

MRV OF NON-GHG ASPECTS OF MITIGATION ACTIONS: DEVELOPING AN APPROACH IN THE SOUTH AFRICAN CONTEXT

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1. EXECUTIVE SUMMARY

Climate change mitigation actions compete with other developmental actions for scarce resources, however climate change mitigation and sustainable development should not be seen as mutually exclusive or competing objectives. Mitigation actions in developing countries need to be prioritized based on least cost actions that maximize developmental benefits. MRV of mitigation co-benefits is important in this regard.

This case study considers how to include the MRV of non-GHG impacts of mitigation into the domestic climate change Measurement and Evaluation (M&E) system currently being developed in South Africa. It considers the rationale behind MRV of non-GHG impacts, assesses options for measuring non-GHG impacts and proposes a potential framework for the development of such an approach specifically within the South Africa context.

A framework is developed based on a literature review, an assessment of South Africa's developmental goals and inputs obtained from key stakeholders. Stakeholders interviewed included representatives from national government departments, the private sector, civil society and the South African Designated National Authority. The conceptual approach and preliminary results were presented to the climate change M&E Technical Working Group (a collection of representatives from national government departments, government research institutions, academia, business and NGOs responsible for developing the M&E system in South Africa) for their inputs.

The key drivers for measuring non-GHG impacts of mitigation were found to be the alignment of mitigation actions with national developmental objectives, meeting international requirements under the UNFCCC (or an alternative framework) and requirements or preferences of buyers of carbon credits and funders of mitigation actions. There are two distinct opportunities for MRV of non-GHG impacts in the context of these drivers: MRV in the planning and prioritizing of mitigation actions (projections and benchmarks); and MRV of the impacts that measure effectiveness in achieving objectives and inform future decision-making. Critically, significant resources are required to MRV non-GHG impacts of mitigation. Investment in MRV therefore needs to be done on a case-by-case (or category-by-category) basis depending on MRV requirements, the objective of the mitigation action and the extent to which the benefits of MRV will outweigh the costs.

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2. INTRODUCTION

Climate change mitigation actions compete with other developmental actions for scarce resources; however, climate change mitigation and sustainable development should not be seen as mutually exclusive or competing objectives. While seeking least-cost mitigation options efforts should be made to maximise other developmental benefits. The MRV of non-GHG impacts of mitigation is important within this context. Mitigation impacts need to be carefully managed and prioritized according to their broader impacts on South African society. Being able to sell benefits such as job creation, reduced air pollution, energy security, etc., will greatly increase the likelihood that such projects and policies will be continued and expanded (Cerqueira *et al.*, 2012).

Measurement, reporting and verification (MRV) of non-greenhouse gas (GHG) impacts can provide valuable insights into the impacts of climate change mitigation policies and projects. Tracking non-GHG metrics allow policy makers to track and highlight the effects of mitigation actions on catalyzing economic growth, poverty reduction and environmental conservation. Non-GHG impacts refer to all mitigation impacts of an action other than the reduction of GHG emissions. Where impacts are positive these are often referred to as co-benefits of mitigation (or sustainable development co-benefits). This case study uses “non-GHG impacts” to refer to both costs and benefits of mitigation and “co-benefits” to refer more narrowly to positive impacts of mitigation other than GHG reductions.

The IPCC AR4 (2007) identifies distributional and equity effects as one of four criteria for assessing mitigation measures, but it is not as common as the criteria of environmental effectiveness, cost effectiveness, and institutional feasibility. Many tools, such as marginal abatement cost curves, focus on measuring mitigation potential but do not quantify the other direct and indirect impacts on society (Casillas & Kammen, 2012). The poor and those whose livelihoods are dependent on agriculture and subsistence activities are most at risk from a changing climate and thus Casillas and Kammen (2012) suggest that equity and vulnerability considerations must be central to GHG emissions reduction strategies. The challenge is to develop a way of planning and measuring outcomes that are based on poor people’s own values, adequately represent the complexities of reality and are simple and accessible enough to be used by policy-makers and tracked over time (Melamed *et al.*, 2012; Winkelman *et al.*, 2011).

This case study considers how to include the MRV of non-GHG impacts of mitigation into the domestic climate change M&E system currently being developed in South Africa. In doing so it considers the key reasons why policy makers and project developers would measure and report these impacts. In considering how best to incorporate these considerations into the M&E system, this case study provides: a review of the literature on mitigation co-benefits and other non-GHG impacts; a brief review of the literature on development theory and measuring welfare; and an assessment of the regulatory environment and of South Africa’s developmental objectives. It is within this context that a framework for establishing the non-GHG impacts of mitigation is considered. Interviews were conducted with a variety of stakeholders from national government departments, the private sector, civil society and the South African Designated National Authority. Based on the literature and the interviews, a simple example is provided to illustrate how to establish a set of mitigation action and sustainable development criteria that is appropriate within the context of South Africa’s developmental objectives. The case study concludes with recommendations on how South Africa should incorporate these elements in the design of the M&E system, highlighting the capacity challenges faced and the need

for simplicity, the need for a system that can accommodate the MRV of mitigation actions with a variety of objectives; and for a system that is flexible to allow for a learning-by-doing approach.

2.1 DRIVERS FOR MEASURING NON-GHG IMPACTS OF MITIGATION IN SOUTH AFRICA

The need to MRV non-GHG impacts of mitigation comes from three potential drivers: national objectives to ensure positive developmental outcomes associated with any policy intervention, including: climate change mitigation; international requirements under the United Nations Framework Convention on Climate Change (UNFCCC) or an alternative international framework; and requirements and preferences of buyers of carbon credits and funders of mitigation actions.

