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Master Thesis

THE ASSESSMENT OF SUSTAINABLE DEVELOPMENT OUTCOMES OF NATIONALLY APPROPRIATE MITIGATION ACTIONS (NAMAs)

An investigation of perception and practices

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Abstract

Nationally Appropriate Mitigation Actions (NAMAs) are a so-called Low Carbon Development Strategy (LCDS) and an outcome of the Common but Differentiated Responsibilities (CBDR), manifested in the UNFCCC principles of the Convention. Based on these principles, NAMAs help individual developing countries to engage in climate friendly and low carbon actions and by this promote national sustainable development. Within the Bali Action Plan from 2007 it is manifested that NAMAs shall be implemented in the name of sustainable development (SD) and shall enhance capacity building in a measurable, reportable and verifiable way. Many countries have adopted the climate change mitigation tool and are registering new projects continuously. However, as the whole context of NAMAs is still under development, so are MRV methods. The question raises how to meet the goals of sustainable development and capacity-building in order not to become questionable in its effects like previous mitigation tools, e.g. the Clean Development Mechanism (CDM). Within this Master Thesis, NAMAs will be investigated in relation to SD. The research question is: *How can the SD outcomes of NAMAs be evaluated in order to be regarded as an effective framework for SD assessments?* The NAMA policy and its functioning as a mitigation tool will be explained as well as recent sustainable development discussions and SD assessment possibilities. The state of the art of SD outcomes' perception and consideration in relation to NAMAs will be investigated among different stakeholders. A comparison with the CDM shows the level of applicability of common MRV methods to NAMAs. Furthermore, critical aspects of the SD performance evaluation of NAMAs will be shown.

Key words: *climate change, mitigation actions, NAMAs, sustainable development*

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Acronyms

BAU	business as usual
BMU	Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit
°C	degree Celsius
CDM	Clean Development Mechanism
CER	certified emission reduction
CONAVI	Mexican National Housing Commission
COP	conference of the parties
CO_2	carbon dioxide
DECC	Department of Energy & Climate Change of the United Kingdom
DNA	designated national authority
DPSIR	Driving-Forces-Pressure-State-Impact-Response-Framework
GEF	Global Environmental Facility
GHG	greenhouse gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (GmbH)
GRI	Global Reporting Initiative
GS	Genuine Savings
IISD	International Institute for Sustainable Development
IPCC	Intergovernmental Panel on Climate Change
IRR	internal rate of return
JI	Joint Implementation
KP	Kyoto Protocol
LCDS	Low Carbon Development Strategies
MATA	Multi-Attributive Assessment
MAUT	Multi-Attributive Utility Theory
MDG	Millennium Development Goals
MRV	monitoring, reporting, verifying
MWh	megawatt per hour

NAMA	Nationally Appropriate Mitigation Actions
NAMA-WP	NAMA – Work Programme
OECD	Organisation for Economic Co-operation and Development
PDD	project design document
PRS	Pressure-State-Response-Framework
PSIR	Pressure-State-Impact-Response-Framework
Q	question
SBI	Subsidiary Body for Implementation
SD	sustainable development
SDI	sustainable development indicator
SDGI	Sustainable Development Goal Indicators
SDM	Sustainable Development Mechanism
SQ	sub question
STAMP	Sustainability Assessment and Measurement Principles
TERI	The Energy and Resource Institute
UNCED	United Nations Conference on Environment and Development
UNCSD	United Nations Conference on Sustainable Development
UNDP	United Nation Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNEP	United Nations Environment Programme
URC	UNEP Risø Centre

1 Introduction

Climate change is a phenomenon, addressing peoples' actions all over the globe. The environmental damages due to climate change are increasing dramatically and political action is needed in order to prevent already vulnerable regions from further damages. Several attempts have been made in order to lower the impacts, to become more sustainable, and to value the resources planet earth is possessing – and sharing those to the disadvantage of less privileged societies. However, mitigation of and adaptation to climate change impacts are deeply connected with the general understanding of sustainable development (SD). Or as the Brundtland Commission puts it: "*[…] development that meets the needs of the present without compromising the ability of future generations to meet their own needs"* (Brundtland Commission, 1987, p. 43). According to the International Panel on Climate Change (IPCC), climate change is:

"*A change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use*" (IPCC, 2012, p. 3).

