy or project (i.e., its barriers). However, another dimension that is less often discussed is how indicators are incorporated practically into policy and project management environments. (Steps 4 to 6 of Hák's list).

A wide body of literature discusses which criteria indicators should meet in order for them to be effective (Audit Commission 2000; Boyle 2005; European Commission 2007). This literature focuses, however, on general characteristics and only has limited applicability to actual design. The most common criteria discussed are SMART characteristics, which suggest indicators should be: **S**pecific, **M**easurable, **A**ttainable/Feasible, **R**elevant, **T**imely and **F**ree of Bias (HM Treasury 1998)<sup>10</sup>.

Although these are desirable characteristics in indicators they only go so far in informing actual design decisions. The list has been supplemented by various authors with terms such as Verifiable and Statistically Valid, Unambiguous, Comparable, Clearly Defined, Easy to Use and Understand, Cost Effective, Attributable, Responsive, Avoid Perverse Incentives, Allow Innovation and Assessing the importance of criteria. Although again all of these characteristics are desirable they are broad and do not focus on the design decisions faced when constructing indicators.

### *Experience with the Use of Indicators*

Indicators are regularly used in the context of policy frameworks and governmental programmes. Results-oriented governments often use indicators for implementation of outcomes and results via performance measurement, target-setting and financial budgeting. For instance, such indicators are common within UK public service delivery strategies. The UK government has increasingly used indicators as a component of their management framework over the past 30 years (Propper and Wilson 2003). Since 1998, and the introduction of the UK Public Service Agreement (PSA) framework, national and local government report on departmental aims and objectives. Recent changes mean that overarching PSAs, Comprehensive Area Assessments and Local Area Agreements, now work in parallel with a National Indicator Set to measure the process of national and local governmental and societal reform<sup>11</sup>.

The US Government Performance Results Act (GPRA) provides another example of indicators that are designed to develop the performance management of national government through strategic plans and annual performance reports (Boyle 1996). Here the policy environment is structured by top-down enforcement through regulation by central government, whilst the performance plans are produced by individual agencies allowing some bottom-up features (Groszyk 1996).

Indicators are widely utilised in development policy at many different levels, from the overarching framework of the Millennium Development Goals (MDGs) and the country-specific strategies of the Poverty Reduction Strategy Papers (PRSPs), to the monitoring and evaluation built into individually funded programmes (for a full review see Kohli 2002). The eight MDGs outlined in September 2000 use more than 60, primarily outcome, indicators to measure progress towards overarching development goals. The PRSPs are utilised by the World Bank and the IMF to provide country-specific frameworks for the actions and assistance needed for countries to achieve the development objectives necessary to meet the MDGs. The focus on results-based management and the drive for efficiency and transparency among donors has led to the standardisation of techniques such as logical framework analysis in project design and management in development assistance. These

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<sup>9</sup> Including: Lehtonen 2009; Marr 2006; Parmenter 2007.

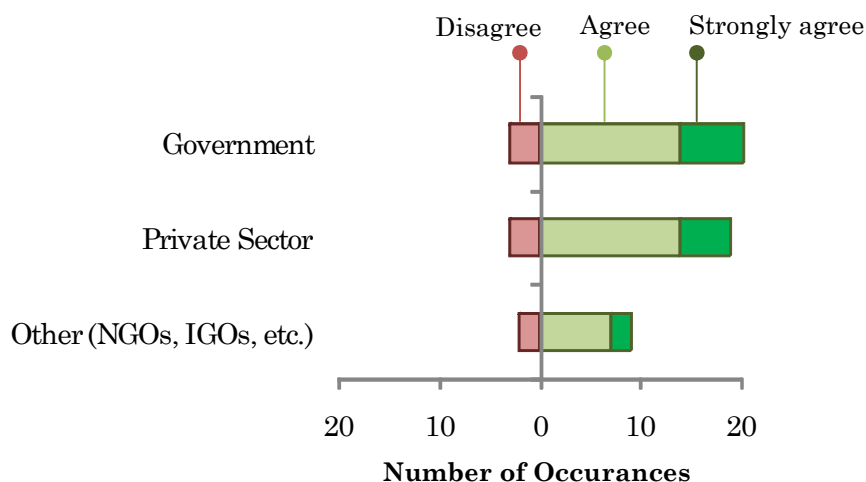
<sup>10</sup> SMART targets are referenced repeatedly throughout UK public sector discourse; first outlined in HM Treasury 1998. Overview and application in: Audit Commission 2000; Boyle 2005; House of Commons Public Administration Select Committee 2003 and HM Treasury et al 2003.

<sup>11</sup> For further description of this interaction see Communities and Local Government Department (2008a).

techniques mainstream monitoring and evaluation and require the identification and utilisation of indicators to measure progress and manage programmes along the whole policy process.

Within the context of climate change and environmental policy, the reporting of greenhouse gas emissions has often been coupled with energy statistics, providing a break-down of different energy sources and users. The OECD and World Bank, for instance, both partner CO<sub>2</sub> emissions and energy usage data in their Key Environmental Indicators (OECD 2008b) and World Development Indicators (World Bank 2009) respectively. However, though such data can be used to illustrate the *state* of the energy and environmental sectors within specific countries or regions, it has offered little use for policymakers to manage the implementation of individual policies, such as renewable energy deployment programmes. And although the IEA offers a starting point for the international comparison of renewable energy policies and deployment achievements<sup>12</sup>, the monitoring of renewable deployment programmes using performance and progress metrics – as in the cases above – is not yet well evidenced. This is set to change in Europe, however, in response to the EU 2020 Renewables Directive targets. By 2010, for instance, every Member State will be required to submit a National Renewable Energy Action Plan (NREAP)<sup>13</sup> and provide a list of indicators describing many of the intermediate actions taken to address the known barriers along the renewables deployment pipeline. The issues surrounding the monitoring and reporting of renewable energy deployment programmes in Europe is discussed further in section 4.

In order to garner more information regarding indicators we conducted a short survey on the role and use of indicators and elicited feedback from stakeholders who have been involved in the development and application of indicators in various sectors. Further details can be found in Appendix 1. We received responses from a variety of sectors, with an overall conclusion that indicators have been useful to support and improve programme implementation (see Figure 1). Further insights from the survey are discussed in the relevant sections below.



**Figure 1.** Respondents who agreed or disagreed that indicators significantly improved programme implementation

### 3. Choices in the Design of Indicators

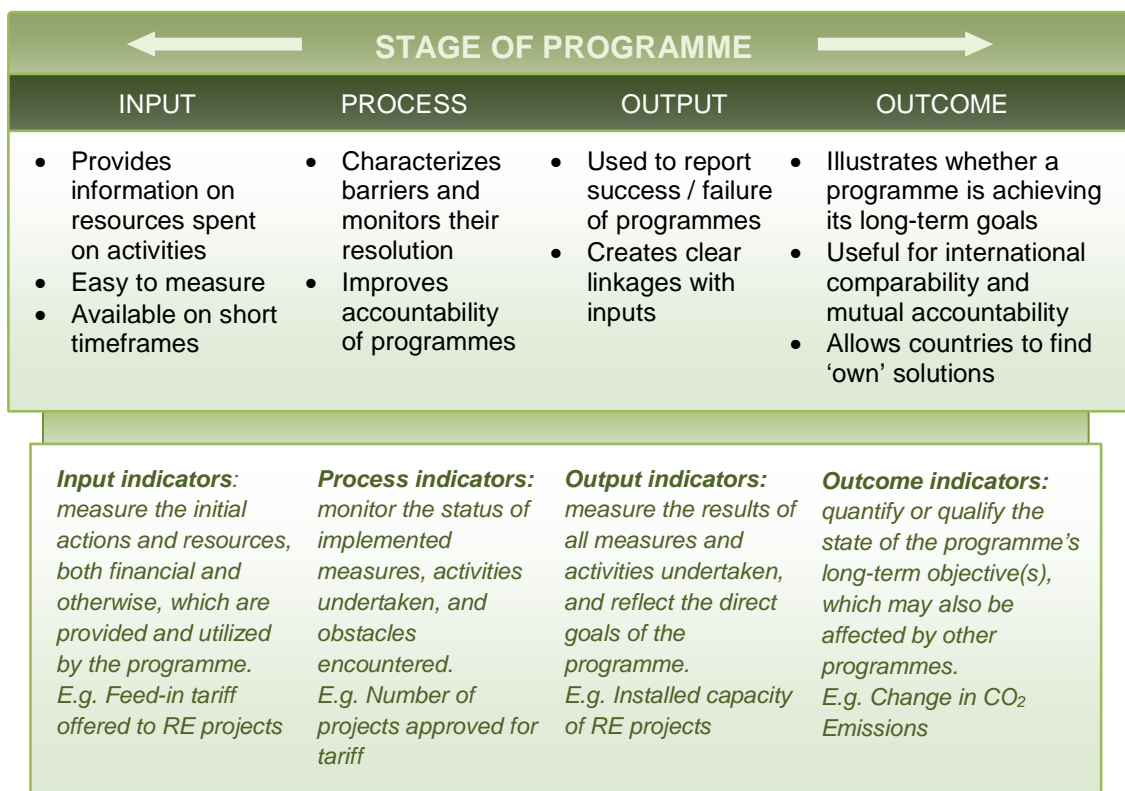
Policy makers have a number of design options when creating indicators. We discuss the three main dimensions of choice, input to outcome, scope and detail of coverage, and domestic reporting versus international reporting; exploring the extent to which these tradeoffs can facilitate the achievement of the objectives outlined in the introduction.

<sup>12</sup> The publication, *Deploying Renewables* (IEA 2008), provides country comparisons of renewable energy policies and assesses their achievements using a set of policy effectiveness indicators.