The strongest driver for the MRV of non-GHG impacts of mitigation is to ensure that investments in mitigation contribute to the development and improved welfare of the South African population. The South African government has a responsibility to ensure that it allocates scarce resources to deliver the greatest benefits in terms of its sustainable development goals. Assessment of potential non-GHG impacts of mitigation is therefore important in planning and prioritizing mitigation actions. The MRV of the outcomes of those actions then serves to assess the effectiveness of the action in contributing towards South Africa's development objectives. In this context, showing progress on sustainable development is essential for addressing core public concerns and garnering domestic political support for mitigation actions and for attracting investments necessary for implementation (Winkelman *et al.*, 2011). International requirements are still under negotiation but as a developing country, South Africa is committed to implementing Nationally Appropriate Mitigation Actions (NAMAs). NAMAs, introduced in the Bali Action Plan, are intended to achieve reductions in greenhouse gas emissions, but also promote sustainable development. Both the mitigation actions and support are subject to MRV (Cerqueira *et al.*, 2012). The MRV of non-GHG impacts of mitigation are not currently mandated under the UNFCCC although, following the Durban decision, Parties are invited to voluntarily submit to the NAMA registry "other indicators of implementation" for NAMAs receiving international financial support, including the co-benefits for sustainable development (Cerqueira *et al.*, 2012). In determining what is "nationally appropriate" there will need to be some assessment of the developmental or non-GHG impacts of those mitigation options. If South Africa intends to "own" its mitigation actions (as opposed to selling GHG reduction credits through the Clean Development Mechanism or the New Market Mechanism currently being discussed) then it will have to comply with international requirements. Although the approach to assessing these impacts will need to be internationally acceptable, there is room in the current negotiations to shape the design of this system (Winkelman *et al.*, 2011). This presents an important opportunity and responsibility on behalf of the South African government and broader research community to contribute towards the development of a system that will suit the South African context.

If the national government (or another local entity) wishes instead to sell the GHG reductions associated with a mitigation action then sustainable development requirements or preferences would need to be considered. International funders may place conditions on funding that go beyond the achievement of GHG reductions alone. Due to the complexity of the climate change challenge and the varied agendas that different funders have, requirements to MRV non-GHG impacts of funded projects is inevitable. Comstock (2012) suggests that funders are very focused on sustainable development co-benefits – even to the extent that mitigation is framed as a co-benefit and that the focus should be on development first. It is expected that the

nature of the MRV requirements for internationally funded actions would be agreed bilaterally between the country and the funder.

The development of the South African M&E system therefore needs to accommodate all of these potential drivers. It needs to accommodate the sustainable development goals and resources constraints in the South African context, consider the preferred approaches currently being discussed in the international negotiations (but also contribute to the international process to ensure no intrusion on South Africa's sovereignty with unduly prescriptive requirements), and meet the requirements and conditions of carbon credit buyers and project funders.

The system should also differentiate between MRV of non-GHG impacts for planning purposes and the MRV of the outcomes of mitigation actions. Although it would always be preferable to assess outcomes to help inform future planning and the prioritisation of public and private investments, this is not always feasible or practical. Devoting resources to the MRV of non-GHG impacts will therefore need to be done on a case-by-case (or category-by-category) basis depending on MRV requirements, the objective of the mitigation action and the extent to which the benefits of MRV will outweigh the costs.

3. METHODOLOGICAL APPROACHES TO PROPOSING A FRAMEWORK FOR THE MRV OF NON-GHG IMPACTS OF MITIGATION IN SOUTH AFRICA

The proposed framework developed in this case study was developed based on recent approaches identified in a literature review, an assessment of South Africa's developmental goals and the inputs obtained from interviews with key stakeholders. The literature review focuses on attempts to MRV non-GHG impacts of mitigation as well as the measurement of development outcomes more broadly. This is married with an assessment of South Africa's developmental goals to present the context within which to develop an appropriate approach to incorporating non-GHG impacts of mitigation into the national M&E system. Interviews were conducted with stakeholders from government officials (Department of Environmental Affairs, National Treasury, the Department of Public Enterprises and the Department of Energy), the Designated National Authority, the private sector (National Business Initiative, Sasol and KPMG), Eskom and civil society (WWF and South South North). In addition, preliminary work was presented at a meeting of the Technical Working Group (TWG) responsible for developing the M&E system needed to support the implementation of the National Climate Change Response Policy. This included a broader range of stakeholders who provided valuable input potential indicators and, in particular, the appropriateness of measuring non-GHG impacts of mitigation.

4. REVIEW OF THE LITERATURE AND CURRENT APPROACHES TO MEASURING NON-GHG IMPACTS OF MITIGATION

The current focus of the connection between climate change and society has been in terms of equity and adaptation (Casillas & Kammen, 2012). The connection to equity is focused largely on the debate in terms of what would be a fair approach to sharing the burden of climate change. Proposals such as the Greenhouse Gas Development Rights (GDRs) (Baer *et al*, 2000) assess mitigation obligations with respect to various burden-sharing criteria. Society's connection to adaptation is framed in terms

of resilience and vulnerability, which is measured according to various manifestations of poverty such as deprivation of money, education, health care, housing, security, and social and political participation (Sen, 1999; UNDP, 2010). There is, however, a growing link between mitigation and poverty/ society, but Casillas and Kammen (2012) suggest that further work is needed that analyzes how mitigation actions affect developmental outcomes (as measured for example through poverty indices such as the Human Development Index). This suggestion is supported in criticisms of marginal abatement cost (MAC) curves: one of the most common techniques for assessing mitigation potential. The primary non-GHG impact being assessed in this case is the financial cost associated with mitigation. The method has been criticized for not adequately assessing other impacts (Ekins et al., 2011). Casillas and Kammen (2012) suggest that the presentation of MAC curves without highlighting stakeholder impacts creates the risk of implementing climate programmes that could widen socio-economic inequalities, thus exacerbating any extant conditions of climate vulnerability.

