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Publication date:
2014

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Citation (APA):

Olsen, K. H. (2014). *Sustainable Development Impacts of Nationally Appropriate Mitigation Actions: An integrated approach to assessment of co-benefits based on experience with the Clean Development Mechanism*. Paper presented at Forum on Development and Mitigation, Cape Town, South Africa.

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Sustainable Development Impacts of Nationally Appropriate Mitigation Actions: An integrated approach to assessment of co-benefits based on experience with the Clean Development Mechanism

Presented at 'Forum on Development and Mitigation', Breakwater Lodge, Graduate School of Business, Cape Town, 27-29 January 2014

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Abstract:

Sustainable development priorities provide the context for Nationally Appropriate Mitigation Actions (NAMAs) by developing countries. While methods exist to assess the sustainable development (SD) co-benefits of Clean Development Mechanism (CDM) projects, no approach has yet been developed to assess the SD impacts of NAMAs. This paper argues for a new integrated approach to assess NAMAs' SD impacts that consists of SD indicators, procedures for stakeholder involvement and safeguards against negative impacts. The argument is based on a review of experience with the CDM's contribution to SD, particularly how a combined process and results approach known from the CDM SD Tool can be applied to develop a strong approach for SD assessment of NAMAs based on a comparison of similarities and differences between NAMAs and CDM. Five elements of a new approach towards assessment of NAMAs SD impacts are suggested based on emerging approaches and methodologies for monitoring, reporting and verification (MRV) of greenhouse gas reductions and SD impacts of NAMAs.

Keywords: Nationally Appropriate Mitigation Actions (NAMAs), sustainable development impacts, developing countries, Clean Development Mechanisms (CDM), monitoring, reporting and verification (MRV), co-benefits

1. Introduction

A key principle of sustainable development in the climate negotiations is developing countries 'right to development'¹ (UN 2002; UN 2011). Nationally Appropriate Mitigation Actions (NAMAs) are framed in the context of sustainable development (SD) and represent developing countries' net contribution to the global mitigation effort, which IPCC recommends should be in the order of a 15% -30% deviation from the business as usual scenario by 2020 to stay below 2 C of global warming (IPCC 2007). A key concern of many

¹ The paper does not define sustainable development but treats it as the object of study, subject to numerous definitions by sovereign nation states, each defining nationally appropriate criteria for SD according to politically defined development objectives. SD impacts are understood as a subset of development impacts. The paper does not pass judgement, whether nationally defined SD criteria meet a particular scientific definition of sustainability.

developing countries is that mitigation actions are costly, that quantitative emission reduction targets or caps will limit their economic development (Koakutsu, Tamura et al. 2012; Dubash, Raghunandan et al. 2013) and do not support poverty alleviation priorities (Wlokas, Rennkamp et al. 2012). Addressing these concerns expressed as the right to development calls for an integrated approach to mainstream climate change mitigation within frameworks of national development planning (Olsen 2013).

Since the Bali Action Plan introduced the concept of NAMAs in 2007 the voluntary pledges submitted under the Copenhagen Accord and the Cancun Agreements have been a key driver of new climate policies and legislation developed at national and sub-national levels (UNEP 2012). However, the concept of NAMAs is still considered to be immature, poorly understood and with little influence over domestic mitigation actions (Tyler, Boyd et al. 2013). While the concept of NAMAs is slowly developing bottom-up, based on developing countries' sovereign definitions of what 'nationally appropriate' means, lessons learned in the 110 developing countries that are hosting CDM projects (Fenhann 2013) represent a wealth of human and institutional capacity to manage and implement mitigation actions. As the only mechanism involving developing countries in the creation of a global carbon, the CDM is widely recognized as a stepping stone towards new policy measures such as NAMAs and New Market Mechanisms (NMM) to be linked under a global Framework for Various Approaches (FVA) (PDF 2012; EC 2013; Marcu 2013).

To assess the sustainable development impacts of mitigation actions the policy objective of CDM to assist Non-Annex 1 countries with the achievement of SD is similar to the policy objective for NAMAs to contribute to national sustainable development. For NAMAs, however, a 'development first' approach departs from national development priorities as the driving force for GHG reductions. For CDM the demand for GHG reductions by Annex 1 countries indicates a 'climate first' approach driving the CDM projects, where SD assessment has been characterised by weak national and international practices for MRV of the SD co-benefits (Olsen and Fenhann 2008; Sterk, Rudolph et al. 2009). The reversal of priorities calls for a strong approach to SD assessment of NAMAs. As national development objectives will shape the design of mitigation actions the impacts for SD should be MRV'ed together with GHG reductions to ensure that mitigation actions deliver both development and climate benefits. While methods exist to assess the SD co-benefits of mitigation projects in the context of CDM, no approach has yet been developed to assess the SD impacts of NAMAs.

This paper argues for a new, integrated approach to assess and promote NAMAs SD benefits that consist of SD indicators, procedures for stakeholder involvement and safeguards against negative impacts. The argument is based on lessons learned from CDM and a comparison of similarities and differences between the CDM and NAMAs. To understand the concept of NAMAs and its relationship to sustainable development the emerging typologies of domestic mitigation actions are assessed and the needs for assessment of sustainable development impacts of NAMAs are identified. To learn from CDM experience the paper reviews the literature on sustainability assessment of CDM projects focusing on the relevance of a new, international, voluntary standard for SD assessment to highlight the co-benefits of CDM projects and programmes of activities; the CDM SD Tool approved by the CDM Executive Board at its 70th meeting in Doha, 2012. Searching for a strong, nationally appropriate approach to assess the SD impacts of NAMAs, the CDM SD Tool is applied to analysis of eight NAMAs submitted to the UNFCCC Registry. Exploring the differences between CDM and NAMAs the project and action cycles for mitigation actions is compared and an integrated approach to assessment of NAMAs SD

impacts is proposed, informed by the CDM SD Tool analysis of NAMAs. Based on this analysis the argument of the paper is structured in three sections: 1) NAMAs in the context of sustainable development; 2) The relevance of CDM experience for SD impact assessment of NAMAs; and 3) Towards an integrated approach for assessment of NAMAs SD impacts based on emerging approaches and methodologies.