This definition slightly differs from the one offered by the United Nations Framework Convention on Climate Change (UNFCCC), where climate change is defined as:

"*[…] a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods*" (UNFCCC, 1992, article 1 of convention).

Industrialised, developed countries have been causing most of the emissions during the industrialisation process in 19th century. Nowadays, the attention of international debates on climate change starts to look also at emerging economies. It is questionable whether this development is meant to be, as already developed countries have undergone this development. The latter seem to feel the need helping less developed countries to leapfrog towards a modern society (e.g. Beck, 1986). However, all of this is to the disadvantage of developing countries who do not obtain the financial capital, necessary institutional governance structures or education to combat climate change (Barbier, 2010).

A consistent discussion is being undertaken at national and international levels in order to clarify the path to be followed by developing countries in the name of a sustainable growth.

SD is hence not only to be seen as a framework condition of global policy making but as a setting or tool to be used in order to fulfil the goal of achieving equity in today's and future generations' life with the given natural resources and climate conditions. *"But defining sustainable development is not the only, and most important, problem. If the sustainability goal is accepted then a fundamental requirement is a set of sustainable principles that can give some concrete form to a sustainable development strategy"* (Turner, 1993, p. 3). Indicators are regarded as tools, which provide information on the state of the art or its divergence. This, in return, means that SD indicators (SDIs) shall be used in order to show whether SD is evident or not. Furthermore, if better developed and established SDIs could show the extent of SD (Spangenberg, 2002).

Above, it has been touched upon the inequalities regarding SD between the wealthy global North and the economically and climatic disadvantaged global South. The debate concerning the joint pursuit of SD objectives and greenhouse gas (GHG) emissions reduction in developing countries reached the first significant milestone in 1997. Indeed, when the Kyoto Protocol (KP) was signed by the Parties during the third Conference of the Parties (COP 3), the Convention established the Clean Development Mechanism (CDM) with the twin purposes of contributing to Non-Annex I countries'[1] development and reducing their GHG emissions. During years of CDM implementations, SD has been pursued and monitored in order to assess the contribution of the tool to sustainable growth of the hosting countries. Nevertheless, the CDM was created within a broader context of emission compensation. This is mainly manifested in the strong connection existing between the CDM projects and the carbon markets. A brief description of the functioning of the CDM and the related issues which emerged along their implementation will be given further on in this study. The SD performance of CDMs has become affected by the abovementioned relation of the tool to the carbon market and the multitude of different goals attributed to it.

The CDM gave the possibility to Annex I countries to meet their emissions reduction goals and at the same time gave the option to Non-Annex I countries to define local objectives for SD. This indeed - and for the abovementioned reasons - resulted in a low level of SD (Sutter and Parreno, 2007).

[1] Developing countries or Non-Annex I countries/parties are listed under: http://unfccc.int/parties_and_observers/parties/non_annex_i/items/2833.php.

CDMs have been the first tool to be officially created under the UNFCCC with the specific aim of promoting SD in developing countries through the reduction of GHG emissions. Now that CDMs are mostly being phased out due to several economic and political reasons, the future of mitigation actions targeting developing countries seems to be pointing at Nationally Appropriate Mitigation Actions (NAMAs). The concept of NAMA is still under development but the nature of the tool is clearly manifested. The idealisation of NAMA refers to the need of offering to Non-Annex I countries a voluntary tool to reduce their emissions while promoting an internal sustainable growth in accordance with the principles of SD. The process that led to the conceptualisation of NAMAs will be described further on in this study. NAMAs find their collocation in the context of SD and serve the net contribution of developing countries to global mitigation efforts, which is recommended by the IPCC to be in the order of 15 % to 30 % deviation from business as usual (BAU) by 2020 to stay below 2 °C of global warming (IPCC, 2007).