Much of the research into the non-GHG impacts of mitigation has focused on air pollution and health co-benefits, sometimes referred to as the co-control of GHG emissions and air pollution. As examples, Haines (2012) illustrates the positive impacts of GHG reduction policies on health, particularly of poor communities and Rafaj *et al.* (2012) predict financial and health co-benefits of mitigation using the Greenhouse Gas and Air Pollution Interactions and Synergies (GAINS) model. In Asia in particular, authors have focused on air-quality co-benefits (Clean Air Initiative, 2011) and more recently on other issues such as energy security and energy access, both seen as high priority issues (Dowling & Russ, 2012, Shrestha & Shakya, 2012; Van Ruijven *et al.* 2012; Van Vliet *et al.*, 2012). This comes with a focus on integrating air pollution, energy access and climate change policies. Many of these authors find that mitigation efforts can lead to reduced air pollution and reduced energy imports.

Also relevant is the assessment of synergies and trade-offs in, for example, energy poverty alleviation and climate change mitigation. Trade-offs include a potential rise in carbon (energy) prices that would impact the poor, or the rebound effect where energy efficiency gains translate into reduced energy prices and increased incomes that drive consumption of other energy consuming goods and services (Ürge-Vorsatz & Herrero, 2012). Synergies and the promotion of positive community and poverty alleviation co-benefits have been explicitly driven through standards such as the Gold Standard (GS), Climate Community and Biodiversity Standard (CCB), Social Carbon, Plan Vivo, etc. These standards promote mitigation co-benefits through the requirements of certification systems. The GS and the CCB Standards encourage and identify projects that are deemed to be of 'high quality' in terms of consulting with local people and bringing about co-benefits (Wood, 2011). The Social Carbon Methodology (SCM) aims to provide a consistent framework to evaluate how well carbon reduction projects are doing, regarding their social impact on affected communities and populations (Reis, 2009). Plan Vivo uses measures developed by Landscape Measures Resource Center (LMRC) to assess the impact of biodiversity and livelihood outcomes of natural resource management initiatives. Many of these standards have been applied in the context of forests and local communities. For example the Climate, Community and Biodiversity Alliance (CCBA) was established in 2003 to promote high quality forestry carbon projects. Its standards are therefore used for projects involving afforestation, restoration and reforestation (ARR), reduced emissions from deforestation and degradation (REDD), and improved forest management (IFM) (Wood, 2011).

MATA-CDM (Multi-Attributive Assessment of CDM) involves the weighting of sustainability indicators to assess the contribution of CDM projects to local sustainable development. Nussbaumer (2009) applied the Multi-Attributive Assessment of CDM (MATA-CDM) to compare projects labeled under the GS and the World Bank Community Development Carbon Fund (CDCF) with conventional CDM projects and found that the “labeled” CDM projects do tend to outperform normal CDM projects although not unequivocally. Wood (2011) assesses the role of the GS and CCB in contributing towards local development (co-benefits) and concludes that both standard systems successfully reward high quality projects which have a demonstrated commitment to local consultations and sustainable development benefits. Moreover, they serve to give well-meaning project developers frameworks with which to ensure that a wide range of criteria are considered in planning and implementing projects. The most comprehensive study yet done on the GS is that of the Wuppertal Institute (Sterk et al. 2009), which assesses the robustness of the GS and discusses the possibility of integrating aspects of its policies into the wider Clean Development Mechanism (CDM). A criticism of the GS (and others like it) is that there is an inevitable degree of subjectivity in the use of the sustainable development matrix as it relies heavily on qualitative explanations of potential impacts (Sterk et al., 2009).

The application of standards such as the GS in the South African context has been less common. A similar concept, developed in South Africa is the *Credible Carbon* registry developed by Promoting Access to Carbon Equity (PACE) to encourage poverty alleviating GHG mitigation projects reaching the market. The system also relies on significant qualitative assessment but also looks inputs from communities themselves (PACE, 2012).

Meeting the requirements of the GS, for example, is costly and onerous and has come under criticism for this. However, if there is a demand (either driven by regulatory requirements or preferences of buyers and funders) then the extra cost implications may make these systems appropriate. At the least, these standards include systems and approaches that can provide useful lessons in developing the local M&E system. This includes potential indicators and methods for collecting and verifying data.

There are also lessons to be learned from the methods for measuring and assessing developmental outcomes that are not specifically related to climate change. The measurement of development outcomes has evolved to try to marry researchers’ evidence on complexity and interconnectedness, poor peoples’ own complicated experiences of themselves and politicians’ need simple and easily understood measures of progress (Melamed et al., 2012). There has been a shift towards including non-economic measures of progress. Amartya Sen (1999) pioneered the shift towards an understanding of “development as freedom” or the enhancement of people’s capacity to advance valued goals. This underpins the “human development approach” of the UNDP (Melamed et al., 2012). This approach led to the construction of the Human Development Index (HDI) included in the UNDP’s 1990 Human Development Report and includes indicators of living standards, health and education, aggregated into a single number. A criticism of this aggregation is that it masks complexity and involves many assumptions about how the different components should be weighted (Melamed et al., 2012). This approach also informs the Millennium Development Goals (MDGs) developed through a process of international summitry and negotiations led by OECD donors and the United Nations (Melamed et al., 2012). A criticism of the MDGs is that they lack input from the poor – especially regarding the need for infrastructure and the threat of violence (Melamed et al., 2012). Different methods have been investigated to incorporate the needs and priorities of poor people into goal setting and measurement in

development. Two examples include wellbeing approaches where surveys are used to identify dimensions of wellbeing and participatory poverty assessments based largely on qualitative research (Melamed et al., 2012). “These approaches have to some extent traded off usability for comprehensiveness” (Melamed et al., 2012: 6). More recently, the Stiglitz-Sen-Fitoussi Commission released a report on the measurement of economic performance and social progress. They emphasized the multidimensional nature of well-being and proposed the construction of dashboards or sets of indicators designed to provide an understanding of the several facets of economic performance and quality of life, and provided “guidelines” for doing this (Stiglitz *et al.*, 2009).