2. NAMAs in the context of sustainable development

Nationally Appropriate Mitigation Actions (NAMAs) by developing countries were first introduced in the Bali Action Plan in 2007:

“Nationally appropriate mitigation actions by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner” (1/CP.13, paragraph 1 (b) (II))

The notion of ‘nationally appropriate’ refers to the political mandate in the decision that mitigation actions in developing countries shall not be climate-centric but are closely related to the concepts of development, sustainable development and co-benefits (Tyler, Boyd et al. 2013). By ‘nationally appropriate’ is meant that development priorities are the primary objectives of NAMAs as opposed to mitigation actions in themselves that have no substantial co-benefits. In the IPCC Fourth Assessment report the relationship between mitigation actions and sustainable development is described as a two-way relationship (Sathaye and R. Schaeffer 2007). In a ‘climate first’ approach the problem is framed as a challenge to reduce emissions of greenhouse gases and as a second priority sustainable development is viewed as the co-benefits of mitigation actions. In a ‘development first’ approach the problem is framed as a sustainable development challenge, i.e. how to make development sustainable for future generations, realising that GHG emissions are unintended negative impacts of economic growth. The concern is how to mainstream mitigation actions into development frameworks to achieve low emission development pathways that contribute to national development priorities in a sustainable way. The perspective of whether climate or development comes first has implications for how to assess the contribution of NAMAs to sustainable development, though it is not a choice of one or the other, as the two approaches are complementary.

Low carbon development strategies

Since Cancun COP-16, NAMAs have been conceptualised in the context of ‘Low Carbon Development Strategies’ (LCDS). The notion of a LCDS was first introduced in the Copenhagen Accord (2/CP.15, paragraph 2) as a framework to describe countries contribution to the global mitigation effort and indicate specific NAMAs to realise this contribution. In the Cancun Agreements the idea of a LCDS is further developed referring to the importance of national development priorities:

“Parties should cooperate in achieving the peaking of global and national greenhouse gas emissions as soon as possible, recognizing that the time frame for peaking will be longer in developing countries, and bearing in mind that social and economic development and poverty eradication are the first and overriding priorities

of developing countries and that a low-carbon development strategy is indispensable to sustainable development” (1/CP.16, paragraph 6)

There is not an international definition of an LCDS but elements of a strategy are likely to include the identification of national options and prioritized actions for low-carbon development in the mid- and long term, sector specific options and a roadmap on how to implement the actions (Lütken, Fenhann et al. 2011). To assess the development impacts of implementing a LCDS and facilitate decision-making on which combination of NAMAs can best contribute to development goals, a new Development Impact Assessment (DIA) tool has been proposed (LEDS_GP 2012). The tool is a visual representation of a country's development priorities categorized into social, economic and environmental impacts combined with an illustration of the costs associated with different mitigation options based on Marginal Abatement Cost (MAC) curves. Available information is used to assess the impacts of NAMAs and the tool is meant to facilitate communication and stakeholder dialogue on the interplay between climate actions and development impacts. Currently the visual tool is being piloted as part of LCDS processes in Kenya, Montenegro and Vietnam to explore its utility in guiding data collection and presenting findings to stakeholders. Preliminary findings from Kenya suggest the tool works best at sector or sub-sector level, not country-wide (Würtenberger 2012). Data are primarily qualitative and prioritization is done through expert input for scoring different options.

In the negotiations leading up to Cancun some developing countries feared, the LCDS would be a back door to binding emission reduction targets, if support to NAMAs was to be conditional on the development of an LCDS. The development of an LCDS is hence voluntary for developing countries but mandatory for developed countries and NAMAs may or may not be framed in this context.

NAMAs

Similar to the concept of an LCDS there is no international definition of a NAMA. Both concepts are developing bottom-up, as Parties have the freedom to interpret and implement LCDS and NAMAs in line with their own priorities for development in a sustainable way. The absence of a COP definition of what a NAMA is – and what cannot be considered a NAMA - has led to some confusion to understand different notions of NAMAs. The NAMA Partnership (www.namapartnership.org) coordinated by the UNFCCC Secretariat has established a NAMA Wiki (www.namapartnership.wikispaces.com) that distinguishes between two avenues for submission of NAMAs to the UNFCCC:

- 1) **Pledge NAMAs:** National goals for emission reductions contributing to the global mitigation effort that are submitted to the UNFCCC Secretariat in the context of a new climate agreement to be agreed by 2015. The pledges of national mitigation goals represent Parties engagement at the international level.
- 2) **Individual NAMAs:** Actions to be implemented at national level. The actions can be policies, measures, programmes or projects that a Party decides to implement to achieve the goals specified in the pledge NAMAs.

This paper is concerned with individual NAMAs representing actions implemented at national level. Tracking the status of NAMA development the UNEP Risoe NAMA Pipeline provides a

monthly updated database and analysis of NAMAs and information on support submitted to the UNFCCC Registry: www.namapipeline.org Focusing on the NAMAs seeking international recognition or support via the NAMA Registry there were 40 NAMAs submitted by Non-Annex 1 developing countries by 1 October 2013 as shown in Table 1.

Table 1: NAMAs submitted to the UNFCCC Registry

Submitted NAMAs	Seeking external support			Total
	For preparation	For implementation	For recognition	
Latin America	3	7	3	13
Chile		3	1	4
Dominica		1		1
Dominican Republic		2		2
Uruguay	3	1	2	6
Asia & Pacific	0	2	0	2
Cook Islands		1		1
Indonesia		1		1
Europe & Central Asia	0	12	1	13
Serbia		12	1	13
Africa	3	0	0	3
Mali	2			2
Ethiopia	1			1
Middle East	6	3	0	9
Jordan	6	3		9
Total	12	24	4	40
Least Developed Countries	3	0	0	3

Source: UNEP Risø NAMA Pipeline, 1 October (2013). Shaded countries are Least Developed Countries.

Based on the NAMA Registry a typology of actions has emerged that distinguish between sources of financing and the stage of implementation as shown in Table 2.