Although already implemented worldwide and discussed under several international panels, NAMAs are not yet common defined. In addition, and probably due to the same reason of being at an early stage in the NAMA development process, homogeneous indicators and methodologies for the evaluation of SD outcomes of NAMAs are not being agreed yet. However, it is clear that the tool was created with a specific purpose of promoting SD in developing countries as manifested since its first mention in the context of the Bali Action Plan:

"*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"* (UNFCCC, 2007).

Sustainable development is the key word in nowadays undertakings to mitigate climate change. Although discussed since decades, the term of SD is still not clear and even after various climate conferences[2] in the last decades, appropriate indicators or assessment methods have not been set up, which include not only the triple bottom line of sustainability, but also governance and national structures (Alfsen and Greaker, 2007).

This thesis aims at connecting the pragmatic topic of NAMAs with the theoretical approach of sustainable development. Therefore, it shows the recent discussion on global sustainable

[2] See e.g. United Nations Conference on Environment and Development in Rio de Janeiro 1992 (UNCED), Rio+20 United Nations Conference on Sustainable Development (UNCSD) 2012 or COP 1-19 by UNFCCC.

development, including degrowth approaches, ecological movements and political debates and in addition explaining different approaches to SD evaluation.

Methodologies and indicators for SD outcomes evaluation will be investigated in relation to NAMAs, as those are regarded as an applicable policy, which covers global political will, national mitigation action and diversity in development needs tackling climate change and sustainability. The whole approach is thus twofold: on the one hand, there will be a literature review on how to measure SD outcomes with a deeper focus on what can be framed the closest to NAMA. On the other hand, an analysis is carried out on how SD is perceived in nowadays political actions and in respect to NAMAs, including an example of a NAMA project in Mexico. This will be done by analysing the results of a survey, which has been customised for NAMA involved entities. Expert interviews with NAMA and CDM stakeholders gave further input. The recently published report "Sustainable Development Impact of NAMAs" by Olsen (2013) from UNEP Risø Centre, an institution conducting research also focusing on NAMAs, emphasises the connection of NAMA and CDM methods for monitoring, reporting and verifying (MRV) SD performance. It has been main context of one of the interviews. The outcomes of the survey and the interviews will provide examples of theoretical approaches regarding SDIs together with the state of the art of SD assessment of NAMAs among the selected sample of actors.

Following the introductory discussion of the role of SD pursued through NAMAs while promoting mitigation actions in developing countries, the research question driving the investigation is as follows:

How can the SD outcomes of NAMAs be evaluated in order to be regarded as an effective framework for SD assessments?

In order to speak of an *effective* framework, the following shall be understood throughout the whole thesis: *an effective framework for SD assessments* is to be regarded as a functioning MRV method, in order to ensure and show SD achievements through a NAMA project.

The abovementioned research question will be investigated by answering the following sub questions first:

1) *Which is the state of the art of the perception of SD implications in relation to NAMAs?*

By *state of the art*, the overall level of understanding of SD in relation to NAMAs among the main stakeholders involved is meant. The question will be mainly answered by analysing the results of the survey, which has been sent to NAMA associated entities. Additional expert interviews, some existing literature and the responses from the survey allow for a conclusion on the recent perception of SD implication regarding NAMAs.

2) *Which methodologies and indicators can be useful for evaluating SD outcomes of NAMAs?*

A literature review regarding SD indicators and assessment approaches provides knowledge about recent discussions on appropriate evaluating methods. Making use of the survey results as well as expert interviews, gives a picture about which methods can be used regarding the SD assessment related to NAMAs in particular.

3) *How could NAMAs make use of the CDM experience to assess their SD performances?*

The abovementioned literature review includes SD performance evaluation methods regarding CDM projects. Those methodologies will be investigated with the purpose of finding a possible applicability to NAMAs. This is also done by making use of a case study. This case study is about a NAMA project within the housing sector in Mexico. It will be explained and investigated regarding the assessment of SD. Because of the fact that CDM methods have been used within that NAMA project, conclusions can be drawn regarding the applicability of CDM methods to NAMAs. It is of interest to relate the CDM to NAMA in order to make statements about feasible SD evaluation techniques for NAMAs. The mentioned report by UNEP Risø Centre gives further indications on that topic. Finally, it will provide an answer to the third sub question.