5. MRV WITHIN THE SOUTH AFRICAN CLIMATE CHANGE MITIGATION AND DEVELOPMENT CONTEXT

The MRV of non-GHG impacts of mitigation needs to be aligned with South Africa’s developmental objectives. The National Climate Response National Climate Change Response White paper (October 2011) addresses this need directly. This policy, together with the many policies, plans and goals that articulate South Africa’s developmental objectives, should guide the development of the framework for the MRV of non-GHG impacts of climate change mitigation.

5.1 THE NATIONAL CLIMATE CHANGE RESPONSE POLICY REQUIREMENTS

The White paper articulates, both directly and indirectly, the need for the measurement and evaluation of climate change co-benefits. The co-benefit links are included here based on their specific reference within the various sections of the White Paper.

In the White Paper the government commits itself to:

Make a fair contribution to the global effort to stabilize GHG concentrations in the atmosphere at a level that avoids dangerous anthropogenic interference with the climate system within a timeframe that enables economic, social and environmental development to proceed in a sustainable manner (DEA, 2011, p.11).

This is guided by a variety of principles, the following of which relate directly to achievement of mitigation co-benefits: equity, special needs and circumstances, uplifting the poor and vulnerable, intra- and inter-generational sustainability, informed participation and economic, social and ecological pillars of sustainable development. The overall approach of the White Paper is:

Developmental – Prioritising climate change responses that have both significant mitigation and adaptation benefits and that also have significant economic growth, job creation, public health, risk management and poverty alleviation benefits. (p 13)

Transformational, empowering and participatory - Supports the required level of innovation, sector and skills development, finance and investment flows needed to reap the full benefit of a transition to a lower-carbon, efficient, job-creating, equitable and competitive economy. ...This policy is therefore part of a broader

social and economic transformation as envisaged by the New Growth Path (NGP) (p 13).

A strategic priority is to:

“Prioritise interventions already envisaged by national policies, legislation or strategies that have climate change co-benefits, particularly those that also contribute towards the national priorities of job creation, poverty alleviation or have other positive socioeconomic benefits” (p 14 – 15).

Finally, Section 6 deals with mitigation and described the need to also focus on non-GHG impacts of mitigation noting:

This policy identifies or sets up processes to identify the optimal combination of actions sufficient to meet the National Climate Change Response Objective. Factors to be considered include not only the mitigation potential, the incremental and direct cost of measures, but also the broader impact on socio-economic development indicators (such as employment and income distribution), our international competitiveness, the cost to poor households and any negative consequences for key economic sectors” (p 27).

5.2 SUSTAINABLE DEVELOPMENT OBJECTIVES AND REQUIREMENTS

South Africa’s sustainable development and low-carbon development goals are articulated in a variety of policies, plans, frameworks and commitments (Rennkamp, 2012). These share a lot of common ground but do not necessarily prioritize the goals in the same way or use the same metrics for measuring performance against these goals.

The National Development Plan (NPC, 2011) prioritizes the reduction of poverty and inequality. The metrics used to these indicators are the percentage of the population living below the poverty line (ZAR 418 per month, 2009 prices) and the Gini coefficient. According to the Plan the key to achieving this is to raise employment and improve the quality of education. The Plan’s targets for poverty and inequality are not national policy (yet) (Rennkamp, 2012).

The National Strategy for Sustainable Development and Action Plan (NSSD1) (DEA, 2011) builds on the National Framework for Sustainable Development (NFSD) approved by cabinet in 2008. It suggests South Africa’s main problems are job losses through the global economic crisis, rising emissions, water scarcity, rising food prices, rising oil prices globally and a domestic electricity crisis (Rennkamp, 2012).

The New Growth Path (NGP) (DoED, 2010) and the Industrial Policy Action Plan (IPAP) (DTI, 2010) also focus on poverty and inequality as the main challenges that need to be overcome (Rennkamp, 2012). The IPAP also places emphasis on localisation of manufacturing components particularly in Solar Water Heating and the renewable energy procurement programme for independent power producers (REIPPPP) (Rennkamp, 2012). The Department of Energy’s plans and priorities are communicated through the Integrated Resource Plan (IRP) with a focus on renewable energy installation. The Department of Science and Technology’s 10 Year Innovation Plan (DST, 2008) identifies five “Grand Challenges” which emphasizes

the development of the green economy (specifically the bio-economy and the development of renewable energy) through technology development and innovation. President Zuma prioritized, in the recent State of the Nation address (Zuma, 2012), unemployment, poverty and inequality and has, through the Outcomes Approach, outlined key developmental outcomes to which all cabinet ministers are required to report on.