<sup>13</sup> For documentation, see European Commission (2009b)

### 3.1 Input to Outcome

Programmes that make use of multiple indicators, or ‘indicator sets’, often include a range of indicator types. Each indicator type has different properties and conveys a specific category of information. The EEA’s DPSIR model reflects one such indicator framework. Another type of indicator set, more applicable to programme management, is the input to outcome (Boyle 2005) framework. These indicators convey information at specific points along a programme’s trajectory; from the establishment of initial actions to their final outcomes. There are a range of varying definitions for indicators in this framework. In this paper we use the definitions in Figure 2



**Figure 2.** Stage of programme: input, process, output or outcome indicators

**Input indicators** are often cheaper and easier indicators to measure (UNAIDS 2000). This data often pre-exists in programme design documents and budgetary records. Input indicators are also often the quickest to measure, as data becomes available as soon as the programme commences. These metrics are crucial for management of programme implementation as they allow for tracking of resource allocation and deployment. Input indicators are often based upon the allocation of financial or human resources, allowing for simple comparability across time, geography and programmes. For these reasons, they are present in most indicator sets across most sectors.

Input indicators are limited in their scope of reporting and they can suffer from biases and gaming, limiting their suitability for transparency or accountability purposes and their use in incentive mechanisms. In fact, as input indicators do not deal at all with assessing the relative success or failure of actions taken, the sole reporting of these types of indicators can misreport success. Furthermore, linking incentive mechanisms directly to these types of indicators can create perverse incentives; for example, to spend allocated budgets. Input indicators also offer limited scope for learning, even if used with output/outcome indicators that measure success. Although such combinations could determine whether the overall programme has not succeeded, it would not be able to tell us at what points along the trajectory, and for what reasons, the programme faltered.

**Activity/Process indicators** assess the ‘middle’ of the programmes and, if well defined, can allow for effective management of programme by capturing the effect of specific actions against the programme’s barriers. They can create transparency and accountability of a current policy’s effectiveness and indicate the current stage of implementation. Used in combination with input indicators they can reduce the scope for misappropriation or ineffective use of resources.

Despite their usefulness in this regard, however, they have often been under-utilised<sup>14</sup> in national and international-level programmes due to the difficulties involved in assessing the process activities and barriers of specific programmes. They may also require collection of a wider set of data than that which pre-exists, and may require quantitative information that may make them relatively costly. As projects develop, it may also be necessary for the indicators to evolve and change in response to unforeseen implementation barriers. For this reason, process indicators that are identified ex-ante may be require some flexibility when linked to wider incentive structures; as the original indicators may not actually be measuring success in later stages of a programme. The activities required and barriers in place are likely to vary between countries for similar projects, limiting the scope for international comparability.

**Output indicators** are often used in indicator sets where they are linked to programme inputs. They often fail to provide the detailed feedback necessary for policy learning (Stahl 2004). Output-based indicators also encourage managers to implement attainable measures in order to produce statistical results, regardless of whether this contributes to overall goals.

**Outcome indicators** are measured on the longest timescale. These indicators can give the clearest indication of success – crucial for long-term accountability – as they directly measure whether a programme is achieving its final goals. Given that policy aims are often similar across countries or shared globally, as is the case of climate change, outcome indicators linked to these shared aims can enable comparison and mutual accountability across nations. Outcome measures can provide insight into understanding reform.

A number of issues prevent the widespread application of outcome indicators to measure the success of programmes. For instance, in a number of scenarios, outcome indicators may be shared across a number of programmes, making the impact of each programme difficult to measure. This is particularly evident in the climate change area, as national CO<sub>2</sub> emissions abatement is rarely the product of one project or policy. Similarly, it may be necessary to wait until completion of a programme to clearly measure the outcomes. Outcome indicators are also less useful for management throughout a programme’s implementation, and linking them to incentives may require ex-ante estimations of a programmes impact. This can be difficult, costly and subject to bias. Outcome indicators may also require extensive data collection (such as in household surveys for poverty monitoring<sup>15</sup>), and information may only be available at substantial cost and at wide time intervals. Thus, when final outcome measurements have been required international support has often been provided to build the statistical capacity to gather data – particularly in developing countries.

Lastly, it is crucial to stress the importance of incorporating baseline measurements to compare against the final outcomes of programmes. These baselines, representing the initial value of the outcome indicator (i.e., at the very start of programme) or the final value of the outcome indicator had the programme not existed, are necessary to accurately measure a programme’s overall effect. This can create additional data collection costs and can cause issues over gaming when the choice of a baseline is uncertain. The large debate over additionality of the CDM (for example see Wara and Victor 2008) often stems from the difficulty in defining the overall level of emissions (the outcome indicator in this example) had individual projects not occurred.

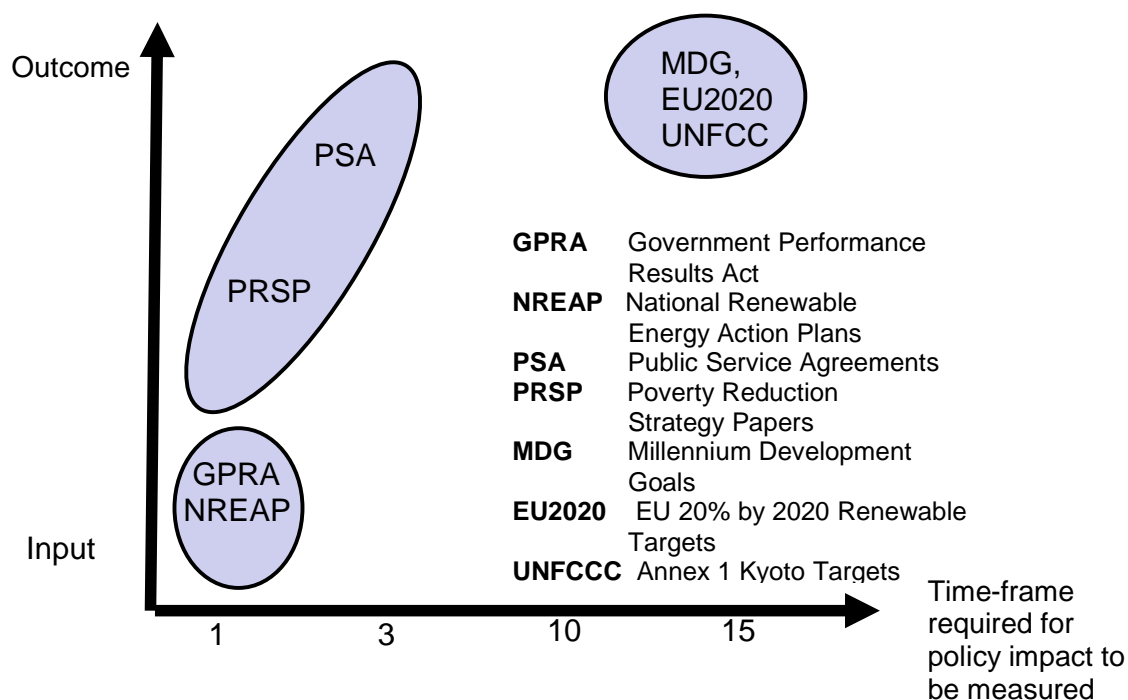
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<sup>14</sup> Sector-specific use of process indicators can increase the effectiveness of policy delivery. For example, Propper and Wilson (2003) suggest that in the case of health care reform, ‘process measures are more sensitive and feasible measures of quality of care than outcome measures’ (p262). Pulles and von Harmelen (2004) suggest the use of policy effectiveness indicators for emissions reductions.

<sup>15</sup> For a wider discussion, see Ravallion (1992)

It is important to note that, prior to designing indicators it is first necessary to outline the scope of the programme identified. In some cases, output indicators of one programme may in fact be the process indicators of others. For example, the patents awarded at the end of a renewable energy R&D programme may be considered 'outputs' of the programme itself, but would represent only 'processes' along the greater renewables deployment pipeline.

The choice between these types of indicators can affect the period during which information is available or progress is projected to occur; thus influencing the time-frame that policy amendments and improvements can be made<sup>16</sup>. Input indicators are available early on in the programme, and thus can be defined in shorter time periods than outcome or output indicators, which by definition are only available on a longer-term basis. Indicators monitored over a longer timeframe provide less structure for implementation. Shorter timeframes allow for flexibility in the design of target regimes and thus for rapid learning from past experience, however, they often do not allow for the full policy impact to develop (see Figure 3 below).



**Figure 3.** Indicator frameworks: programme time-frames.

**A combination of measures.** Generally, the literature and our discussion of the input, process, output and outcome indicators advocate the use of a range of measures for individual programmes<sup>17</sup>. At present, however, most evidence from actual policies suggests a prevalence of using only input and output or outcome indicators. This has often created a 'missing middle' problem, where the link between policy objectives and final outcome indicators is not fully established (Booth and Lucas 2002b). Intermediate process indicators are therefore required to assess progress at regular interval (Holvoet and Renard 2007).

To understand the trade-off between input-process-output and outcome indicators further, in our survey we asked respondents to provide examples of three indicators from their identified project and classify them as to their use. Figure 4 summarises our results: The survey asked respondents to classify whether indicators were used: to manage implementation, to facilitate learning, or to report success and/or provide a basis for incentives. We found that a greater share of input and process

<sup>16</sup> For discussion of statistical variations between long and short-term performance measures see Bird et al (2005).

<sup>17</sup> For example; Propper and Wilson 2003; Boyne and Law 2005 advocate a 'basket of indicators' (p258).

indicators were used to manage implementation, and output and outcome indicators were more often used to report success. Although all indicators seemed useful to facilitate learning, process indicators were used to a greater degree than in the other categories. As input indicators have a limited ability to provide policy feedback, relatively few of these measures were used to facilitate learning.