The research question will be finally answered by combining the methods of survey and interview analysis as well as the comparison of CDM and NAMA SD assessment methods, which have been previously assessed through the answering of the sub questions. A discussion will reflect on some of the investigations.

2 Methodology

This chapter aims to give an overview of how the research is designed, planned and undertaken (sub chapter 2.1), in what context it is placed concerning theory of science (sub chapter 2.2) and how the different methods were carried out and analysed (sub chapter 2.3). For the latter the survey including its intention will be introduced.

2.1 Research design

The research design explains how the research within this master thesis has been undertaken. The schematic overview of the methodology (figure 1), gives a visual idea of how has been proceeded:

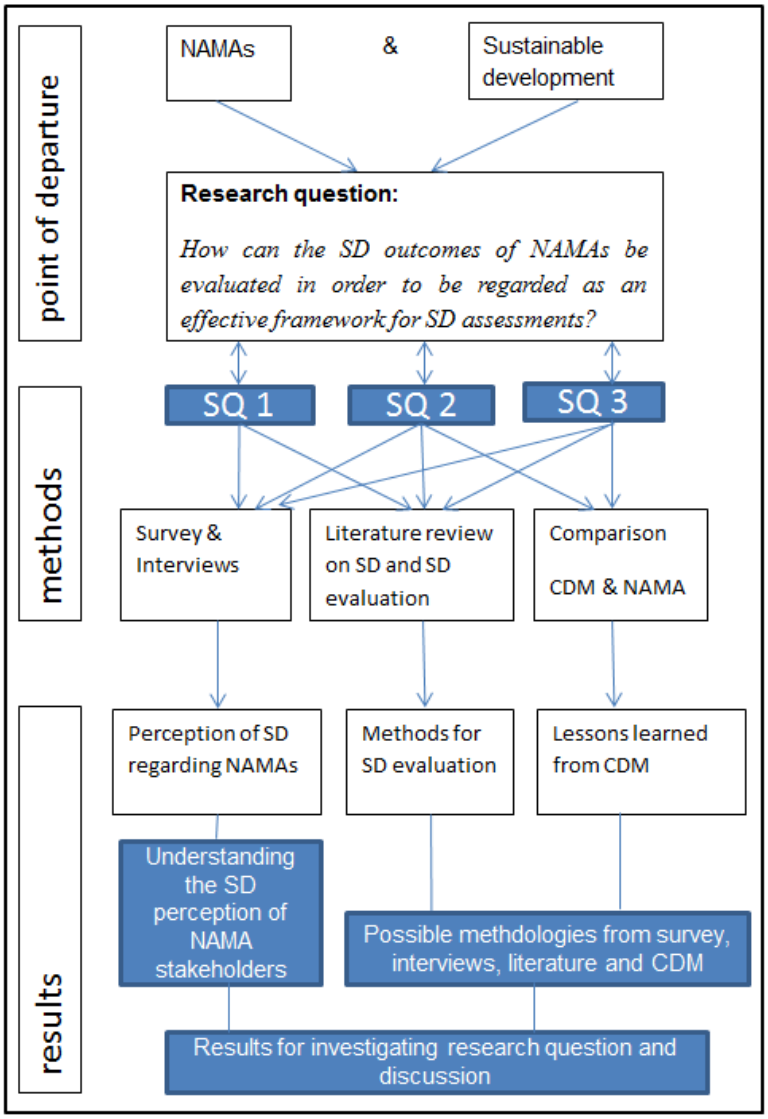

Figure 1: Schematic overview of methodology (own figure).

From the beginning, the two subjects of interest have been the new UN policy of NAMAs, with its aim on SD, and the actual perception and assessment of SD. The question of interest is to find the connection of NAMAs and SD, so that an effective evaluation of SD in relation to NAMAs can be manifested. Figure 1 illustrates this point of departure.