6. ESTABLISHING A FRAMEWORK OF THE MRV OF NON-GHG IMPACTS OF MITIGATION

The establishment of a framework for the MRV of non-GHG impacts of mitigation is required to ensure that mitigation actions not only result to emission reductions but also contribute to the development and improved welfare of the South African population. Based on the literature, recent examples and the inputs from key stakeholders, this case study proposes five steps to achieving this objective:

1. Identify if non-GHG impacts of mitigation should be measured and the extent to which this information is valuable
2. Identify a set of appropriate non-GHG indicators
3. Gather and report data according to the chosen indicators
4. Verify data
5. Structure and communicate the information at the appropriate scale

6.1 ASSESS THE NEED TO MEASURE NON-GHG IMPACTS OF CLIMATE CHANGE MITIGATION

The objective of the mitigation action would determine whether, and to what extent, non-GHG impacts should be measured, reported and verified. In determining this, there is a need to assess whether the action is intended to deliver GHG emissions reductions that can be traded, whether it is funded by international donors that attach specific requirements to funding, whether the project is intended as an offset programme in the potential carbon tax system, if the action forms part of South Africa's international commitment to mitigate climate change (is domestically funded), etc. These differing objectives will influence the extent to which non-GHG impacts of climate change mitigation need to be measured, reported and verified and at what stage in process of a mitigation actions life cycle. MRV of potential non-GHG impacts of climate change mitigation, assessed during the planning stages, needs to be distinguished from impacts associated with the outcomes of a mitigation action. For example, the estimation of potential non-GHG impacts through modelling or based on outcomes of similar projects should be used to prioritize mitigation actions. However, the additional cost and time requirements to assess outcomes once the mitigation action has been implemented may outweigh the benefits of having such data, especially in instances where mitigation actions are funded by the national government as part of the country's international commitment to take action to reduce GHG emissions.

6.2 IDENTIFY POTENTIAL NON-GHG INDICATORS OF CLIMATE CHANGE MITIGATION

Steps 2 and 3 are related and their design should be jointly considered as the measurement and reporting approach influences the choice of indicators and vice versa. There are currently no international guidelines for the MRV of nationally supported actions (this relates to the MRV of GHG and non-GHG impacts). There are also no guidelines for internationally supported actions but it is expected that MRV

indicators and reporting requirements will be agreed bilaterally between the country and the funder.

A significant challenge in the MRV of non-GHG impacts of mitigation is deciding on the appropriate metrics. Various individuals and entities have proposed a variety of metrics (Cerqueira *et al.*, 2012; Elsayed, 2012; Spalding-Fecher, 2002; Sutter, 2003; Winkelman *et al.*, 2012). What to measure will depend on a range of variables. The challenge is developing a set of indicators (and a system for measuring, reporting and verifying those indicators) that is generic and flexible enough to accommodate all types of mitigation actions but specific enough to be useful, while at the same time being practical and cost-effective within the South African context. Variables influencing the choice of metrics include the local developmental objectives, the type of mitigation action, the nature of the mitigation action and various factors affecting the practicality and feasibility of MRV activities.

The local development objectives will guide the prioritisation of impacts that need to be considered. The type of mitigation action will determine the potential impacts that could be measured. For example the substitution of fuelwood for a gas or electric cooking system would have significant indoor air-pollution (and health) benefits, whereas the construction of a green building could have significant office productivity benefits. The nature of the mitigation action refers to the objective of the action which, as described above, influences the extent to which there is value in measuring non-GHG impacts of mitigation and at what stage in the life-cycle of the mitigation action this is required. Finally, there is a need to be pragmatic when choosing indicators. In this context it is important to consider a range of factors described below:

- Availability of data
 - Certain data gathering and reporting is mandated under law. In South Africa this includes the Mandatory Provision of Energy Data under section 19(1) of the National Energy Act that includes provision for the reporting of payback periods and job creation associated with energy efficiency initiatives. Various voluntary reporting systems such as the Carbon Disclosure Project and the Water Disclosure Project (CDP, 2012) require the reporting of potentially relevant data and many contracts associated with direct or indirect mitigation activities will require the reporting of financial and other data. However often data is not readily available and this will constrain the variety and nature of indicators that can be selected.
- Resource constraints
 - MRV requires financial and human resources. The skills necessary to assess impacts, particularly in the case of complex interactions and often intangible impacts, may not be available at the scale required or may require an investment in training.
- Impact measurement challenges
 - Often quantitative estimates may not be possible but qualitative impacts make benchmarking more challenging.
 - Assessing the diversity of experiences is optimal (Stiglitz *et al.*, 2009) particularly in South Africa where inequality is so pervasive and developmental efforts need to be targeted, however average measures are simpler and more cost effective.
- Standardization and building on existing systems

- Efforts to standardize indicators will be cost efficient but risk losing the nuances needed to properly understand the impact in a specific context.
- Some authors (International Partnership on Mitigation and MRV, 2012) recommend building on existing systems such as the CDM Gold Standard to provide good guidance when developing indicators for measuring co-benefits.

There will be challenges in applying a set of indicators across different spatial and temporal scales and this may require different methodologies and indicators to be applied (Elsayed, 2012; Stiglitz et al., 2009). Mitigation actions are often implemented at a local scale but the impacts need to be captured at a national scale. Sustainable development goals also differ across different spatial scales making it difficult to apply locally relevant indicators that can be used for comparative purposes or that can contribute to an understanding of sustainable development performance at the aggregated national level. It may also be the case that certain mitigation actions will need to be considered at a regional scale (in the case of South Africa shifting to gas, hydro or other potentially less carbon intensive sources of energy purchased from neighboring countries). Moreover, for practical reasons, impacts are often measured at points in time and therefore do not necessarily provide an indication of the impacts over time.

Another important question relates to the individuals / organization responsible for identifying which indicators are appropriate. A top-down approach to determining indicators has the advantage of gaining a panoramic view of the situation as a whole and the opportunity to use it to identify factors that have an impact on trends in the medium and long term (International Partnership on Mitigation and MRV, 2012), as well as to ensure that the approach is aligned to national objectives. Such an approach can also be more pragmatic and cost effective as it is simpler to establish and administer. The disadvantage is that a top-down approach loses detail and may not capture the local communities' actual experiences, a requirement advocated in much of the development theory. According to Von Ritter and Aschmann (2012) the top-down direction already exists in some shape in South Africa, simply because of political and budgetary dependency of local governments on national government. However, the bottom-up direction is less developed although it is explicitly stipulated in the White Paper and in South Africa's principle of cooperative government. There is thus a need to strengthen bottom-up communication.