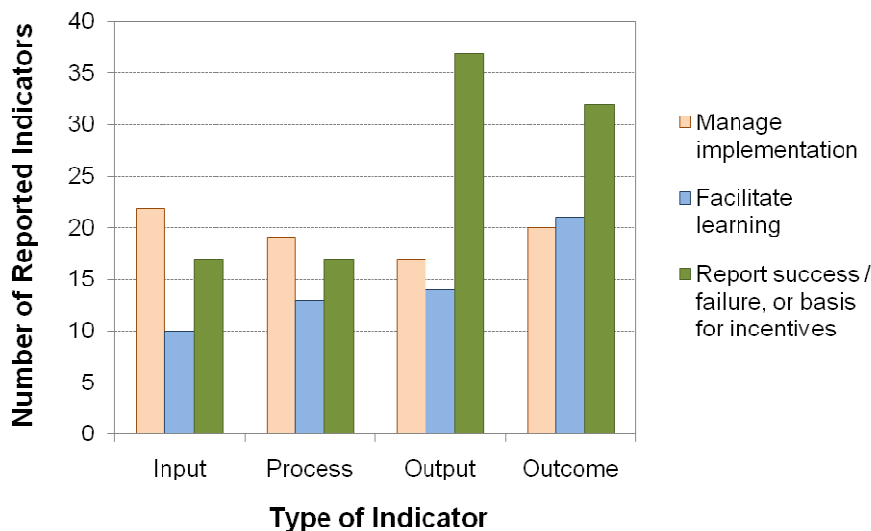


Figure 4. Distribution of indicator objectives

### 3.2 Scope and Detail of Coverage



Figure 5. Scope and detail of data coverage

Indicators can have various levels of coverage, or measure different amounts of data. The scope of indicator use is vast, as programmes can be monitored using individual indicators or sets containing hundreds of measures. Indicators can be used to attempt to cover all elements of a programme or just examine one key dimension. A further question regarding the scope of indicator design is the extent to which measurement varies between timescales; a key choice being whether indicator data is collected more or less frequently. There are differing costs and benefits from moving between these ranges. Several questions need to be addressed to understand these choices:

- What, and how much, information should the indicators cover?
- What are the costs associated with data collection (and verification)?
- What is the capacity of policymakers to comprehend the indicators and take resulting action?

Without practical constraints on collection costs and the capacity to manage information, it may be easy to prescribe a large set of quantitative indicators to inform the progress and outcomes of a given activity. Broader indicators allow for a wider range of insights as they increase the comparability of the information collected and make it more credible. Similarly, if the indicator set is comprehensive in its coverage, being both useful and applicable, the information garnered will be more robust and will facilitate the management of program/policy implementation and help identify best practices quickly. A relevant and comprehensive set of indicators should help fulfil the objectives outlined in section 2.

### **Coverage**

Coverage does not necessarily refer to the quantity of indicators, rather the amount of useful information they contain which addresses programme issues. There is a significant trade-off between the simplicity of single indicators and the overarching coverage of sets of multiple indicators; creating too many indicators adds unnecessary complexity and impedes their interpretation, however, single measures often overemphasise a particular aspect and have inherent distortions (Bird et al 2005). The complications of creating large composite index indicator sets has been discussed in detail by Freudenberg (2003), who suggests ‘the relevance of the indicators that are available is highly variable, and in some cases...the appropriateness for cross-country comparison purposes is questionable’ (p29). This paper would tend to agree with the assessment by Bird et al (2005) that ‘the number of dimensions must be specific to the particular situation’ (p14).

Coverage may also refer to the frequency of indicator collection. Frequent collection allows for identification of trends and anomalies giving additional context to an indicator set. A good understanding of historical trends allows for the early identification of barriers in the policy implementation process. Longstanding indicators, frequently collected over time, will have increased credibility. However, frequent collection will increase indicator costs.

### **Assessing Costs of Indicators**

Developing and using indicators will involve costs. Few papers quantify the costs incurred with developing indicators for specific projects largely because this action represents an additional cost in itself and secondly because it is often difficult to disaggregate programme costs into specific components. It is particularly difficult to calculate the marginal cost of indicator development if structures for data collection and analysis already exist. The numeric cost of developing indicators will vary widely, making generalisations about absolute costs very difficult. It is difficult to even estimate a range of cost values for developing indicators, as cost will be programme specific Annex III gives examples of the scales and components of indicator costs from different programmes implemented by the public sector and international organisations. Even though they are difficult to assess in absolute terms, indicator development costs are likely to be small relative to the total programme costs. Baker (2000) analysed three World Bank studies where indicator costs accounted for 0.1-1.5% of total programme costs but were a crucial component of programme management<sup>18</sup>.

The costs of indicators must be assessed in terms of the marginal benefit of new information they reveal relative to their marginal collection costs (Rose 1972). Although this approach is conceptually simple, the trade off between marginal costs and benefits is difficult to assess in reality, particularly if there are external pressures which guide the policy maker’s decisions when designing indicators e.g. cost minimisation<sup>19</sup>. The 85% of respondents to our survey highlighted the fact that indicator creation was data intensive; a proxy for costs, but nevertheless the majority emphasises the usefulness of indicators<sup>20</sup>. Budget constraints act as a limitation to complete coverage of indicator choices, emphasising the importance of understanding the trade-off between collection cost and scope and detail of indicator coverage when developing indicators, in order to make measures as efficient as possible at each state of indicator development.

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<sup>18</sup> Calculated from information in World Bank (2002),

<sup>19</sup> For example: Audit Commission (2000)

<sup>20</sup> For a fuller discussion of how survey respondents found indicators to be useful, see Annex I

### Data Collection and Verification Costs

The costs involved with data collection have been widely discussed in statistical literature<sup>21</sup>. The more in-depth the information collected and the larger or more specific the target group is, the more costly information will be to collect. This is true even if information is elicited through cost-saving mediums such as online surveys. The costs of data collection depend on; the type of information collected (qualitative/quantitative), the target group, the number of respondents, amount of information elicited, location (higher costs when respondents are more remote), local characteristics (e.g. labour costs), level of indicator harmonisation, time-frame for collection (at which stage during the policy process they are collected) and frequency of collection. Policy makers decide how much detail and scope is required from the indicators, and then assess cost considerations against a fixed budget. Significant questions exist around the issue of evaluation costs; is the cost of evaluation and verification of indicators as justifiable as investment in achieving reforms?

Ideally, indicators should be designed in way that elicits as much information as possible for the least cost. Often, the cheapest option to do this when designing indicators is to use existing data sets or methodologies. If the required information has already been collected for an alternative purpose then it is a win-win situation. For example, DFID implemented a project in Nepal to estimate the number of Forest Dependent Poor. The project lasted for a month and only cost £605, largely because it extrapolated information from existing data (Salim 2001). Coordination between policymakers is necessary to realize these cost savings and avoid duplication of data collection efforts.

In some instances, however, information that is already available will not be the most relevant for the programme in question because it may have been designed as context specific for another programme (Rose 1972). Using secondary data may also make verification trickier and potentially less trustworthy if policy makers were not directly involved with the collection process e.g. collection biases in the original data set may be difficult to identify or account for. When the option to use existing data arises, relative weighting must be given to cost-efficiency, comprehensiveness and credibility objectives.

Where costs and management concerns overshadow the pressure to monitor progress in detail, there is a tendency towards smaller sets of indicators that, although not as informative, are more easily measured. Thus, whereas it is important to ensure that enough indicators are selected to maintain sufficient depth into the programme, it is also important to ensure that policymakers are able to make use of the information successfully without incurring unjustified costs.

Although they are cheaper to use, existing data sets represent an increased opportunity for gaming and data mining. By looking at the dataset prior to indicator selection, there is the potential for information to be manipulated to reflect a particular agenda, creating a bias and diminishing the reliability of the indicators and their associated benefits. Where possible, ex-post creation of indicators should be avoided. One survey respondent highlighted this as a key consideration for policy makers, stating that “indicators need to be project-specific and agreed upfront between the client and contractor”.

A second cost-reducing approach to developing indicators would be to build on existing mechanisms and methodological approaches to data collection. Structures may already exist for data collection and could be adapted at low cost to collect information on new indicators. The marginal costs of collecting new indicators would be negligible if they were incorporated into an existing established survey or review. If this approach is taken, it is important to ensure the continued relevance of existing indicators as they may evolve over time<sup>22</sup>

Once data has been collected, verification methods can be used to increase data accuracy and credibility. Improving reporting and monitoring through verification is often necessary to ensure accountability for performance (House of Commons Public Administration Select Committee 2003). This can be done either through internal or external bodies and there are substantial trade-offs

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<sup>21</sup> For example, Moser. C & Kalton. G (1975)

<sup>22</sup> Approximately half of the respondents in the EPRG survey said their chosen indicators evolved over time.



between these two approaches. In the case of external monitoring, Bird et al (2005) suggest that intelligent sampling of institutions is required for a successful verification programme; performance management frameworks should aim to define ‘how institutions will be identified ... to preserve confidentiality and objectivity at analysis, and the criteria to be met before institutional or individual’s identities will be revealed to third parties, and who these third parties are’ (p11). The importance of verification was evident in our survey; 88% of respondents had verified their indicators for accuracy, 66% of cases were verified by an external body. This is likely to be more costly than internal verification but increases the credibility because of guaranteed neutrality. One survey respondent suggested the involvement of civil society as another (perhaps cheaper) way of verifying data. This in turn would have the benefit of increasing ownership and interest for the issue under consideration as the policy makers would be directly accountable to the citizens.

### Capacity to Use Indicators

Processing information requires specific skills and experience that might not be present in all institutions. In some instances, technical assistance and training programs may be a prerequisite to designing and collecting data on indicators. A good understanding of how to interpret and use indicators will facilitate the management of policy implementation. Furthermore, it will also facilitate policymakers’ ability to identify successes and failures in the policy process, allowing for the identification of best practice for the future. There may also be opportunities for transferring lessons from experiences with indicators internationally. However, creating the necessary capacity can be costly, thus pointing to benefits of limiting the complexity of indicator frameworks.

### 3.3 National and Domestic Reporting versus International Reporting

If indicators are to be linked to international agreements, several choices exist regarding whether they are defined and reported domestically or internationally. Specifically, these choices are:

- 1) Whether the **indicators are harmonized at the international level** so that every country reports the same statistic (e.g., UNFCCC-mandated GHG inventories);
- 2) Whether the **indicators are selected by individual countries but must fall under specific categories** established by an international reporting agreement (e.g., in the reporting of ‘national circumstances’ in the UNFCCC National Communications, countries have freedom to choose what indicators they report within this category); and
- 3) Whether **countries define and report their own indicators** (e.g., within the UK government PSAs, indicators were chosen directly by the UK government and not reported to an international body).



**Figure 6.** Level of reporting – nationally or internationally defined indicators

The first choice has the advantage of standardization, making international comparability and learning straightforward. A balance is also required between the amount of indicators prescribed and the effect of their usage. When individual countries must only report against the outcomes of a programme, they are free to choose their own methods to achieve them. This allows for the identification of country-specific solutions suited to domestic circumstances.