The research methods used in order to answer the research question by investigating the sub questions, will be introduced in sub chapter 2.3 (Methods) of this chapter. Chapter 3 (Context of the Analysis) is going to introduce the NAMA and the CDM in detail. This is done in order to understand the two mitigation actions and to later comprehend on the comparison of those two. The same chapter also includes a literature review on SD and SD indicators and will give an overview on the state of the art of SD in social, political and natural science. Different SD indicator approaches will be introduced, which will be resumed on when answering the research and sub questions. A working definition of SD will be set up in order to have the same understanding of the term throughout the thesis (see sub chapter 3.6). Theories regarding different views on SD will frame the context of sustainability and climate policies (chapter 4).

The Analysis (chapter 5) will make use of different methods in order to analyse the perception of SD regarding NAMAs (see sub chapter 2.3 for the methods used) and to examine effective frameworks for NAMA SD evaluation. The reason for comparing NAMA and CDM lays in the similarities of the two approaches, which will be analysed in chapter 5. The research question will be investigated by making use of the answers of the sub questions (see figure 1). This helps to follow a logic and consequent path, which enables the reader to understand how the research has been undertaken and at the same times enables the researchers to show how conclusions have been drawn in order to come to the final results. Those results partly come from the literature review on SD and SDIs in chapter 3. Together with the outcomes from the survey and the expert interviews, a comprehensive picture of the SD assessment regarding NAMAs and the perception of SD of different NAMA stakeholders can be given. Sub question 1 "*Which is the state of the art of the perception of SD implications in relation to NAMAs?"* will hence be answered by making use of the survey and interview outcomes (combined with the few existing literature on that topic). Also the second sub question can be answered, making use of the outcomes of the survey, but also referring to the literature review on SD and SDIs: "*Which methodologies and indicators can be useful for evaluating SD outcomes of NAMAs?"*

However, this does not give the full picture of an effective SD evaluation, since the NAMAs are a relatively new approach. CDM projects by contrast, are well known and have been assessed multiple times already. The CDM as a known mechanism for climate change mitigation and global action will be used as a tool for applying functioning SD assessment methods to NAMAs. Having a look at the housing sector in Mexico acts as a case study and gives an impression of how a NAMA project can be evaluated regarding SD.

"*How could NAMAs make use of the CDM experience to assess their SD performances?"* is the third and last sub question. It will be answered by the mentioned comparison of CDM and NAMA. Especially the MATA system and the investigations by TERI (explained in sub chapter 3.7), assessments of SD within CDM projects are subjects of interest regarding the answer of sub question 3.

Finally, the research question "*How can the SD outcomes of NAMAs be evaluated in order to be regarded as an effective framework for SD assessments?"* will be analysed.

Within chapter 5 (Analysis), the results will be investigated and interpreted. In chapter 6 (Discussion), some of the results will be discussed more deeply. Furthermore, the discussion chapter will be critical upon recent SD discussions and the setting of SDIs. General research limitation will be discussed as well. A conclusion (chapter 7) will give a brief summary of the findings within this thesis.

2.2 Theory of science

This paragraph aims to provide a methodological framework to the undertaken research. This will be done by placing the study across some of the currents of investigation of reality. In fact, the methodology applied to this analysis finds its contextualisation within three different theories of science. Elements and methods of phenomenology and pragmatism are considered within a more general investigation structure based on a critical realism approach. The need of referring to different metatheoretical positions lies in multiple reasons here described.

A critical realism approach facilitates, in force of its being ontologically less restrictive and more accommodating of the inclusion of multiple methodological approaches (Bhaskar and Danermark, 2006), to undertake social science's investigations when multiple systems and spheres of reality are involved. This is the case of the research undertaken within this thesis whose object is the outcomes in terms of SD of NAMAs with a more specific focus on how to effectively asses them. Indeed, a study that gravitates around SD cannot refrain that the concept itself is built on a trans-sectorial perspective of human activity which includes both

the economic sphere and the social sphere, and consider them as open subsystems of the earth's ecosphere. Hence, economic and social improvements are pursued through activities that are implemented under the global sphere of environmental preservation.