Determining the level of attribution that can be assigned to a specific mitigation action or measure is often very challenging (Elsayed, 2012). There can also be problems with using proxy measures for example access to electricity does not necessarily indicate access to safe and affordable modern energy services or that low carbon emissions and a high use of biomass is sustainable when this may reflect poverty and underdevelopment (Spalding-Fecher, 2002). These and other challenges would need to be considered when what indicators to measure. These considerations are explained through the application of a generic example of determining a set of non-GHG indicators described below.

6.3 GATHER AND REPORT DATA

Once non-GHG indicators have been prioritised a system then needs to be set up to manage the process of gathering and verifying the data. Once again the nature of the mitigation action will determine the data requirements.

In certain circumstances, such as when mitigation is intended to generate credits or is funded by an international donor, a baseline will be required against which impacts

are measured. When funded domestically the establishment of a baseline would be preferable. During the initial stages at least, collection of data on the impacts of mitigation actions will be useful for benchmarking and planning of future projects. If data are qualitative then it may be worth applying a scaling system. For example, one could adopt a scaling system of 1–5, with the numbered categories clearly defined. Alternatively a simpler system, such as that adopted in the Gold Standard, classifies the impacts as negative, neutral or positive. Such systems would require skills to administer. In this context a key consideration will be the skills that will need to be developed and in which institutions. The experience of the Designated National Authority in South Africa with CDM showed that collecting data is challenging (questionnaires were used) and no significant form of verification took place. A scorecard approach was suggested but this was not supported during public participation.

The collection of data should be integrated into existing measuring and reporting systems where possible and every effort should be made to reduce the reporting burden on officials and other project stakeholders. For less tangible indicators (such as those relating to well-being) data collection based on participatory, survey and ethnographic approaches (the assessment of societies and cultures through the collection of detailed observations and interviews) should be considered. Guidance will need to be provided on reporting requirements for project implementers and setting deadlines for the submission of monitoring reports will help enforce MRV of sustainable development metrics (Cerqueira *et al.*, 2012).

If gathering data for the planning phase of a mitigation action, with the intention of informing the selection of mitigation actions that have a greater contribution to the developmental objectives of the country, policy makers will need to model potential impacts. This could range from a simple identification of the experiences of similar actions already implemented in similar contexts or through the use of more formal modelling techniques. Local organisations with capacity to model potential socio-economic and other environmental impacts of mitigation include (this list is not exhaustive) the Energy Research Centre (at the University of Cape Town), Eskom, the CSIR, the Centre for Renewable and Sustainable Energy Studies (at the University of Stellenbosch), DNA Economics, Green House, KPMG, Department of Energy and National Treasury. National Treasury has the capacity to conduct economy-wide assessments of mitigation co-benefits. The focus is on macro-economic impacts (emissions, GDP, employment, etc.). Equity is measured according to the Gini coefficient. Potential impacts on health are not currently being assessed and the current modelling approach also fails to assess some well-being measures such as social cohesion. It is possible to assess “winners” and “losers” through income across deciles and costs that those deciles face before and after the implementation of the mitigation action.

6.4 VERIFY DATA

International Consultation and Analysis (ICA) of Biannual Update Reports (BURs) are the mechanisms used to verify mitigation actions, outcomes and support and should be non-intrusive, non-punitive and respectful of national sovereignty (Cerqueira *et al.*, 2012). Currently there is no guidance on the verification of non-GHG data. It is expected that verification requirements, and potentially guidance, would be agreed bilaterally in the case of internationally supported mitigation actions. Where South Africa supports the implementation of the mitigation action then using approaches developed in the CDM process could be used where the financial resource and time requirements could be justified. There is uncertainty regarding the verification of offsets under the National Treasury’s proposed carbon tax in South Africa. It is expected that the Treasury will build on approaches already

used in the CDM process and in the verification of private sector emissions. Standards such as the Gold Standard may also be accepted.

6.5 STRUCTURE AND COMMUNICATE THE INFORMATION AT THE APPROPRIATE SCALE

The information needs to be packaged according to the objective of the mitigation action and the report audience. The way statistics are reported is important. Certain indicators are not appropriate when trying to consider certain effects. What is required is a good understanding of the appropriate use of each measure (Stiglitz et al., 2009). There are a number of innovative approaches to presenting this information that move beyond traditional reporting. For example the ECN (with partners) developed an impact assessment tool that visually represents sustainable development impacts of mitigation with aims of communicating development impacts and facilitating decision-making (ECN, 2012). HELIO international has developed TIPEE to assist decision-makers use information on 24 indicators that include environmental, social, economic, technological, governance, vulnerability and resilience indicators to support “ecodevelopment” (sustainable and equitable development). The indicators are presented graphically and compared over time to assess progress. The system has been applied in Togo and Camaroon (HELIO-International, 2012).

7. IDENTIFYING APPROPRIATE INDICATORS: AN EXAMPLE

The indicators proposed in this case study are derived from a range of South African policies, plans, frameworks and commitments, the literature on development theory as well as relevant examples from the literature that focus on the MRV of GHG and non-GHG impacts of climate change mitigation actions.

The key developmental polices, plans and programmes consulted, in addition to the National Climate Change Response Policy, included the New Development Path, the National Growth Plan, The Industrial Policy Action Plan (IPAP), the Integrated Resource Plan (IRP), the National Sustainable Strategy for Sustainable Development and Action Plan (NSSD1), the department of Science and Technology’s 10 year Innovation Plan and the Presidential Outcomes. The South African government commitments also incorporate many of the indicators discussed in the development theory literature, most notably the Millennium Development Goals (MDGs). Not all of South Africa’s sustainable development related commitments and indicators are explicitly included but the older plans and commitments are likely incorporated in the more recent documents highlighted below. For example the NSSD1 indicators were derived from the MDGs, the Development indicators published by the Presidency, the Environmental Sustainability Indicator Technical Report, and the DTI’s Medium Term Strategic Framework (MTSF).