Nevertheless, defining and reporting metrics at the international level can reduce one aspect of the gaming of indicators, namely indicator selection bias. If countries are free to choose their indicators, they may be inclined to select measures that mainly illustrate success; ‘managers become motivated to establish goals they know they can attain, with little regard for whether they make a difference on the ground or contribute to long-term goals’ (Hauge 2001, p9). Bird et al (2005) suggest that domestically focused service-based indicators ‘can result in a type of statistical gaming whereby, instead of improvement in existing services, PM [Performance Management] leads to service drift so that *either* individuals are excluded from receiving the service whose attendance would be likely to comprise PI’s [Performance Indicators] *or* an institution’s range of services is limited in future to those associated with high past performance on measured indicators’ (P10).

The ease of comparability across countries of harmonized indicators can also facilitate international learning. However, as previously mentioned, one drawback is that such indicators may not measure what is relevant in particular countries due to varying local circumstances. This may reduce the incentive to accurately collect data related to the indicator, and may reduce its value for the policy process.

The second option gives greater freedom of choice for countries to select indicators that are relevant, but reflect internationally prescribed bounds. This can create greater buy-in from countries to the reporting agreement and can improve the usefulness of the indicators with regard to programme management and accountability. However, this category of reporting does reduce the ability to use international incentive schemes and affects the level of international comparability obtainable. In addition, with a wide range of different indicators, even if based upon specific categories, verification of data accuracy is likely to be more difficult and expensive than indicators that are defined and reported uniformly across all countries.

The third option allows states to choose indicators that measure what is relevant and necessary to the country directly. This enhances each country’s sense of ownership of the monitoring process, which can improve incentives to collect and report. This is vital when we think of the wider policy-making perspective. The most useful indicators are those that are grounded in institutions that have incentives to utilize the data that they provide.

In our survey, we asked respondents whether they were involved in creating the indicators they identified. We cross-referenced this answer with our questions on whether the indicator specifically identified issues, significantly improved project implementation, offered a fair measure of success, and helped to identify best practice. A greater percentage of respondents who were involved in the design of the indicators agreed that the indicators specifically identified issues (85% vs. 64%), significantly improved implementation (76% vs. 55%), offered a fair measure of success (78% vs 50%) and identified best practices (72% vs 45%). These responses helped to illustrate that ownership of indicators can help to create an improved perception of their usefulness and may help to better identify key issues within programmes and identify greater opportunities for learning.

There is a danger, however, that countries may choose to report indicators that they know they can achieve and thus there can be false reporting of success through this selection bias. They may also choose indicators for which there is existing reporting or for which the data already exists, rather than identifying the indicators which yield the most useful information. The UNFCCC allows countries to report any indicators they wish to illustrate the state of mitigation in the country, beyond the standard greenhouse gas inventory. This has led to a wide range of different indicators reported for different countries in many different sectors. Many countries report no indicators for a particular area while others report scores. This leads to difficulties in making assessments of the comparability of effort in different countries.

### Implications for reporting requirements under the UNFCCC

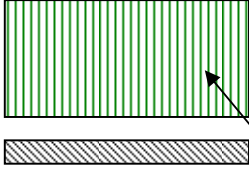
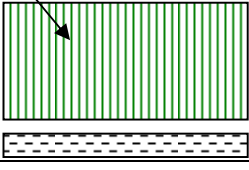
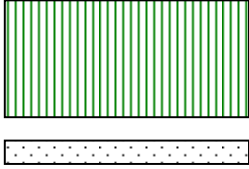
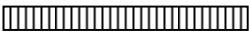

- *A comprehensive set of indicators is an effective tool for policy management, as demonstrated by its application in a wide variety of sectors and its positive evaluation by stakeholders. They need to be tailored to specifics of sector and country, and thus defined in conjunction with aspecific action or policy, to be most effective for management of implementation.*
- *Identification of best practice requires an internationally harmonised a set of indicators. In addition, international reporting on a broader set of indicators facilitates learning about drivers and barriers for success.*
- *Accountability to domestic stakehodlers and the international community requires an understanding, and international comparison, of policy success provided through internationally harmonised indicators. Indicators that allow for identification of specific barriers and monitoring of actions pursued in response by government, create trust with domestic stakeholders and investors.*
- *Accountability towards counter parts of international cooperation requires internationally reporting of the respective contributions (e.g. financial support provided, actions pursued).*
- *Accountability towards third countries requires internationally harmonised reporting, so as to facilitate comparison of the success of developed and developing countries in their joint pursuit of mitigation action.*

*This discussion suggests that a small set of internationally harmonized and reported indicators can be complemented by a larger group of indicators that are tailored to country and sector specific NAMAs. There are multiple benefits of also reporting these broader sets of indicators internationally, including international learning. Thus a balance between local ownership of tailored indicators and international harmonization of a few additional indicators seems viable.*

### Figure 7. Reporting aims and levels of indicators

We suggest in Figure 7 that defining indicators at different levels can help to best perform different functions. The different shading on the diagram represents the use of various indicator mixes to achieve specific aims; reflecting the need to appropriately tailor indicator choices to local environments and specific reporting requirements. The differing amount of indicators demonstrates the need for different coverage levels for indicator sets; for example, more indicators may be necessary to identify international best practice than for providing accountability for domestic stakeholders. Some groups of indicators can be used to fulfil different functions, but this may require reporting at different levels. In the case of indicators for implementation and management, the same measures can be used for identifying best practice as those used for fostering international learning (as illustrated in the figure by the larger green boxes); although this may require reporting internationally rather than domestically.

*Domestic agencies not only need the financial capacity to monitor and report data, but also the capacity to analyze the information communicated by indicators and take resulting actions.*

<i>Height of box represents the amount of suggested indicators required</i>	Domestically defined and reported	Domestically defined and internationally reported	Internationally defined and reported
Facilitate implementation and management of individual programmes		Same indicators can be used	
Identify best practices and foster international learning			
Provide accountability to domestic stakeholders (including private sector investors)			
Provide mutual accountability in the case of international cooperation			

**Figure 7.** Reporting aims and levels of indicators

#### 4. Learning from Indicator Tradeoffs within Sectoral Experience

##### *UK and USA Public Service Indicators and Performance Management*

Indicators are regularly used in the context of policy frameworks and governmental programmes. Results-oriented government focuses indicator use for implementation on outcomes and results via performance measurement, target-setting and financial budgeting. Such indicators are common within UK public service delivery strategies, for instance. The UK government has increasingly used indicators as a component of their management framework over the past 30 years (Propper and Wilson 2003). Since 1998, and the introduction of the UK Public Service Agreement (PSA) framework, national and local government have been required to report on departmental aims and objectives. Recent changes mean that overarching PSAs, Comprehensive Area Assessments and

Local Area Agreements, now work in parallel with a National Indicator Set to measure the process of national and local governmental and societal reform<sup>23</sup>.

The US Government Performance Results Act (GPRA) provides another example of indicators that are designed to develop the performance management of national government through strategic plans and annual performance reports (Boyle 1996). The GPRA legislation (1993) created efficiency goals for public administration that apply to all Cabinet departments, agencies, and government corporations. Federal departments are required to prepare strategic plans that span five years, and annual performance plans outlining performance indicators. These annual plans serve to monitor outcome-based performance over the previous fiscal year, as well as setting future performance levels. The indicators are single statistical measurements, usually input or process-based metrics (for example the number of initial disability claims processed). The policy environment is structured by top-down enforcement through regulation by central government, whilst the performance plans are produced by individual agencies allowing some bottom-up features (Groszyk 1996).

These frameworks provide policy stability for national government action, while incentivising action to produce annual monitoring of specific change. Implementation of, and the lessons learnt from, these programmes differ. The PSA framework provides an example for the input-outcome trade-off discussed in section 3.1; the first phases of the UK Local Public Service Agreements used output indicators to structure the flow of resources to deliver policy. However, output indicators often fail to provide the relevant feedback for policy learning (Stahl 2004). To address this problem, later phases of the UK public service indicators were extended to include outcome-based indicators, thus assessing delivered outcomes and effects in combination with input, output and process indicators to create a successful implementation framework. For example, during the first phase of the Local PSA scheme over half the indicators measured outcomes, with the remainder covering mostly processes and outputs (Communities and Local Government Department 2008b; Boyne and Law 2005). However, there is an acknowledgement that outcome focus can be 'pushed too far' (p62) and that multiple levels of outcomes, as well as local requirements determined the suitability of indicators (Communities and Local Government Department 2008b).

The GPRA targets function under a dual measurement framework using a five-year overall timeframe complemented by annual milestones and monitoring. This framework provides policy stability for national government action, while incentivising action to produce annual monitoring of specific change. PSA experience also suggests that linking indicators to specific medium-term implementation frameworks is important for policy delivery. Both case studies suggest that indicators monitored over a longer timeframe provide less structure for implementation; however, indicators defined over longer timeframes allow policy learning and make it possible to assess policy impacts.

Sectoral and regional approaches have also been proposed as a way of linking various types of indicators. The UK has implemented Local Area Agreements and Comprehensive Area Assessments within a performance indicator framework to tie the strands of local government and successful indicator design together. The current framework requires all councils to report against the National Indicator Set, while allowing local government to outline specific priorities within their Local Area Agreements. These recent reforms are an attempt to understand local priorities; the individual nature of these agreements allows some flexibility for the choice between large sets of indicators (for local governments who have the capacity and desire to measure on a large scale) and smaller, more targeted use of indicators (for local authorities who do not need comprehensive measurement). For example in 2009, a large and diverse city such as Liverpool reports 62 performance indicators covering a range of strategic issues, while a smaller county such as Rutland has only 36 designated priorities largely focused on environmental and social/cultural objectives<sup>24</sup>. Such tailored approaches allow local government to develop their own monitoring schemes, while still reporting the

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<sup>23</sup> For further description of this interaction see Communities and Local Government Department (2008a).

<sup>24</sup> Details of Liverpool's LAA strategy available at: [www.liverpool.gov.uk](http://www.liverpool.gov.uk)  
And Rutland's strategy available at: [www.rutland.gov.uk](http://www.rutland.gov.uk)

overarching National Indicators at the state level. However, the degree to which this approach has been deemed successful within local government is debated<sup>25</sup>.