According with the critical realistic ontological stratification, a plurality of research methods is also suggested (Danermark *et al.*, 2002). This second aspect of critical realism finds an elevate degree of applicability to the research (see sub chapter 2.3) where different methods of data collection and analysis are utilised. Mainly qualitative but also quantitative analyses are advocated in order to investigate a reality intended in accordance with the different levels of laws of causality. Considering that critical realism theory of science understands causality in terms of generative mechanisms (Danermark *et al.*, 2002), the deep understanding of the structures that lead to certain SD outcomes of NAMAs is helpful for the debate on how to implement an effective assessment of these outcomes. From a critical realistic perspective, causes are not regularities but powers and liabilities, and they "[…] *may be possessed unexercised, exercised unrealised, and realised unperceived by men; they may also be transformed*" (Bhaskar, 1978, p. 198). Therefore critical realism considers causality as a generative contextual concept (Wad, 2000). What differs from a positivistic investigation of causality is that the following analysis aims at uncover structures and mechanisms even if not directly observable. The ultimate objective of this research is then pursued, also, through a satisfactory understanding of the elements of NAMAs and of the structures, sub-structures and context in which the tool operates in order to produce the mentioned outcomes. Based on the critical realistic methodology of explaining phenomena by identifying tendencies and generative mechanisms, the stratified structure of SD outcomes deriving from NAMAs can be presented as follows (see figure 2).