Table 2: Categories of NAMAs

Categories of NAMAs	Submissions to NAMA Registry
Supported NAMAs	Seeking support for preparation – design stage Seeking support for implementation – implementation stage
Unilateral NAMAs	For Recognition – any stage

A third category of NAMAs is discussed as ‘Credited NAMAs’ to be traded in the global carbon market. The NAMA Registry, however, has no mandate to facilitate the crediting of NAMAs. Instead, negotiations to develop an international unit for UNFCCC compliance with emission reduction targets are taking place in the context of New Market Mechanisms (NMM) and a Framework for Various Approaches (FVA) negotiated under the Subsidiary Body for Scientific and Technological Advice (SBSTA). A pilot phase to start developing the elements of a NMM is proposed to be launched at COP-19 in Warsaw (EC 2013). A fourth category of NAMAs is proposed by Tyler, Boyd et al. (2013) to be the catch-all concept of ‘domestic mitigation actions’, referring to actions that are not recorded by the UNFCCC at international level but are taking place at national level driven by a variety of climate and other policy goals. The notion of unrecorded mitigation actions is relevant, as countries

engagement with NAMAs appears to be ad hoc, un-coordinated and non- strategic and existing domestic mitigation actions are not linked.

Distinguishing between a 'development first' versus a 'climate first' approach to mitigation actions, the paper argues for SD assessment at two complementary levels: 1) Assessment of the SD co-benefits of individual NAMAs (climate first approach) to assess the local SD co-benefits of mitigation actions; and 2) Assessment of the impacts at strategic level (LCDS) towards transformational change for low carbon and sustainable development at national or sectoral levels (development first approach) including a quantification of the GHG reductions. Assessment at both levels is complementary to facilitate a substantive approach to national appropriateness as well as a procedural approach (Tyler, Boyd et al. 2013). A substantive approach is based on a bottom-up, project or programme approach relying on national SD criteria to assess, if the action is aligned with national priorities for SD. A procedural approach to SD impact assessment assumes top-down, strategic alignment with national development planning priorities, which makes actions automatically appropriate. The procedural SD impact assessment is needed *ex-ante* to inform the LCDS climate policy process including the design of individual NAMAs. The substantive SD impact assessment of local co-benefits is needed during implementation and *ex-post* the action to track progress towards the SD goals for transformational change. The *ex-ante* and the *ex-post* SD impact assessments are hence complementary and part of an integrated approach covering all stages in the NAMA action cycle (See Table 4).

3. The relevance of CDM experience for SD impact assessment of NAMAs

While developing countries emphasize the right to sustainable development as a key driver for NAMAs, developed countries are mainly interested to support and finance the GHG reductions (Sterk, Rudolph et al. 2009). The CDM tried to bridge this divide by establishing two objectives but in practice the demand for CDM projects is driven by GHG reductions (Olsen 2007). In contrast, NAMAs are developing bottom-up, incentivized by developing country governments following a development first approach (Koakutsu, Tamura et al. 2012; Wlokas, Rennkamp et al. 2012). Accordingly sustainable development objectives that reflect national development priorities are now widely recognised as a key driver of NAMAs in developing countries (Cerqueira, Davis et al. 2012; LEDS_GP 2012; Tilburg, Röser et al. 2012; GIZ 2013). This reversal of priorities is leading the SD benefits of NAMAs to be integrated into the MRV frameworks as an equally important metric to be monitored, reported and verified as GHG reductions and actions.

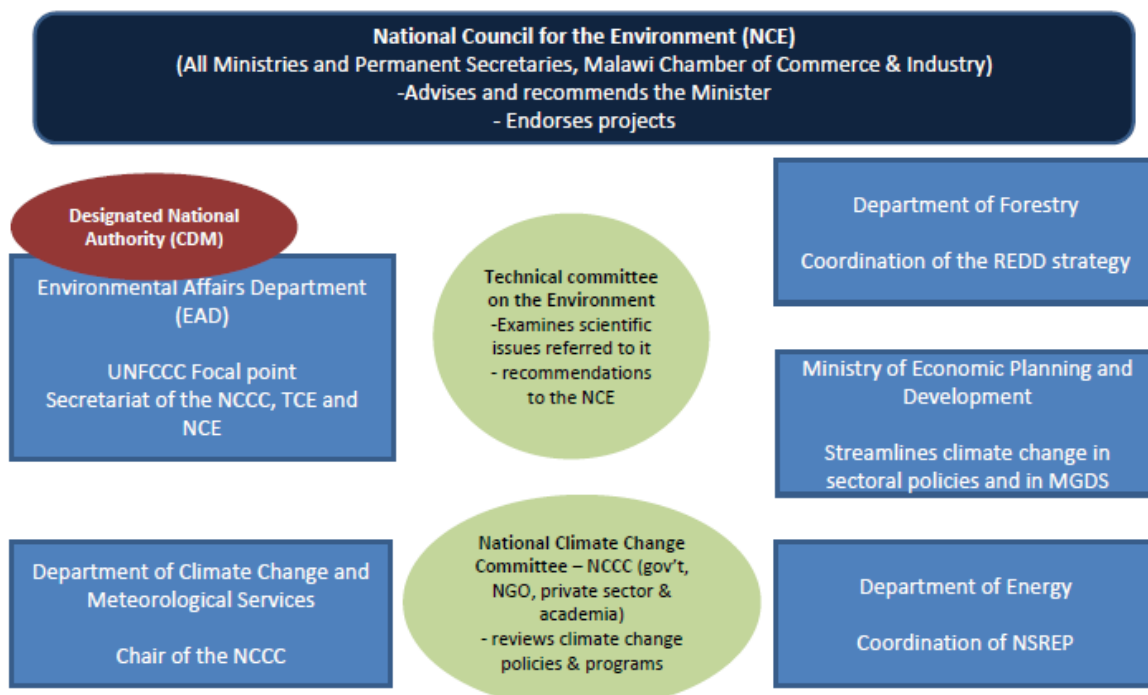
To learn from CDM experience and identify how NAMAs are different from CDM, the next section reviews how SD 'co-benefits' are assessed in the context of CDM. Key aspects of CDM experience relevant to NAMAs include the institutional set-up for national approaches to SD assessment and a voluntary, international CDM SD tool approved by the CDM Executive Board in November 2012.

Institutional set-up: The Designated National Authority (DNA)

The decision that: 'it is the host Party's prerogative to confirm whether a CDM project activity assists it in achieving sustainable development' has been reaffirmed in several decisions (17/CP.7, 1/CMP.2, 2/CMP.3 & 2/CMP.4). Accordingly, host countries' institutional set-up and definitions of SD vary reflecting national circumstances and development priorities.