The UK public service indicators provide a micro level example of the national and international reporting trade-off discussed in section 3.3. The first phase of the UK PSA framework determined all indicators and reporting externally at the national level, so that every county reported both nationally harmonised indicators and individual area priorities (Communities and Local Government Department 2008b). However, development of the subsequent phases resulted in local input when designing indicators; during this process local governments were able to determine locally focused indicators that were aligned with national priorities<sup>26</sup>. The aim of this was to allow greater choice and tailoring of local authority policy. This, however, increased the reporting burden and general indicator hebetude within local government triggering further reforms. During the third phase of this process, local government now have substantial freedom to determine their own performance agenda, and are only required to report a 'minimal' number of 198 National Indicators at the national level (Communities and Local Government Department 2006). To some extent, this has simplified measurement and reduced the burden of data collection and reporting. In addition to these minimum requirements, local authorities are now able to choose indicators that measure what is relevant and necessary to the county directly, and should enhance feelings of local ownership and buy-in (Communities and Local Government Department 2008a).

#### *European Union: Indicators to Monitor Renewable Energy Deployment*

In 2008, the EU established an ambitious target to supply 20% of energy needs from renewable resources by 2020 (EU 2009). Delivery of the target, requires that governments implement regulatory frameworks, market designs, financial support schemes and infrastructure development plans. While many Member States have already developed such policies, their overall impact has varied. Studies by the European Commission or the International Energy Agency (IEA) offer a starting point for the international comparison of renewable energy policies and deployment achievements (IEA 2008). They compare and assess national renewable energy policies, measuring for example 'effectiveness' across countries by comparing the annual increase in renewable generation capacity with the total available renewable energy generation potential. Although this is useful for determining the impact (or 'outcome') of programmes across countries, it is not suitable for specifically *identifying* the barriers and obstacles that individual member states may be facing.

Painuly (2000) provides a framework to assess these barriers, and Neuhoff (2009) provides an outline of the key categories of barriers facing the renewables deployment pipeline: project planning, grid and market access, supply chain development, and project finance (Figure 8). Monitoring intermediate results of renewable energy support programmes, in addition to the final outcomes allows for the early identification and management of policy barriers. This requires measuring additional disaggregated 'process' indicators.

The European Commission has recognized the importance of reporting on specific intermediate actions. By June 2010 each Member State is required to submit a National Renewable Energy Action Plan (NREAP)<sup>27</sup>, which includes a list of quantitative and qualitative indicators defined within the NREAPs templates and thus harmonized across Member States.

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<sup>25</sup> Amongst others: Boyne and Chen 2007; Boyne and Law 2005; Sullivan and Gillanders 2005.

<sup>26</sup> Changes to the second phase of the PSA framework outlined in: Communities and Local Government Department 2008b and ODPM 2003.

<sup>27</sup> For documentation, see European Commission (2009b)

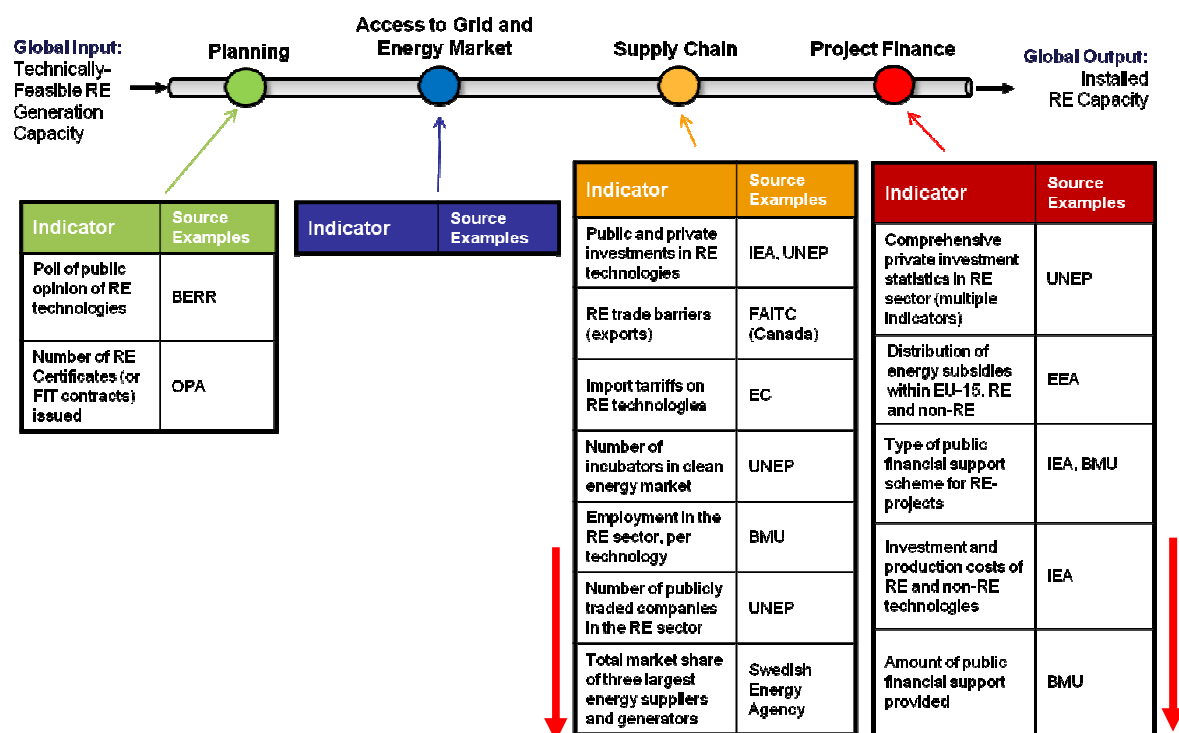


Figure 8. Coverage of regularly-reported indicators along the renewable energy deployment pipeline<sup>28</sup>

With respect to the last set of choices and trade-offs related to data collection costs and the degree of coverage, the reporting capacity of European countries might differ from other regions of the world. As a result, it is important to recognize the need to tailor reporting mechanisms to domestic conditions. Within the IEA’s publication of energy statistics in 2006, for instance, the UK and Germany each reported over 300 statistics related to energy usage, prices, research and emissions, whereas India and Ghana reported approximately 200 and 100 respectively. This may be partly explained by the need to recognize countries’ statistical capacities; a topic discussed further in the following review of development policy experiences.

#### Development Policy Case Studies

Development policy utilises indicators at many different levels. The MDGs use indicators to measure progress towards the internationally agreed targets. Country-level Poverty Reduction Strategy Papers (PRSPs) contain explicit monitoring and evaluation regimes using domestically defined indicators. Results-based management and the use of techniques such as logical framework analysis have institutionalised the use of indicators across project design and management for donor-funded individual programmes and projects. Several studies examine the link between successful monitoring and evaluation and project outcomes (Urban and Wolcott 2009).

The Millennium Development Goals use more than 60 indicators to measure progress toward 8 targets that were globally agreed and harmonised in 2000. The indicators are primarily outcome indicators and have been defined across all countries and reporting is required upwards to the UN. The issues of baseline definition and the immeasurability of some of the goals have called into

<sup>28</sup> Data sources and documentation: BERR (2008), Swedish Energy Agency (2008), BMU (2008), UNEP and New Energy Finance (2009), IEA (2008), European Commission (2009a), European Commission (2009b), FAITC (2008).

question the desirability of outlining global quantitative targets of this nature (Attaran 2005). While the goals are internationally defined, theoretically indicators can be amended in order for domestic circumstances to be taken into account. In practice this has not been widely undertaken and most countries report the recommended indicator. The international definition of outcome based targets for development policy has helped to focus attention and efforts on the issue of development policy and create a framework for assistance. Vandemoortele and Roy argue that national circumstances must be taken into account in tailoring the targets, indicators and approach in order for greater achievement (2004).

The Poverty Reduction Strategy Papers (PRSPs), which are created in cooperation between a developing country and the World Bank or IMF, are one tool that allows for country specific frameworks for the actions and assistance needed for countries to achieve the development objectives necessary to meet the MDGs. The results-oriented nature of these documents requires the undertaking of detailed monitoring and evaluation of the activities outlined and these strategies incorporate sets of indicators for both donors and countries.

A key component of the PRSPs is the orientation to partnership between development partners. Given this and the nature of the strategies to orientate towards the MDGs the indicators tend to be a mix of indicators that are comparable across countries and ones that are domestically defined. The indicators have tended to focus on inputs and outputs/outcomes. This raised some concerns, that immediate outcomes of individual actions and policies are not measured. The 'missing middle', consisting of both the actual policies required and the impact of the policies on the overall aims, has been a significant criticism of their implementation (Booth and Lucas 2002b, Prennushi et al 2001). Booth and Lucas (2002b) suggest that output indicators can supply 'policy learning of a deeper sort: a better understanding of how poverty sometimes get reduced ... [and] what are the entry points and levers that might be utilised in a strategic fashion' (p24). The lack of this 'middle', however, reduces the effectiveness of the PRSPs and can increase the incentives for gaming in both indicator and policy selection and also in data reporting.

The need for both many types of indicators and also a wider coverage has been highlighted by experience from the PRSPs. For the PRSPs the World Bank suggests that indicators should be disaggregated when possible (either by geography or socio-economic factors), in order to tailor the design of policies and programmes to individual circumstances (Bastagli et al 2004). In practice, the lack of statistical capacity and costs of collection have meant that in many instances such disaggregation has not been possible.

The focus on results-based management and the drive for efficiency and transparency among donors has led to the standardisation of techniques such as logical framework analysis in project design and management in development assistance. These techniques mainstream monitoring and evaluation and require the identification and utilisation of indicators to measure progress and manage programmes along the whole policy process. For this purpose they require the identification of input; process; output and outcome indicators.

Despite the relative standardisation of techniques the actual reporting requirements and details over indicators and monitoring is highly variable between donors, and despite the Paris Declaration which aims for standardisation, is increasingly donor driven (Urban and Wolcott 2009). This donor-driven nature of reporting can create burdensome arrangements on recipients and can also create senses of micro-management (Urban and Wolcott 2009).