Criteria for assessing well-being, as described in the development theory literature, included impacts on material living standards (income, consumption and wealth); health; education; personal activities including work, political voice and governance; social connections and relationships; environment (present and future conditions); insecurity, of an economic as well as a physical nature (Stiglitz *et al.*, 2009). Also considered were the Human Development Index, the Millennium Development Goals, methods of assessment such as the Participatory Poverty Assessments (Melamed et al., 2012), and the extensive research that has been carried out on climate competitiveness, and the institutions that have made attempts at quantifying this concept through metrics and indices (Elsayed, 2012).

From the co-benefit literature the approach drew on CDM criteria from Sutter (2003); metrics from Casillas and Kammen (2012), Elsayed (2012), Winkler *et al.* (2008); and Spalding-Fecher (2002) who used sustainability indicators for the energy sector in South Africa based on the Helio International Sustainable Energy Watch (SEW) framework. Valuable lessons are also provided by the Centre for Clean Air Policy drawing from experience with MRV in the development community, and propose specific sustainable development metrics that can be used in five key sectors: Transportation; Renewable Power Generation; Residential, Commercial and Public Building Energy Efficiency; Industrial Energy Efficiency; and Waste Management (Cerqueira *et al.*, 2012). The authors suggest that the selection process should aim for indicators that are specific, measurable, cost-effective to harvest, relevant, understandable and meaningful to domestic policy-makers and contributing countries (Cerqueira *et al.*, 2012).

Current approaches considered included the South African CDM matrix, the Gold standard SD Matrix (The Gold Standard, 2012) and indicators used by the Climate Community and Biodiversity Standard and Social Carbon. The South African CDM matrix is based on the requirements of the National Environmental Management Act (1998). The Designated National Authority assesses projects according to this matrix to make a judgment on the overall contribution of a CDM project to sustainable development (DNA, 2012). This approach is summarized in Figure 1 which shows how the three elements (South Africa’s developmental goals, current approaches to measuring non-GHG impacts of mitigation and examples from development theory were combined to produce a potential set of nationally appropriate indicators to assess impacts of mitigation in South Africa.

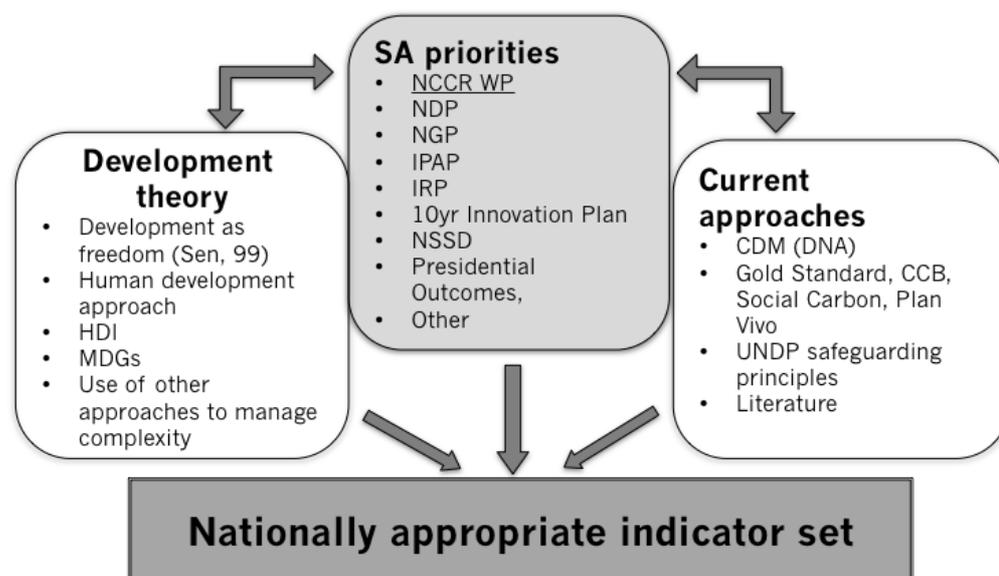


Figure 1: prioritizing non-GHG indicators of mitigation actions based on South Africa’s priorities, developmental theory and current approaches and literature

A tiered approach was used to try to accommodate issues of scale in order to ensure that at the highest (national) level, indicators are measured that relate to South Africa’s developmental goals (tier 1 criteria). At the lowest level (tier 3) there is some flexibility to allow for context specific indicators to be developed but restrained in a way that the data could be aggregated and reported at a higher level (tier 2) that sits below the high-level tier 3 criteria. This approach emphasizes the need to set a framework that ensures alignment towards high-level goals but allows for locally

relevant indicators that can be cascaded upwards to be relevant within that high-level framework. Using the approach outlined in

Figure 1 a preliminary set of potential indicators was developed. As an example, this list was simplified to create a potential set of indicators and is presented in Table 1. It is important to stress that this approach should be seen as an example of a possible selection of appropriate indicators but that in a real application the issues highlighted earlier in this case study would need to be considered to ensure the MRV of non-GHG impacts is appropriate to the specific mitigation action.