Often DNAs are hosted by Ministries of Environment also hosting the UNFCCC Focal Point, though the diversity in legal structure, partners, sources of technical and financial support and responsibilities is large reflecting country specific circumstances (Figueres 2002). The set-up with Ministries of Environment taking a lead indicates that climate mitigation issues were typically not at the heart of development planning priorities, when DNAs were established around 2002 and onwards (Olsen 2006). This is changing, however, with the development of LCDS and NAMAs being closer to the central development planning and financial ministries that take a lead to coordinate and mainstream climate issues, while sector ministries take a lead on particular mechanisms such as REDD+ (Njewa 2012). A common development is for the DNAs approving CDM projects to also be appointed as NAMA approvers, as UNFCCC Focal Point responsibilities are broadened to coordinate both CDM and NAMA mitigation actions at country level. An example from Malawi illustrates a common institutional set-up for the DNA with a CDM Focal Point serving as the secretariat that service a CDM Technical Committee and a National Council on the Environment (Malawi 2010). See Figure 1.

Figure 1: Institutional set-up for the CDM in Malawi



Source: Njewa (2012)

The DNA Focal Point is hosted by Environmental Affairs Department, Ministry of Natural Resources, Energy and Environment. The key mandate of the DNA is to assess, whether CDM project idea notes (PINs) and project design documents (PDDS) submitted to the DNA are in line with national sustainable development criteria (Malawi 2013). If CDM projects comply with national SD criteria, the DNA will issue a Letter of No Objection for PINs and a

Letter of Approval (LoA) for PDDs. A Technical Committee² is established to review CDM projects and make recommendations for approval by the National Council on the Environment (NCE). The NCE consists of all Ministries and Permanent Secretaries, Malawi Chamber of Commerce & Industry and it advises and recommends the Minister. The Council will make a final decision on approval or rejection taking into consideration the advice received from the CDM Technical Committee.

In literature on the CDM's contribution to sustainable development the strengths and weaknesses of host countries' assessment approaches have been identified and analysed over the years (Figueres 2005; Olsen 2007; Corbera and Jover 2012; (Couth and Trois 2012)). Critique is raised the current set-up is weak due to the lack of clear and transparent SD criteria by many host countries (Sterk, Rudolph et al. 2009), cases of registered projects with no SD benefits or negative impacts (TERI 2012) and the lack of requirements or procedures to monitor, report and verify that intended SD benefits are actually achieved (Olsen and Fenhann 2008).

An international voluntary approach to SD assessment – the CDM SD tool

Responding to critique the CDM is not significantly contributing to sustainable development the CDM Executive Board launched a call for input in June-July 2011 to invite comments on how to include co-benefits and negative impacts in the documentation of CDM project activities, and the role of the different actors and stakeholders in this process (Secretariat 2011). The issue was raised to the highest political level when the Conference of the Parties serving as the meetings of the Parties to the Kyoto Protocol (CMP) at its seventh session in Durban requested the Board to:

“continue its work and develop appropriate voluntary measures to highlight the co-benefits brought about by the CDM project activities and programmes of activities, while maintaining the prerogative of the Parties to define their sustainable development criteria” (8/CMP.7, paragraph 5).

In this decision, there is no reference to negative impacts. This later came to play a crucial role, when members of the Executive Board at its 69th meeting argued there was no mandate for the SD tool to assess negative impacts of CDM projects. The Secretariat was requested to simplify the tool by leaving out two of the three elements in an integrated approach to SD assessment, namely safeguards to avoid negative impacts and enhanced procedures for stakeholder involvement. At EB70 the final CDM SD tool was decided. The decision reduced the draft tool to only declare the SD co-benefits using a taxonomy. This

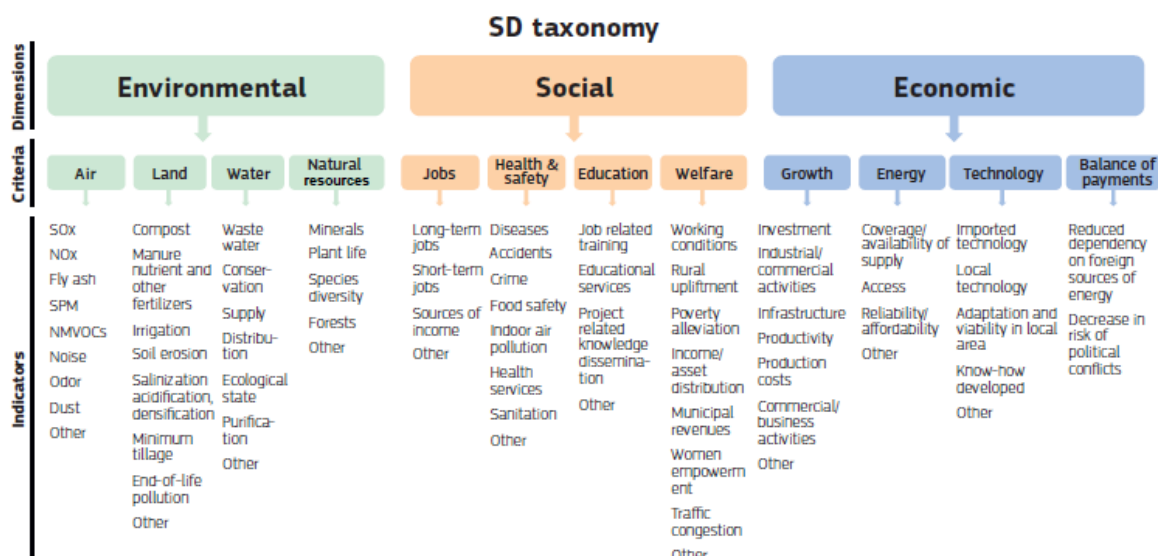
² The Committee comprises the following Institutions: Coordination Union for the Rehabilitation of Environment (CURE), Department of Energy, Department of Forestry, Environmental Affairs Department, Malawi Environment Endowment Trust (MEET), Malawi Investment Promotion Agency (MIPA), Ministry of Development Planning and Cooperation, Ministry of Finance, Ministry of Local Government, Ministry of Industry and Trade, Ministry of Irrigation and Water Development, Mzuzu University, Malawi Industrial Research Technology Development Centre (MIRTDC), University of Malawi (Constituent colleges as appropriate), Wildlife and Environment Society of Malawi (WESM).

interpretation disregarded the CMP decision that EB should ‘continue its work’ from the EB65 report focusing on how to include co-benefits and negative impacts in the documentation of CDM project activities, and the role of the different actors and stakeholders in this process (EB65, Annex 17).