One challenge that has emerged with such ex-ante identification of all indicators was their responsiveness to dynamic aspects of projects/policies that may encounter different barriers as they develop<sup>29</sup>. There are also questions over the capacities of participants to provide this information in a timely and meaningful manner, whether many countries have the capacity to manage and analyse the data this produces, and whether the scale of data collection required is justified relative to the

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<sup>29</sup> See Earle 2003 for a wider discussion and World Bank 2005 for an overview of the technique.



costs involved. Although the use of log-frame analysis in development policy has helped to establish the practice of choosing such indicators, a standard has converged towards a combination of primarily input and outcome indicators. This has been due to the ease of identification and collection of these types of indicators, and the aforementioned difficulties in identifying lead indicators between programme conception and successful outcomes. More so, the ‘missing middle’ problem was evident in many early PRSPs, where there has been a lack of identifying specific policies to meet the stated goals and therefore a lack of suitable indicators to measure and manage the implementation (Booth and Lucas 2002a).

Development literature also provides some evaluation of Sector-Wide Approach programmes, which suggest that although the links between input, output and outcome targets are well defined for most SWAps, the actions and resources required for delivery are not<sup>30</sup>. More generally, the point can be made that ‘what is required is not a greater general emphasis on some particular point in the chain from inputs to final outcomes, but a greater linkage all along the chain’ (Booth and Lucas 2002b, p26).

## 5. Conclusions

Indicators are valuable tools that can help to achieve effective programme implementation and provide monitoring information for various stakeholders. Indicators have been used extensively and successfully across many different sectors – an insight that is sometimes overlooked due to the variety in classification and characteristics of measurement. There are many lessons that this experience can teach us when thinking of indicators as a tool to help implement future domestic climate action supported by international mechanisms. Current climate policy actions already use a monitoring, reporting and verification (MRV) structure, under which the UNFCCC requires Non-Annex I Parties to “provide a national inventory of anthropogenic emissions... using comparable methodologies”<sup>31</sup>. Many have emphasised the limitations of using a single CO<sub>2</sub> indicator to monitor and manage programmes, as this information only reveals the outcomes of policy action; such limited measurement is insufficient for illustrating the process and progress of intermediate actions, as well as identifying and managing barriers along the policy process. However, the incorporation of mechanisms that support mitigation programmes through technology cooperation, capacity building and the provision of financial support for Nationally Appropriate Mitigation Actions (NAMAs) strengthens the need to examine how such actions can be better monitored to facilitate management of implementation, and create robust information for international learning and mutual accountability.

From the wider work reviewed in this paper, particularly with experience of indicators used to manage policies, there seems to be little focus on specific design issues associated with choosing indicators. Although design frameworks that establish the issues and choices between input or outcome indicators have been discussed in literature, issues pertaining to the scope and scale of the indicators, and whether they should be defined domestically or internationally, are covered to a lesser extent. There are also tradeoffs concerning the costs of data collection and the ability of policymakers to manage information. What is clear from the experience in various sectors and from our survey is that no single type of indicator can meet all monitoring objectives on its own; it is necessary to employ a measurement and monitoring scheme that includes a range of various types of indicators.

One of the key lessons emerging from the case study experience is that this range of measures should incorporate a variety of indicators from input to outcome.

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<sup>30</sup> For a more complete evaluation of this approach see Booth and Lucas (2002b) and Foster and Mackintosh-Walker (2001).

<sup>31</sup> UNFCCC (2004) Guidelines for NAI National Communications

- Input indicators are key to managing the implementation of programmes, but provide less information on the success of projects or reasons for failure.
- Process indicators allow information on the route between inputs and outputs to be communicated to programme managers, which can provide valuable lessons for individual project implementation, identification of barriers, and wider policy or technology learning.
- Output and outcome indicators can measure how programmes have fared against their goals.

Every type of indicator incurs a set of trade-offs, described in the previous sections, but when combined they can present a robust framework for facilitating the success of policies and projects. Lessons from the UK public sector support such a use of a range of measures; suggesting that combining outcome-based indicators with input, output and process indicators can create a successful implementation framework.

Underlying this trade-off is the fact that project specifics dictate the type of measures necessary to facilitate learning and success; indicators should be designed on a local specific basis while allowing for measurement throughout the policy or project process chain. This does not, however, mean that generic, internationally harmonised, indicator sets should be compiled to measure every aspect of a programme; indicator choice should be based on assessment of barriers and project aims. This raises the question of how many indicators are sufficient to meet a programme's goals, and what are the trade-offs of extra information. The costs of data collection and indicator creation is small compared to the cost of implementing projects or policies, and is therefore likely to be justified where the information enhances policy implementation. These costs, however, can constitute a substantial barrier for effective data collection if they are to be paid out of developing country public budgets. Experience from both the UNFCCC and the PRSPs highlights the importance of international support towards these costs, in particular where publicly available information contributes to international learning and identification of best practice.

Case study experience suggests that tailored locally designed indicator frameworks can contribute to policy stability for national government action while incentivising action to produce annual monitoring of specific change. This raises the question of who should define the indicators that are to be used for monitoring NAMAs, and at what level should they be reported. Defining internationally harmonised indicators has advantages in terms of comparability, lower verification costs, and allowing countries to develop unique solutions. However, whether such indicators can be suitable for all countries – or can foster crucial country-level ownership – is questionable. This suggests that a UNFCCC framework might focus on the harmonisation of some indicators that are necessary for international learning and identification of best practice. In line with this, it may also be necessary to harmonise indicators that reflect compliance with commitments, e.g. volume of international support provided by developing countries, to allow effective evaluation of policy action. More detailed indicator sets, however, are necessary for the effective management of the implementation of an action (e.g. a lead indicator for the performance against barriers). Such indicators can then be defined by domestic countries, in cooperation with international support partners, as part of the design process of individual NAMAs. This can also provide a greater sense of ownership in the overall process for both partners.

Individually defined indicators may be more easily gamed, both in their selection phase, where governments choose indicators they know will reflect success, and in the data collection phase, where verification for accuracy can be extremely difficult. As both host countries for NAMAs, and international institutions or individual countries that are supporting a specific NAMA, have limited incentives to reveal delays or difficulties in the implementation of a NAMA, this is an additional reason to ensure indicator choice and public reporting facilitates identification, improvements and international learning about such problems. Such indicator choice might be prescribed as part of an internationally harmonised indicator set. Alternatively, countries that want to register a NAMA might also be required to register the set of indicators they will use for management and implementation of the programme. This could provide an opportunity for a review panel to assess the suitability of the proposed set of indicators that will be reported internationally.

Taking all of these considerations into account is vital for defining the types of indicators that will be used for monitoring NAMAs or similar strategies. Recognizing the importance of often neglected categories, such as process indicators, may be crucial towards achieving the key monitoring goals.

It is encouraging that emerging discussions focus on the inclusion of indicators and development of metrics. Their design needs to ensure that negative progress and implementation problems are not hidden. Development experience points to overly optimistic evaluations that might occasionally occur as a result of incentives for both donor and local agencies to over-report success. Well-designed UNFCCC mechanisms might reduce this problem through reasonable reporting requirements.

## Annex I: Survey Methodology

A survey on the role and use of indicators was also created to elicit feedback from those who have been involved in the development and application of indicators in various sectors. The survey period lasted from May-July 2009. Potential respondents were contacted by email and phone, and invited to complete the survey online. A total of 60 responses were received from 20 different countries. The respondents were largely from the energy and environmental sectors, although a number of responses were received from other industry sectors. 17 respondents were from the public sector, 8 were from international organisations such as the World Bank, 22 were from the private sector and 13 were from non-profit organisations. Answers were anonymised prior to analysis. For the majority of respondents, the survey was conducted electronically for cost-saving reasons and due to an anticipated higher and faster response rate<sup>32</sup>.

We surveyed respondents on their individual experiences with developing and implementing indicators for specific programmes. Building on this exploration of issues with creating indicators, we then posed more general questions on their opinions of using these indicators for different purposes (i.e., to facilitate management, learning, or report success/failure). The survey mainly contained closed questions though there was a final open-ended question for comments which gave respondents the opportunity to document the main lessons they learnt from the use indicators. Themes under general consideration were: programme management, reporting, and learning for future projects/policies. The survey results were collated and used to supplement the academic literature and case studies in the following discussion on indicator choices and trade-offs.

### Survey Structure

The survey began by requesting details on the type of project/policy undertaken by the respondent. The programme is defined in term of financial size, sector (for initiation, implementation and financing). The respondent was then asked to outline the name of the indicator, its type (input, process, output and outcome), and why it was chosen and for what purpose? A number of questions were the asked regarding the design and collection process of the indicator. The survey concluded with a number of sliding scale questions about the use of indicators more generally.

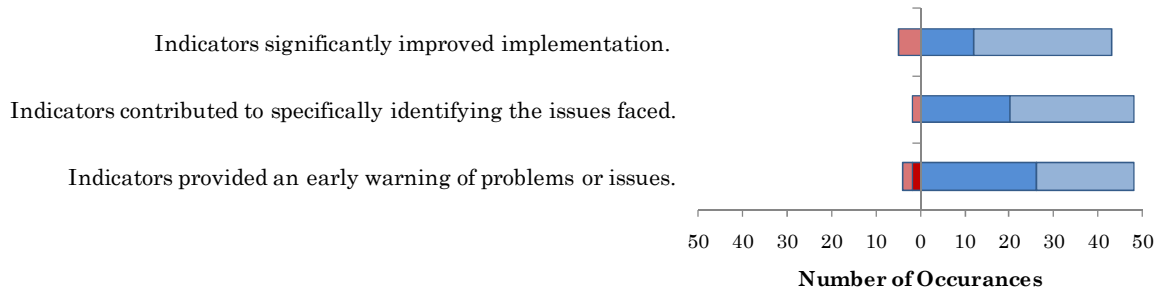
### Survey Results

The majority of the survey respondents supported the idea that indicators were useful. The charts below outline the specific areas of use. The bar to the right of the vertical axis indicate a positive response to the question (i.e. strongly agree or agree) and the answers to the left of the vertical axis denote negative response to the question (i.e. disagree, strongly disagree). Neutral responses to the questions (i.e. neither agree nor disagree) were given a 'zero' weighting, and are thus not explicitly shown.