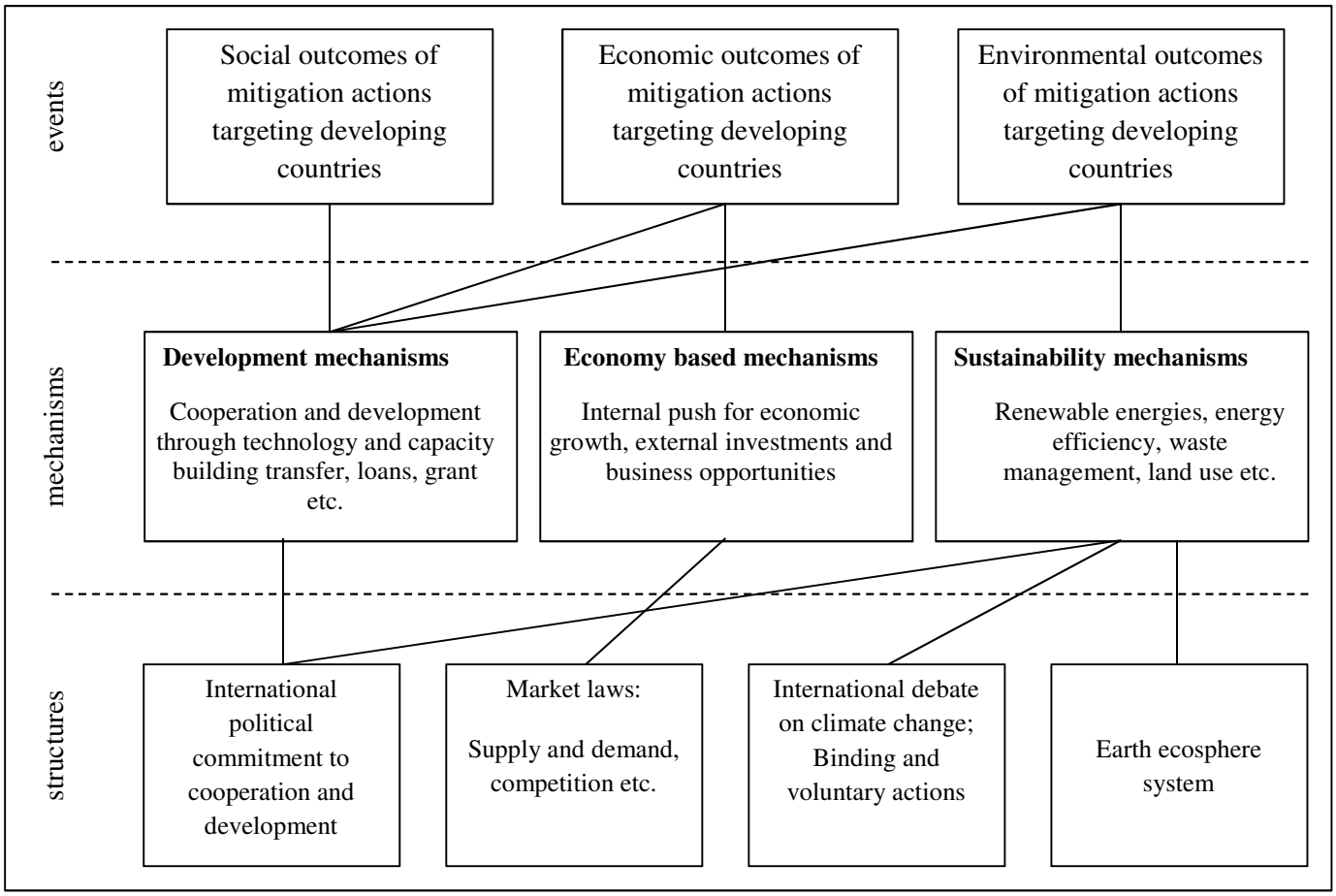

Figure 2: structures, mechanisms and events generating NAMA SD outcomes (based on Sayer, 1992).

The scheme illustrated above highlights mechanisms and structures needed for the production of SD outcomes from NAMAs which are, partially, the object of this investigation. In this regard, it is necessary to underline that the final object of this research, according with the research question, lies more likely within the mechanisms stratus since it focuses on the evaluation of the mentioned outcomes[3]. In fact, tools and structures to effectively asses SD outcomes are, at the same time, part of the mechanisms that allow the manifestation of the event and more precisely the capacity to perceive it. Therefore the metatheoretical positioning of the research partially differs from a common application of the critical realism approach.

Both events (in terms of SD outcomes) and structures (in terms of driving laws and framing contexts) will be analysed in order to answer the research question that focuses on mechanisms.

[3] Within this thesis it is not aimed at uncovering each structure in detail. Some will just be taken as granted and not further applied.

A consistent part of the analysis will be based on a comparison between NAMAs and CDMs and the study of existing methods to evaluate SD performance of CDMs. The reason for this comparison is to uncover similarities and differences among the two tools. However, it might seem clear that the two tools start from a common context and operate pushed by common driving mechanisms and structures, but a deep comparison will uncover whether similar mechanisms can be applied or not in order to evaluate their SD outcomes.

Comparative case studies more than non-comparative ones appear easier to frame into a critical realism approach (Bergene, 2007), especially in accordance with the case of the current analysis. Indeed, the aim of a comparison is not restricted to the stratus of events (the contents of SD outcomes and their empirical perception in this case), but it is rather to obtain explanatory depth by discovering how generative mechanisms (including mechanisms for SD outcomes evaluation in this case) manifest in different contexts in order to produce concepts across cases (the applicability or not of CDM SD evaluation systems to NAMAs in this case) (Danermark *et al.*, 2002). Danermark *et al.* also highlight comparisons as a possible strategy for discerning structures and mechanisms that are, according to the methateoretical positioning of this research, the object of the following investigation.

Reflecting on the fact that one of the aims of comparative studies is to uncover the differences in terms of causal conditions underlying different or similar outcomes (Ragin, 1994), and considering Mill's "method of agreement"[4] and "method of difference"[5], the approach undertaken for the comparison between CDMs and NAMAs can be explained as an analysis of structures and events of both tools. The two tools aim at revealing compatibilities and incompatibilities of SD evaluation systems and are considered as part of the generative/interpretative mechanisms of the events. Identifying necessary conditions for the considered outcomes to manifest requires the examination of cases with similar outcomes and checking whether they have variables in common or not, and uncover these variables if they occur (Hammersley *et al.*, 2000).

Setting part of the analysis on the comparison between CDMs and NAMAs is expected to bring the research to uncover whether SD performance evaluation mechanisms (considered as part of the generative mechanisms of SD outcomes' existence and perception) can be applied

[4] "*If two or more instances of the phenomenon under investigation have only one circumstance in common, the circumstance in which alone all instances agree, is the cause (or effect) of the given phenomenon"* (Mill, 1882, p.482).