The CDM SD tool taxonomy

The findings from SD assessment in host countries, voluntarily and in all registered CDM projects show that there is no one, ‘right’ way to define SD. Defining SD can be done in numerous ways depending on the context and purpose of the definition as reflected in the different host country definitions of SD criteria. To highlight the co-benefits of CDM project activities, while maintaining the prerogative of Parties to define their sustainable development criteria, a taxonomy was developed. See Figure 2. The indicators are identified bottom-up based on what is reported in PDDs reflecting different host country criteria (Olsen and Fenhann 2008) and are based on the assessment of more than 2500 registered CDM projects (UNFCCC 2011). The taxonomy consists of generic SD criteria and indicators, which makes it possible for the Board to demonstrate to the CMP, the public and stakeholders, *how* the CDM is able to meet its first purpose under Article 12 of the Kyoto Protocol. To strike a balance between standardization and flexibility the taxonomy functions as a menu of generic dimensions, criteria and indicators that project participants may choose from. Criteria and indicators that are not relevant to a project can be skipped and aspects of SD that are not included in the taxonomy can be added using an ‘other’ indicator. This allows for a transparent, inclusive and objective approach to SD assessment including comparison across projects as well as the need for flexibility to define SD criteria according to host country priorities and project or programme specific needs.

Figure 2: The CDM SD taxonomy



Source: CDM EB69 meeting, SD Tool User Manual (UN 2012)

The online based CDM SD-tool is currently available at <https://www.research.net/s/SD-tool> Based on the input of the project developer a declaration report will be generated and made available for public use, similar to other CDM documents made available on the UNFCCC web pages. Figure 3 shows the declaration of environmental benefits using the example of a programmatic CDM project titled 'Electrification in Malawi'. The format is the same for social and economic benefits.

Figure 3: Example of format for SD declaration report

A. Environmental co-benefits

Water and land co-benefits were declared as N/A, which means the criteria are not relevant to the project.

The programme of activities improves air quality in the area through:			
Criteria	Indicators	Specification	Extent
Air	SOx	limited	Slight
	NOx	limited	Slight
	Fly ash	limited	Slight
	Suspended Particulate Matter (SPM)	limited	Slight
	Noise	substituting diesel generators	Partly
	Odours	substituting kerosene lamps	Partly
	Dust	limited, but some dust from wood waste will be reduced	Slightly
	Other air based improvements	Indoor air improved as no kerosene and paraffin lamps	Partly
The programme of activities protects or enhance depletable natural resources:			
Natural resources	Forests	Controlled use of several types of renewable energy resources. Less forest will be cut down	Partly

The extent of the environmental co-benefits:



The following indicators were not applicable to the activity: Reducing level/frequency/time of NMVOCs (Non Methane Volatile Organic Compounds), Mineral resources, Plant life and Species diversity.

Source: CDM EB70 meeting, November 2012 (UN 2012)

Judged by its design, the SD tool has a number of shortcomings to realise a strong approach to the CDM's contribution to sustainable development. The SD tool is voluntary and benefits are not monitored, nor verified. Risks of negative impacts are not assessed and only project proponents and coordinating managing entities can report on SD benefits. Local and global stakeholders are not involved. To strengthen the current system for SD assessment of CDM projects the High-Level Panel on the CDM Policy Dialogue recommends to follow up with reporting, monitoring and verification on impacts, to enhance safeguards against the risk of negative SD impacts and to support host countries with capacity-building and sharing of best practice examples to strengthen their assessment of SD (Dialogue 2012). In line with these recommendations a strong approach to SD impact assessment can inform the assessment of NAMAs for sustainable development.

4. Towards an integrated approach for assessment of NAMAs' SD impacts

For assessment of NAMA's co-benefits for local SD the CDM SD tool taxonomy is applied to analysis of eight NAMAs submitted for recognition and support to the UNFCCC Registry. The result is shown in table 3 below.

Table 3: SD benefits in submitted NAMAs

NAMA	Environmental	Social	Economical	Institutional	Transformational
Chile: Implementation of a National Forestry and Climate Change Strategy <i>(support for implementation)</i>	Forest management Biodiversity Afforestation Restoration of natural forests Generation of environmental assets	Gender equality	Economic alternative for owners of degraded land Access to participate in the forestry business and in carbon markets	Improvements in land titling processes Sub-national reference levels and MRV systems to include indicators related to adaptation Platform for the Generation and Trading of Forest Carbon Credits Social and environmental safeguards are fully considered	
Uruguay: First introduction of Photovoltaic Solar Energy in the national electrical grid <i>(support for implementation)</i>		Testing laboratories Training professionals	Strengthen the assembly and maintenance of the national solar network	Conditions for holding a competitive process for the incorporation of new plants by private companies Capacity building support in the regulator organism and the Public Electric Utility Technical regulatory framework for this resource	Goal to have at least 50% of the national energy supply mix based on renewable sources At least 90% of the electrical grid supported by renewable sources
Indonesia: Sustainable Urban Transport Initiative <i>(support for implementation)</i>	Air quality Transport models for emission monitoring, promotion of efficient vehicles	Accessibility of transport Equity Road safety City livability (fragmentation of neighbourhoods, noise and air pollution)	Quality, capacity and accessibility of public transport (e.g. ridership, travel speed, information, network coverage, level of service) Quality of walking and cycling facilities (km of high quality bicycle lane, modal share, parking management, no of on-street/off-street parking spots, regulation, enforcement), emissions per vehicle and kilometre	Policy Framework for Sustainable, Low-carbon Urban Transport, comprising a regulatory framework, co-financing of local measures, capacity building, practical guidelines for local planning, and overall MRV of the actions Comprehensive Urban Low carbon Mobility Plans Strengthening the capacity of technical staff and decision makers through workshops and trainings	Up-scaling the policies of the pilot to national level
Chile: Expanding self-supply	Renewable energy	Training and capacity building	Reduced demand for grid connected	A technical help desk to provide a central entry	Contribute to the achievement of