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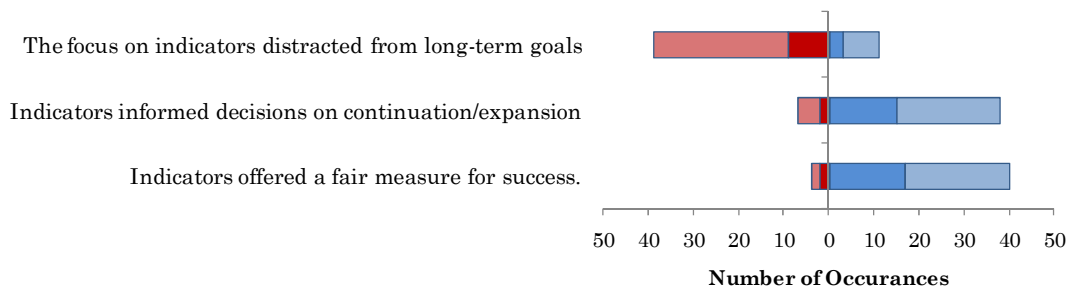
<sup>32</sup> For a fuller justification see Kellner. P (2004)

## In Support of Programme Implementation and Management



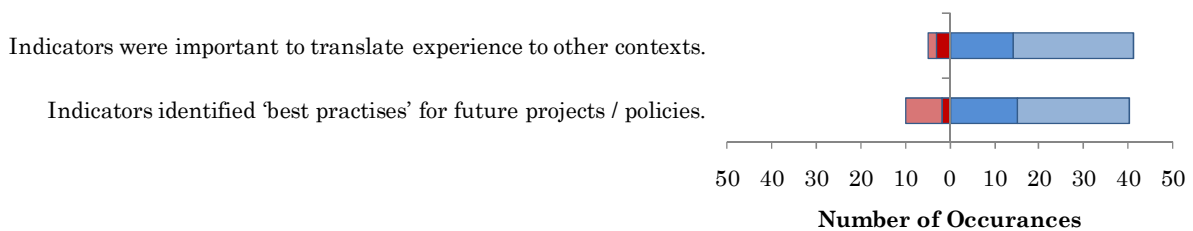
The above graphs demonstrate that almost all respondents believe that the indicators used in their programme improved implementation, identified potential issues in the project and provided early warnings of where these potential problems may arise.

## To Measure Success / Failure and Inform Future Decisions



The majority of respondents disagreed with the idea that indicators distracted from the longer term goals of the programme, suggesting that the indicators did not compromise the programme priorities. Instead, the respondents indicate that their chosen indicators were useful for informing decisions on expanding and continuing the programme and offered a fair measure of success.

## To Facilitate Learning



Finally, with regard to facilitating learning in the programme, the majority of respondents outlined that indicators were useful for translating experience for other programmes and similarly identified 'best practice'.

Key



Agree



Strongly  
Agree



Strongly  
Disagree



Disagree

## Annex II: Current International Reporting of GHG Emissions and Mitigation Actions

This annex provides an overview of the current level of national monitoring, reporting, and verification (MRV) of greenhouse gas (GHG) emissions and mitigation activities, with a focus on the reporting instruments of the UNFCCC. In addition, an overview of alternative reporting instruments is provided of those which have a specific relation to domestic actions in developing countries. Table A1 provides a summary of results found.

*Table A1: Examples of some existing GHG reporting instruments (emissions and mitigation activities) and their incorporation of quantitative indicators*

Regions	Reporting Agency	Reporting Instrument(s)	Cost Burden of MRV	Reporting Frequency	QUANTITATIVE INDICATORS			Verified internat.
					GHG Emissions Data	GHG Mitigation Activities		
						(To illustrate results of actions)	(To facilitate management)	
Developed Countries	UNFCCC	GHG Inventories	Nat. bodies	Annually	●			✓
		Annex I National Communications	Nat. bodies	Every 4 years	● <sup>33</sup>	●		✓
Developing Countries	UNFCCC	Non-Annex I National Communications	GEF	Every 4-6 years (approx.) <sup>34</sup>	●	○		
	UNDG	National MDG Reports	Nat. Bodies <sup>35</sup>	Every 3-5 years	●			
	GEF (World Bank, UNEP, UNDP)	Various	Nat. Bodies	Project-defined	● <sup>36</sup>	● <sup>4</sup>	● <sup>4</sup>	✓ <sup>4</sup>

References: UNFCCC (2000), UNFCCC (2003), UNFCCC (2004), UNDG (2003), GEF (2006)<sup>37</sup>

**Legend:**

- Required and determined by reporting agency
- Required, but determined by, or in consultation with, national body
- Requested not required, and determined by national body

<sup>33</sup> GHG emissions data is not collected specifically for the national communications. Rather, countries provide summary tables of data from the GHG Inventories

<sup>34</sup> There is a tendency towards reporting national communications every 4-6 years, however, least developed countries are free to exercise discretion and are not subject to firm reporting intervals.

<sup>35</sup> In some cases, additional funds may be provided through the Millennium Trust Fund, coordinated by the UNDP

<sup>36</sup> Monitoring, reporting, and verification of GHG emissions and activities is required by these projects, however the specific instruments, indicators used, and degree of verification varies on a project-to-project basis

<sup>37</sup> Further information documented online through official websites: UNFCCC: <http://unfccc.int/>, UNDG: <http://www.undg.org/index.cfm?P=3>, and GEF: <http://www.gefweb.org/>

## Current State of Reporting National GHG Emissions and Mitigation Actions to the UNFCCC

### Monitoring, Reporting, and Verification of GHG Emissions

Under the UNFCCC's variety of agreements including the Kyoto Protocol, the monitoring and reporting of GHG emissions is distinguished largely between developed countries (i.e., Annex I countries) and developing countries (non-Annex I). There are two main instruments under which countries regularly report GHG emissions and associated data, annual GHG inventories (for Annex I countries only), and National Communications (for both Annex I and non-Annex I countries).

#### *Annual GHG Inventories*

Every year, Annex I countries are required to submit individual data on the various sources and sinks of anthropogenic GHG emissions attributed to energy usage, industrial processes, waste, agriculture, land-use and land-use change (including forestry). The reporting of these inventories is performed in two manners: the submission of data through the Common Reporting Format (CRF) and the submission of a National Inventory Report (NIR), for which the UNFCCC provides a harmonized template (UNFCCC 2004). CRFs are distributed to individual countries as a computer tool, which lists and organizes the specific emissions statistics in a spreadsheet format. NIRs, on the other hand, describe, in detail, the methodology used by each country to collect and process their emissions data.

Although the specific data collection process is unique to each country, the general procedure for the estimation of GHG emissions is taken from the revised IPCC guidelines for national GHG inventories (IPCC 1996). In brief, emissions data is often calculated from an approximation – based on scientific principles – of the carbon content within commodities and goods processed by each country. For instance, to calculate emissions generated by the energy sector, accounting of the total fossil fuel imports, exports, and production (as well as consumption statistics) is sufficient to accurately estimate the flow of carbon and resulting emissions. The choice of this methodology has obvious advantages over direct measurements of GHG emissions, given that information on energy usage, agricultural processes, waste, and forestry is, for the most part, incorporated into existing national statistical databases.

Upon submission of both CRFs and NIRs, each annual inventory is subject to a review process conducted by an international panel of experts appointed by the UNFCCC. The reviews can be conducted in-country or externally, although in-country reviews are only mandated every five years. The key findings of the verification process are categorized into six topics: completeness of data, transparency, recalculations and time-series consistency, uncertainties, verification and quality assurance/quality control approaches, and a reflection of recent results against the recommendations of previous reviews. Examples of these reviews are available online<sup>38</sup> and the UNFCCC's methodology behind the review process is also readily available (UNFCCC 'guidelines for review of annex I inventories').

#### *National Communications*

In addition to inventories, Annex I countries and all non-Annex I countries must produce and submit National Communications approximately every four years, although this varies considerably for non-Annex I States. These reports describe the specific background of each country with respect to climate change, and elaborate on the actions and plans underway to mitigate GHG emissions, described further in the section below. The reports must also include summary tables originating

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<sup>38</sup> All country reviews conducted to-date are available online at:  
[http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/inventory\\_review\\_reports/items/4704.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/inventory_review_reports/items/4704.php)

from the countries' GHG inventories. In the case of non-Annex I countries, which do not produce annual inventories, the UNFCCC require to the production of one-off GHG inventories, using estimation procedures similar to those of Annex I countries (UNFCCC 2003)

Not only do Annex I and non-Annex I countries vary in their degree of reporting, they also vary in terms of the cost burden of monitoring and reporting. For Annex-I countries, each state is responsible for the cost of collecting the data and producing the reports, although the data on these cost figures is not widely available. The mandatory verification of the inventories and National Communications of Annex-I countries is comprehensive, and coordinated by a team of international experts. The UNFCCC provides finance for this verification, with approximately \$3 million USD budgeted in 2008 and 2009 for the expenses of experts and their meetings (UNFCCC 2009).

In comparison, non-Annex I countries are neither required to provide National Communications as frequently, nor are their reports subject to international verification. Due to the lack of sufficient financial resources and reporting capacity throughout non-Annex I countries, the Global Environmental Fund – by way of organizations such as the UNDP and UNEP – provides the necessary financial provisions for the preparation of these National Communications ###. Throughout 2005 and 2007, for instance, during the period that most non-Annex I countries submitted their second National Communications, the majority received \$420,000 USD for the reporting process. A select number of countries received increased funds, such as India and Brazil for instance, which were provided \$3,849,000 USD and \$3,400,000 USD respectively. Additional non-financial resources provided to non-Annex I countries include the availability of international consultants to assist the development of domestic monitoring and reporting capacity.

### Monitoring, Reporting, and Verification of GHG Mitigation Activities

Apart from the monitoring of greenhouse gas emissions, the UNFCCC requires all countries to report on the progress of GHG mitigation activities within each country. This reporting is covered within countries' National Communications, which are particularly relevant in the discussion of possible future international monitoring and reporting instruments for NAMAs. As the required depth of reporting varies between Annex I and non-Annex I countries, a distinction between each group is warranted.