Table 1: A sample set of non-GHG impact indicators for a mitigation action in South Africa

Tier 1 indicators: South African goals							
Reducing poverty	Job creation (developing livelihoods)	Economic development	Expansion of infrastructure	Transitioning to a sustainable economy	Improving education and training	Providing quality health care	Improving governance and institutions
Tier 2 indicators							
Reduction of people living below R418 per month (2009 prices)	Reduction in the level of unemployment	Increase the GDP per capita	Infrastructure spend	Sustaining our ecosystems and using natural resources efficiently	Improved education at all levels	Improved health care management	Building a capable state, Fighting corruption and enhancing accountability,
Tier 3 indicators							
Improvement in incomes of the poorest households	Number of jobs (net jobs over short, medium and long term)	Local economic indicators as appropriate (e.g. GDP by sector / sub-sector)	Capital investment in infrastructure	GHG emission reductions achieved	Skill developed	Changes in life expectancy	Local government skills developed
Number of households with improved access to basic services	Distribution of employment opportunities (gender, income group, skill level, BBBEE)	Cost	Type of infrastructure investment	Impact on water quality and quantity available	Changes to gender equality in education	Changes in childhood nutrition	Scale of stakeholder participation

As previously mentioned this approach would need to be tailored depending on the objective of the mitigation action and the extent to which impacts, actions or potential impacts (modelled when planning mitigation actions) need to be measured, reported and verified.

8. CONCLUSIONS AND RECOMMENDATIONS

Measuring sustainable development impacts requires both objective and subjective data. The challenge is to improve upon what has already been achieved, to identify gaps in available information, and to invest in capacity to MRV non-GHG impacts of climate change mitigation. To achieve this, within the context of the development of the climate change M&E system in South Africa, a number of recommendations are provided.

8.1 UNDERSTAND DRIVERS AND SUSTAINABLE DEVELOPMENT GOALS

There needs to be a common understanding of the drivers and sustainable development goals. Each department has its own objectives and these are broadly aligned but greater clarity of the requirements of the M&E system will help to align goals but also minimize duplication of reporting effort. This is a longer term objective

and relevant to all aspects of government reporting with respect to development objectives but the complexity of climate change presents an opportunity to more explicitly tackle this challenge.

8.2 NO REGRETS FIRST

South Africa needs to start focusing on MRV that meets domestic purposes before looking to meet any potential international requirements. This approach would also allow for informed contributions to designing an international approach/ system that would suit South Africa. This does not apply to creditable mitigation actions and actions supported by international funding which may require the MRV of non-GHG impacts.

8.3 FOCUS ON A LEAST-COST SYSTEM

Many non-GHG impacts of mitigation are already being measured- such as costs of capital and employment in formal contracts - and these need to be captured within South Africa's M&E system. Building on what is already being done will contribute to a least-cost system. Efforts to harmonize existing systems would also avoid duplication of effort. Cerqueira *et al.* (2012) highlight the importance of including costs for technical assistance, staff support and financial resources necessary to measure and evaluate metrics. Since the technical assistance, staff support, and financial resources required to effectively when securing financing for NAMA development

8.4 BUILD A BOTTOM-UP SYSTEM INFORMED (NOT DICTATED BY) TOP-DOWN

Stakeholders need to be consulted in the process of choosing which indicators to measure, based on a firm belief that the close participation of local people is one of the strongest guarantees that they will benefit from a project (Wood, 2011). This will hopefully ensure buy-in and prevent criticism associated with devoting resources to mitigation actions. An approach that is too prescriptive is unlikely to meet stakeholder expectations and requirements.

8.5 FOCUS ON SIMPLICITY AT THE INITIAL STAGE

The system needs to be iterative, building on experiences and developing as resources became available (if more resources become available) and as systems mature and develop. It is important that the system is valuable even if comprehensive non-GHG data is not collected but rather that some developmental impacts of mitigation are considered. Limiting the number of indicators chosen will simplify the process but this needs to be balanced against the need for a range of different measures required to measure well-being (Stiglitz et al., 2009)

8.6 IMPROVE THE SYSTEM OVER TIME

Establish a system that can allow for greater levels of MRV of non-GHG impacts over time. This flexibility will also allow for a learning-by-doing approach.

8.7 INVEST IN THE SYSTEM

Resources will be required to develop statistics and indicators that provide policymakers with the information they need to make the decisions confronting them (Stiglitz et al., 2009). Additionally, a high level of skills is required to assess complex

interactions and make qualitative judgements. The DNA experience showed that, in addition to a clear framework, appropriate skills are required and will likely need to be developed in South Africa.

8.8 SET UP THE SYSTEM TO ATTRACT INTERNATIONAL FUNDING

A system that can MRV non-GHG impacts may attract more international funding for mitigation actions. MRV requirements will need to be bilaterally negotiated with international funders. Recent evidence suggests that funders will place a significant emphasis on MRV of sustainable development indicators. In a partnership with the Thai government, the Danish Energy Agency is requiring the MRV of mitigation co-benefits and other non-GHG indicators relating to actions (e.g. training, implementation of awareness campaigns, enterprises supported, etc.) and the sustainability of the project (e.g. assessing whether the fund can be replicated, if the system can be sustained without donor funding, etc.). KfW¹ is supporting Programme Based Actions (PBAs) and prioritises those that can demonstrate positive sustainable development impacts. The Government of Norway's International Climate and Forest Initiative² supports mitigation in Guyana and requires the MRV of non-GHG impacts but accepts that building a system takes time and is accommodating of the system improving over time. Increasingly, international funders will require the demonstration of positive sustainable development outcomes and so the M&E system needs to be designed to accommodate this even if on an *ad hoc* basis and in the longer term.

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¹http://www.kfw.de/kfw/en/KfW_Group/Sustainability_and_Climate_Protection/Further_activities/New_Market_Mechanisms.jsp

² <http://www.regjeringen.no/en/dep/md/Selected-topics/climate/the-government-of-norways-international-/why-a-climate-and-forest-initiative.html?id=547202>

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