renewable energy systems (SSRES) in Chile <i>(support for implementation)</i>	Decreasing pollution	Public awareness campaigns Technology road shows and demonstrations Job creation	power Reducing external dependence Enabling more suppliers to establish themselves Development of the incipient energy services industry and further development of the market	point for project developers and other stakeholders Promotion of capacity building activities Development of MRV platform and easy-to-use tool	Chile's national target to achieve a 20% deviation of GHGs below business-as usual by 2020
Cook Islands: Supporting Implementation of 100% Renewable Electricity by 2020 <i>(support for implementation)</i>	Avoided emissions of about 25 kt CO2 Commensurate risks of spills into pristine environments Avoided leaks from diesel storage facilities Less local air pollution effects	Jobs created during installations Increasing the number of and upskilling local trades people Positive benefits on stemming migration	Lowered electricity tariffs Avoided diesel purchase leads to reduction in foreign transfers and balance of trade deficit Increased investment that may stem from this increased confidence More private sector capital is attracted Consumer and business confidence about the future costs of electricity	New legal and regulatory frameworks associated with private sector engagement in the electricity sector Tariff reform: putting in place "investment grade" policy framework that will enable and attract private investment	Policy goal for 100% renewable electricity by 2020 Phased-in implementation plan that achieves 50% by 2015
Chile: Clean Production Agreements in Chile <i>(Seeking recognition)</i>	Indicators: -Energy consumption -Raw material use -Water consumption -Emissions -Effluents -Waste -GHG -Transportation -Land use -Biodiversity	Indicators: -Exposure to pollutants -Hygiene and food safety -Staff training -Relationship between companies and the community -Number of complaints from the community	Indicators: -Productivity -Salaries and benefits Investment in research, development and innovation -Economic relations with suppliers -Savings from reduced consumption - Time payback investment	Law Compliance	GHG reduction for the additional CPAs of 11.4 MtCO2e by 2020
Uruguay: LNG Terminal with regasification capacity of 10.000.000m3/d of natural gas with possible expansion to 15.000.000m3/d <i>(Seeking recognition)</i>	Improvement of environmental terms of energy use, Reducing CO2 emissions		Energetic independence Economic development	Better management of electricity balance during periods of low rainfall	

Uruguay: Promotion of renewable energy participation in the Uruguayan primary energy mix <i>(Seeking recognition)</i>	Reducing GHG emissions	Two pilot plants for solar PV	Distributed power generation Increment energy independence Promotion of national value-added ;	New law promoting and regulating the production, sale and use of biofuels and biomass Development of the national wind map, and promoting competitive procedures for the installation of wind farms by private developers Development of competitive procedure for the installation of private solar PV plants Decrees for tax benefits (Consumption, Rent and Heritage taxes), for renewable energy projects	Minimum 50% of the energy supply mix supported by renewable sources by 2015 Multiple policy instruments to support solar power
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Source: Own analysis based on eight NAMA submissions to the UNFCCC Registry

The NAMA SD impacts are categorised based on the three dimensions of sustainable development in the CDM SD tool taxonomy. Information available in the NAMA submissions did not allow a more detailed analysis by criteria and indicators. Rather, the information went beyond the SD co-benefits, we know from CDM. Information in Table 3 indicates that NAMAs will have a significant impact at national level for institutional development and towards national goals for sustainable development. The findings suggest that two new dimensions of SD can be achieved by NAMAs, which are labelled: 1) Institutional and 2) Transformational. Together the two new SD dimensions constitute a potential for *transformational impacts* of NAMAs. New institutional developments may reform existing ways of governance to achieve sectoral or national policy goals for low carbon development that will have a lasting impact for transformational change towards mitigation targets and sustainable development goals defined nationally.

Elements of an integrated approach

Based on CDM experience Table 4 compares the NAMA action cycle with the CDM project cycle and suggests an integrated approach to assess and promote NAMAs contribution to national sustainable development.

Table 4: Comparison of the NAMA action cycle with the CDM project cycle with suggested approach to SD assessment of NAMAs

Action/Project cycles	NAMAs	CDM
National Development Planning	Low Carbon Development Strategy (LCDS) A 'development first', co-benefit approach: Identify national (sustainable) development priorities that	-

	NAMAs contribute to (ex-ante)	
Design of action/project	No format requirements Include indicators for SD co-benefits in the design format and conduct stakeholder involvement and safeguards for no-harm-done	Project Design Document (PDD) Stakeholder involvement
National Approval	NAMA Approver submit mitigation actions to the Registry: To seek support for preparation, to seek support for implementation or to seek recognition (unilateral)	Designated National Authority (DNA) issues Letter of Approval (LoA) for SD contribution SD indicators
Validation/Registration	-	Designated Operational Entity (DOE) and Executive Board (EB)/ Registry
Financing	Supported NAMAs: bilateral, multilateral, private sector, Green Climate Fund, Foreign Direct Investment (FDI) and carbon markets. A mix of sources is possible. Unilateral NAMAs: domestic finance Explicit SD and climate benefits can help inform investors to get the most benefits for their money	Investors
Implementation	NAMA developer	Project owner/Coordinating Managing Entity (CME) for Programmes of Activities (PoAs)
Monitoring, reporting and Verification	SD co-benefits and impacts of mitigation actions to be monitored, reported and verified along with GHG metrics (ex-post). For pledged, international NAMAs there is International Consultation and Analysis (ICA) of Biennial Update Reports (BUR). There are no requirements for MRV of individual NAMAs	Designated Operational Entity (DOE) Safeguards against negative impacts
Issuance of CERs/units of GHG reductions	Possible links to New Market Mechanisms (NMMs) and Framework for Various Approaches (FVA) for crediting of NAMAS Units of GHG reductions to be certified for their SD co-benefits	Executive Board (EB)/Registry

Source: Own comparison of CDM project and NAMA action cycles

The components of an integrated approach are SD indicators, stakeholder involvement and safeguards against the risk of negative impacts. The three components are interrelated and implemented at different stages of the CDM project cycle as shown in Table 4. With an 'integrated approach' is meant that SD assessment consists of both a process approach focusing on stakeholder involvement including safeguards against the risk of negative impacts and a results approach focusing on impacts measured through SD indicators. By comparing an integrated approach for SD assessment of CDM projects with the action cycle of NAMAs, five elements are suggested for a new approach to assess and promote NAMAs for sustainable development. As the steps of the CDM action cycle are different from the NAMA action cycle, the three components for an integrated approach to CDM projects is translated into five elements for an integrated approach to NAMA SD assessment. The principles of an integrated process are the same, namely a combined process and results approach to SD assessment of both CDM projects and NAMAs. However, the operational implications are different as explained in the five elements suggested for NAMA SD assessment, which are highlighted with bold in Table 4 and described below.