#### *National Communications of Annex I Countries*

Most Annex I countries have been submitting national reports every four years since 1994/1995. The UNFCCC guidance on the preparation of these reports (UNFCCC 2000) requires four key topics to be addressed.

The first concerns the national circumstances related to GHG emissions, where countries must discuss the production of GHG emissions and their effect on various sectors, populations, and the environment of their States. Disaggregated indicators are to be used, whenever possible, to facilitate this discussion and illustrate the state of various issues. Examples of these indicators include: total population density and distribution, regional temperature distribution and annual temperature variations, GDP per capita, natural energy resource inventories, etc. However, a mandatory indicator set is not prescribed by the UNFCCC; countries are free to choose which metrics they wish to report along these lines. In support of this information, countries must provide summary tables of data contained within their GHG Inventories, described above.

The second topic covered within National Communications describes the policies and measures taken by each country to mitigate GHGs either directly or indirectly. An overview must be provided on all actions either planned, in progress, or terminated, and describe the estimated impact of these programmes on GHG emissions. Although there is still flexibility to choose which data to report in this discussion, the UNFCCC does provide a structured table for countries to submit their information. In the most recent National Communications the estimation of impact on GHG



emissions, for instance, is required for the years 1995, 2000, and 2005. Other information to be included in this section covers: the domestic entities responsible for implementation of each action, information on the costs of actions, information on the non-GHG benefits of these actions and how they may affect policies and measures in other sectors. For these issues, specific indicators are not mandated.

The third topic requires countries to present their projections on the potential long-term effect of policies and measures on domestic GHG emissions and climate change. This requires an aggregation of the estimated impact of individual actions described above. Countries must also distinguish these impacts with respect to their 'additionality'. The UNFCCC requires countries to also provide information on the assumptions used to produce their projections. Quantitative data used for the calculations should be provided in tables, although countries are free to choose which metrics to report in this regard. With respect to the projected impacts of GHG emissions on climate change, the UNFCCC directs countries to the IPCC technical guidelines on estimating GHG emissions, and leaves the reporting requirements for this topic relatively open-ended.

Fourthly, Annex I National Communications must include information on the financial resources that countries have provided to address climate change. They must also describe the actions undertaken (such as technology transfer programmes) and the resources provided to assist GHG mitigation activities in developing countries. This is done in a format similar to the presentation of domestic activities, as described above. Furthermore, a number of indicators are required to detail the financial resources that Annex I countries have provided to various organizations (i.e., GEF, World Bank, etc.), as well as to individual developing countries. In the latter case, a further disaggregation of financial contributions is required based on the purpose of funds (i.e., for the support of mitigation actions, capacity-building, etc.) and the sector involved (i.e., energy, waste, forestry, etc.).

Lastly, National Communications must provide information on the level of research undertaken by countries, as well as the domestic status of education, training, and public awareness. Certain subtopics are highlighted by the UNFCCC, such as the status of atmospheric climate observations systems, the support provided for climate observations in developing countries and the status of public information campaigns. However, the UNFCCC allows countries to choose the method of reporting on these topics largely at their own discretion; the reporting of specific data is not required.

Upon submittal of National Communications, each report is subject to verification by an international team of experts, not unlike the process undertaken for annual GHG inventories. The results of the verification process are provided in publicly-available reports online<sup>39</sup>. As it is not within the mandate of the UNFCCC to currently monitor and verify the progress of specific GHG mitigation activities, the verification process remains primarily critical of the completeness and accuracy of each National Communication with respect to the UNFCCC guidelines. As with annual inventories, the cost of international verification is burdened by the UNFCCC.

#### *Reporting by Non-Annex I Countries*

Just like Annex I countries, Non-Annex I countries are required to submit National Communications to the UNFCCC. These reports are similar to those of Annex I communications, and cover topics such as national circumstances, GHG emissions and discussions of GHG mitigation activities. There are, however, particular aspects in which the non-Annex I reports differ. First, each country must estimate their annual GHG inventories for the year covered by the report. This follows an in-depth process similar to the preparation of Annex I countries' annual inventories. Second, the National Communications of non-Annex I countries are not directly verified at the international level.

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<sup>39</sup> See UNFCCC website: <http://unfccc.int>

This latter aspect weighs heavily on the depth of information available within the National Communications of developing countries. In order to recognize limitations on monitoring and reporting capacities within such countries, the reporting guidelines of the UNFCCC do not include requirements for the inclusion of quantitative indicators. The prevalence of the terms “encouraged to report” or “encouraged to provide” within the UNFCCC’s user manual for the preparation of non-Annex I National Communications (UNFCCC 2003) lays evidence to this. As a result, although the space and format is provided for countries to provide detailed information and indicators related to GHG mitigation actions and impacts, not unlike Annex I countries, the lack of harmonization (created by stringent requirements) makes international comparability difficult.

### Alternative Reporting of GHG Mitigation Actions by Developing Countries

Beyond the UNFCCC, other international agencies have gained experience with the identification and reporting of GHG mitigation policies and actions in developing countries, to various degrees of depth. The UN Millennium Development Goals (MDGs) for instance, require countries to report on GHG mitigation using per capita GHG emissions as a key indicator. This relates to MDG Goal 7, Target 9, “to integrate principles of sustainable development into country policies and programmes and to reverse the loss of environmental resources”. However, the MDGs do not offer a sufficient platform to examine climate mitigation policies in detail, and thus do not provide additional metrics and indicators used to measure these actions.

Another type of reporting is conducted by international organizations which aim to directly facilitate or address specific projects or policies in developing countries. The WRI, for instance, is updating and expanding its case study database of Sustainable Development Policies and Measures (SDPAMs), which are specific climate mitigation activities in major developing countries like China, India, Brazil and South Africa. ‘Reporting’ may be a loose term, however, as the WRI does not coordinate the monitoring, reporting, and verification aspects of the projects. Instead, the WRI makes use of the reporting schemes which already exist at the project-level, without explicit reference to current or future reporting requirements (WRI 2005). The Global Environmental Facility, which covers projects by the World Bank, UNEP, and UNDP and provides financial and non-financial resources to developing countries for climate-oriented projects, goes one step further. Although the specific reporting structure is still unique to individual countries and projects, recipient countries are typically required to define a range of input, process, output indicators, at times relating their specific activity to the outcome-based MDG indicators<sup>40</sup> (GEF 2006).

Naturally reporting of domestic actions also occurs at national levels<sup>41</sup>, where the use of quantitative indicators can also be seen. However, in light of this paper’s focus on international support for such domestic activities, further discussion on this topic is omitted.

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<sup>40</sup> See World Bank climate change-themed project listings for examples: <http://web.worldbank.org/external/projects/main?pagePK=217672&piPK=95916&theSitePK=40941&menuPK=64140078&category=THEME&goalid=81>

<sup>41</sup> In India, for example, the Ministry of New and Renewable Energy provides information and quantitative data on the progress of their renewable energy deployment policies, see: <http://mnes.nic.in/>

## Annex III: Examples of Indicator Costs

Name of Project	Location	Timescale	Cost
<b>Developing Indicators</b>			
Pre-UNFF5 survey and support services	Global	2 months (2005)	£3,809
Development of effective indicators for monitoring biodiversity in tropical moist forest ecosystems	Belize, Bolivia, Cameroon, Ghana, Indonesia, Malaysia, Timor-Leste	2 Years (1996-1998)	£60,623
Problem survey Brazil	Brazil	1 week (2002)	£2,570
<b>Data Collection, Reporting and Verification</b>			
Numbers of Forest Dependent Poor People in Nepal	Nepal	1 month (2001)	£605
A survey of the priority problems of the forest and tree-dependent poor people in Nepal	Nepal	15 months (2002-2003)	£5,289
Review and appraisal of past land/water interface (LWI) projects in Ghana against the LWI system's output OVI's and the strategy for achieving them	Ghana	1 month (2000)	£3,175
<b>Capacity Building</b>			
Developing capacity for applied agricultural meteorological data collection and analysis in Eastern Africa	Kenya	3 months (2005)	£73,000
Improving scientists capacity for processing climatological data	Kenya	3 months (2001)	£25,476
Sustainable use of urban Environmental Health Indicators	Cambodia, Ghana, India, South Africa	1 Year (1996-1997)	£106,794

Table 1: Examples of disaggregated indicator costs from projects implemented by DFID.

Lead Organisation	Project/Policy	Project/Policy description	Use of indicators in the project	Costs associated with developing and using indicators	
<b>Country level programmes</b>					
EUROSTAT	National Sustainable Development Strategies	Incorporates the principles of sustainable development into national economic, social and environmental	To monitor the progress of National Sustainable Development Strategies in Europe	Bulgaria	€50,000
				Hungary	€43,000
				Lithuania	€17,000
				Malta	€18,000
				Netherlands	€150,000
				Austria	€87,000
				Portugal	€130,000

## INTERNATIONAL SUPPORT FOR DOMESTIC ACTION

		policies.		Romania	€61,000
				Slovenia	€34,000
GEF (UNFCCC)	National Communications (Non-Annex I Parties)	National inventory of anthropogenic emissions, details of steps taken to implement the convention and other information deemed relevant by the party to monitor county emissions under the UNFCCC guidelines	To document country emissions	€109,960,134 given to date by the GEF (figure excludes any additional finance from other sources)	
Project-level programmes					
World Bank	Trabajar Project, Argentina	Government run short-term employment programme in poor areas of Argentina	To evaluate whether or not the programme made a difference to an individual's long term employability	€209,938 (\$300,000 USD)	
World Bank	Nicaragua's School Reform	1991 policy to gradually reform the schooling system in Nicaragua. Including the decentralisation of school management.	To evaluate whether or not the intended management and financing reforms were observed and if they had better learning outcomes.	€346,348 (\$495,000 USD)	
World Bank	Agricultural Extension Project, Kenya	Raising agricultural productivity.	Examines the impact of the project services on farm productivity and efficiency	€244,892 (\$350,000 USD)	

Table 2: Examples of aggregated indicator costs (design, collection and analysis)

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