A development first, co-benefit approach to identify SD objectives to which NAMAs contribute

SD objectives and indicators for transformational change towards low carbon and sustainable development can be identified in the process of formulating a national low carbon development strategy (LCDS). In the context of Indian climate change policy formulation a co-benefits based approach has been developed (Dubash, Raghunandan et al. 2013). The approach assists to identify measures that promote development objectives while also yielding co-benefits for mitigation. It offers a structured way to climate policy decision-making, to formulate NAMAs based on multi-criteria analysis (MCA) methodologies that strengthen public consultation processes and enable informed and rigorous judgement. MCA is the name for analytical techniques to assess and rank policy options against multiple objectives and allow multi-stakeholder participation to give input to a policy process. The methodology is based on two steps: 1) Co-benefit analysis; to assess if climate a policy objective delivers co-benefits across multiple desired outcomes; and 2) Implementation analysis of the instruments proposed to achieve the policy objective. A key feature of the co-benefits analysis, which distinguishes it from the Development Impact Assessment (DIA) Tool using generic SD indicators, is to be based on national priorities for sustainable development. In India the analysis is based on India's Twelfth Five-Year Plan suggesting a minimum of four outcomes against which climate policy objectives should be assessed; growth, inclusion, local environment and GHG mitigation. Stakeholders assess policy options such as enhanced use of biofuels or improved use of energy efficient appliances against the priority outcomes to identify positive and negative impacts/co-benefits and assign a qualitative score on a scale from 1-5. As such the analysis facilitates a structured discussion of the co-benefits and identifies the strengths and weaknesses of NAMAs to promote national sustainable development priorities.

Design of NAMAs including SD indicators and metrics, stakeholder involvement and safeguards for no-harm-done

There are no mandatory templates for design of NAMAs, unlike for CDM projects where the Project Design Document (PDD) documents are mandatory to use. Templates do exist for voluntary submission of information to the registry regarding NAMAs seeking support for preparation, implementation or recognition (www.unfccc.int/cooperation_support/nama/items/6945.php). A template is also developed

for provision of support but only Germany, United Kingdom and the Global Environmental Facility had provided information on support by 1 October 2013. Other formats are developed by technical agencies supporting readiness for design and implementation of NAMAs such as the NAMA Identification Note (NINO) (Lütken, Fenhann et al. 2011). New approaches to the design of NAMAs are increasingly focused on a broad approach to mitigation actions that go beyond measurement of emission reductions to include MRV of the SD impacts of NAMAs from the design stage. Elements of a broad approach are; 1) SD metrics and indicators at national or programmatic level, 2) a small number of indicators specific to the project or program that align with the overall criteria, 3) establishment of reporting requirements and deadlines as well as 4) stakeholder consultation (Cerqueira, Davis et al. 2012).

Stakeholder involvement is critical to the success of NAMAs as a means to ensure ownership of the actions through a participatory, bottom-up and inclusive process involving local and national expertise (GIZ 2013). For CDM requirements exist for stakeholder involvement at local and global levels, however for NAMAs the national level is increasingly important as actions are designed based on national policies and measures. Guidance for participatory planning and coordination frameworks for NAMAs is needed and may be embedded in multi-stakeholder, multi-level and multi-sectoral decision-making approaches to develop low-carbon and resilient development strategies (UNDP 2012; Dubash, Raghunandan et al. 2013).

Safeguards are common practice for international institutions to prevent or mitigate risks of negative impacts (EPFI 2006) and are also addressed as part of fiduciary standards that national climate finance institutions should to meet to become accredited for direct access to the Green Climate Fund (School 2011). Under REDD+ actions seven safeguard measures have been agreed by the COP (1/CP.16, Appendix 1) and countries are in the process of developing national Safeguard Information Systems to ensure their implementation. The draft CDM safeguards may inspire an international practice for NAMAs that build upon internationally agreed core values to ensure no-harm-done. The draft safeguards incorporate all the areas of the UN Global Compact's ten core principles for corporate sustainability that enjoy universal consensus based on internationally agreed values (UN 2012). The safeguard principles fall in six categories; human rights, good labour practice, environmental protection, anti-corruption, land rights and other potential negative impacts (EB68, Annex 22). For each of the six safeguards the draft CDM SD tool offered an option to positively confirm that the project activity respects good practice in the area. In case of concerns for any negative impacts related to violation of the principles, the risks should be assessed and ranked according to severity. In case of moderate or high risks, measures to mitigate, minimize, prevent or compensate should be identified.

Financing of NAMAs to be informed by sustainable development and climate benefits

Highlighting the SD co-benefits of unilateral NAMAs can facilitate the prioritization of scarce domestic finance for mitigation actions with the best sustainable development impacts. For supported NAMAs clearly formulated SD objectives, strong national ownership and well developed domestic systems for MRV are likely to give donor institutions the confidence that supported NAMAs will be implemented. In Durban the COP requested the Secretariat to make a prototype of a registry to match actions and support and in Doha, it was decided, the registry shall be fully functional at the latest two months before COP-19, 2013 (Sterk, Arens et al. 2012). The Green Climate Fund has been set up as an operating entity of the financial mechanisms of the UNFCCC and is mandated to support climate actions for

transformational change towards low carbon and resilient sustainable development (Committee 2011). Operating in the context of SD the Fund will promote environmental, social, economic and development co-benefits and therefore needs a MRV framework to assess progress towards objectives.

Monitoring, reporting and verification of SD indicators, stakeholder involvement and safeguards

For pledged NAMAs international guidance for monitoring and reporting is under development known as Biennial Update Reports (BURs) that shall be subject to a process of international consultation and analysis (ICA) by a team of technical experts, for the first time in July 2014 (2/CP.17, paragraph 41). The Subsidiary Body for Scientific and Technological Advice (SBSTA) has been requested to develop guidelines for domestic MRV of unilateral NAMAs. There are, however, no international guidelines for MRV of supported, individual NAMAs. Actual practices are therefore likely to develop bilaterally between developing country governments and the funding institutions different requirements (Hänsel, Röser et al. 2012). According to a draft manual for the prototype of the registry (UNFCCC 2013) NAMAs seeking support or recognition are invited to submit three types of information to the NAMA Registry regarding their outcomes: 1) Emission reductions (quantitative), 2) Indicators of implementation (quantitative or qualitative) and 3) Information on co-benefits for local SD (quantitative or qualitative). As the final registry will be set up with no mandatory fields, the substance of what a NAMA is continues to develop bottom-up, driven by developing countries. In the absence of international guidance for MRV of individual NAMAs an integrated approach to SD assessment may inspire bilateral practices for MRV of supported NAMAs.

Certification of the SD impacts of emission reduction units from possible crediting of NAMAs

A certification approach to crediting of NAMAs would enable SD impacts to be internalized into the price of units of GHG reductions. Certification of the SD impacts would add a social dimension to the concept of environmental integrity which otherwise focus exclusively on standards that deliver 'real, permanent, additional and verified mitigation outcomes, avoid double counting of effort, and achieve a net decrease and/or avoidance of greenhouse gas emissions' (1/CP.17, paragraph 79). Learning from CDM experience there is a need for an international standard to avoid a race to the bottom and ensure that credits also deliver sustainable development outcomes (Olsen and Fenhann 2008). However, the political feasibility of an international SD standard for credits traded under New Market Mechanisms is assessed to be extremely difficult (Wehnert, Arens et al. 2012). Given the difficulties to attribute GHG reduction to specific policies and measures under sectoral approaches, it is also difficult to assess and attribute the SD impacts to carbon credits that are issued against a sector benchmark or baseline and not at installation/project level. Realistic options to promote certification of the SD impacts of credited NAMAs would therefore have to rely on domestic schemes for SD impact assessment (EAD 2011; EAD 2011) informed by a generic integrated approach and global goals for sustainable development to be agreed in 2015 under the Rio +20 and MDG processes (UN 2013).

5. Conclusions

National sustainable development goals and priorities are a key driver of mitigation actions in developing countries. Learning from CDM experience this paper has argued there is a need for a strong integrated approach to assess and promote NAMAs contribution to sustainable development. A strong approach consists of a combined results approach focusing on SD indicators and a process approach focusing on stakeholder involvement and safeguards against negative impacts that are translated into the action cycle of NAMAs. CDM experience has shown that without an international standard to assess mitigation projects' contribution to SD benefits, there is a risk that mitigation actions will only make a weak contribution to local and national SD benefits. An international SD tool for the CDM was approved by the CDM Executive Board in November 2012. The tool allows a standardized assessment of SD co-benefits across countries while respecting nationally appropriate definitions of SD. However, the tool does not include a provision for verification that claims to SD benefits are realized, neither for stakeholder involvement and there are no safeguards against negative impacts. Applying the taxonomy of the CDM SD tool to analysis of eight NAMAs submitted to the registry two new categories of SD impacts are found; 1) institutional development and 2) transformational indicators that indicate NAMAs potential to significantly contribute to transformational change for low carbon and sustainable development at national level. By comparing the project cycle for CDM with the action cycle for NAMAs five elements are proposed for a new approach to assess and promote NAMAs SD benefits: 1) A development first, co-benefit approach to identify national SD objectives, 2) Design of NAMAs including SD indicators, stakeholder involvement procedures and safeguards against negative impacts, 3) Financing of NAMAs to be informed by SD impacts to promote transformational change towards low carbon and sustainable development, 4) Monitoring, reporting and verification of SD impacts, GHG reductions, stakeholder involvement and safeguards against negative impacts and 5) Certification of credited NAMAs' SD impacts to be traded under domestic or new market mechanisms in a framework for various approaches.

The five elements proposed for an integrated approach to SD assessment of NAMAs is a first step towards sustainability impact assessment of mitigation actions at national level. While the CDM represents a wealth of institutional and human capacity useful for an up-scaling of mitigation efforts in developing countries, new challenges are that NAMAs are implemented at sector, cross-sectoral or national level additional to CDM project and programme activities. NAMAs are primarily government driven by climate and development policy goals, whereas CDM is an international market-mechanism driven by private sector interests for trading in carbon credits. To further develop and operationalize an integrated approach for SD impact assessment of NAMAs further research is needed to explore the following issues: 1) How SD co-benefits can be quantified in their own right e.g. in terms of green jobs created, air pollution reduced and health benefits achieved and in monetary terms to compare the value across benefits. 2) How the SD co-benefits translate into national and global measures for transformational change to guide investments and overcome tensions between short-term financing requirements and longer term interests for sustainable and low carbon development. 3) How national systems for monitoring and evaluation of policy goals and development investments can be used to also MRV the climate and development impacts of NAMAs and domestically certify the SD impacts of emission reduction units traded under national, regional or international New Market Mechanisms. A key challenge is to strike the right balance between standardization and flexibility: standardization for an international approach to enable a high contribution to global sustainable development and flexibility to accommodate the diversity of what Parties consider to be 'nationally appropriate' mitigation pledges and actions, styles of governance

and different institutional capacities for stakeholder involvement and ensuring safeguards against negative impacts.

A differentiated approach may accommodate the different needs for SD assessment for unilateral, supported and possibly crediting of NAMAs. For unilateral NAMAs the approach can be nationally appropriate by mainstreaming the elements into existing or emerging national systems for tracking SD impacts, stakeholder engagement and respecting national laws and regulations as well as internationally ratified agreements. Guidance for an integrated approach to SD assessments may be included in guidelines under development for domestic MRV of NAMAs. Domestic approaches could be inspired by the seven safeguards developed for REDD+ actions (1/CP.16, Appendix 1), domestic Safeguard Information Systems under development and methodological development under SBSTA to address the non-carbon benefits of REDD+ actions. For supported NAMAs guidance should be developed for international good practice for an integrated approach to SD assessment, stakeholder involvement and safeguards. For the crediting of NAMAs traded under a New Market Mechanism (NMM) or a Framework for Various Approaches (FVA), domestic certification of the SD co-benefits associated with units of GHG reductions can be informed by an integrated approach to SD impact assessment.

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