[5] "*If an instance in which the phenomenon under investigation occurs, and an instance in which it does not occur, have every circumstance in common save one, that one occurring from the former; the circumstance in which alone the two instances differ, is the effect, or the cause, or an indispensable part of the cause, of the phenomenon.* (Mill, 1882, p.483).

to NAMAs. In a more methodological interpretation it means uncovering whether these mechanisms can also be considered generative in regard to SD outcomes of NAMAs.

As mentioned above, critical realism is the main theory of science in which this research is framed. Nevertheless, influences of phenomenology are easily found when dealing with the analyses of the concept of NAMAs. The choice of a phenomenological inclusion is forced by the still uncertain definition of the concept. Although several steps have been made in the conceptualisation process around NAMAs, the seeking of a common and shared understanding of the tool and of its future role in the mitigation panorama is still ongoing. From an ontological perspective, the need of clarity about NAMAs definition and implementation is not yet satisfactorily fulfilled. Considering the lack of precise and uniform knowledge related to NAMAs in all their specific aspects, including SD impacts and the way to evaluate them, and the very young history of the tool, it is understandable how a partially phenomenological approach can be useful for the deep investigation of the concept.

A phenomenological approach will be applied parallel to a causality investigation in order to reach the highest level of knowledge in relation to NAMAs. This degree of knowledge is required first to be able to compare the mitigation tool with CDMs which due to their more precise generative context and their longer tradition do not need a phenomenological approach to be described. Secondly, the degree of knowledge is required to ontologically highlight what could be actually considered as a NAMA and consequently investigate generative mechanisms. In fact, an elevate degree of uncertainty still affects any possible quantitative categorisation or empirical evaluation of NAMAs. As will be further described during the investigation of the concept of NAMA, the tool appears as a broad concept including several types of actions and different operational contexts. According to Heidegger's phenomenology, ontology is mainly based on experience (Trincia, 2010), and since the concept of NAMA can be seen as bottom up definable, the only way to obtain essential knowledge about it is to look at the multiple manifestations of the phenomenon itself. Many NAMA projects with different characteristics are under implementation worldwide. Investigating the deepest essence of the concept by observing its plural manifestations is here considered as the most effective way of obtaining ontological knowledge of NAMAs. Therefore, adopting an ontological investigation of the phenomenon (NAMAs), phenomenology becomes useful inasmuch it could be considered as the main access road to ontology (Trincia, 2010). Nevertheless, since the seeking of a general and unified understanding of NAMAs is not the ultimate goal of the research, but an essential step towards the investigation of mechanisms to evaluate SD outcomes generated by the tool, it is

necessary to combine this phenomenological approach with the abovementioned causal and comparative approach that is framed into a more critical realist lens. It is also necessary to state that, for the purpose of the following investigation, the analysis finds its epistemological positioning in between phenomenology and critical realism moving within the middle of the subject-object scale. Nevertheless phenomenology is left aside when the analysis gets to the point of trying to generalise conclusions. Indeed, one of the objectives of the investigation is to try to generalise SD evaluation methods across CDMs and NAMAs. This can only find its contextualisation in a critical realist vision.

The second and last "contamination" to the overall critical realistic frame of this analysis comes from pragmatism. Since the pragmatic theory bases the investigation of reality and the creation of knowledge on experience and direct participation (Hoch, 1984), it is natural to refer to it in the case of the following analysis. Indeed, some of the data and information utilised along the development of the thesis directly derive from close collaboration put in place with the UNFCCC secretariat and other relevant stakeholders. In addition, during the period of the production of the following elaboration, one of the authors was covering a role within the NAMA and Registry unit at the UNFCCC secretariat. For these reasons, it seems necessary for the authors also to refer to pragmatic actions when considering the metatheoretical positioning, especially, regarding the data gathering but not only. In addition, the results of the investigation find their generic placement in a discussion that has a strong connection with practice (how to evaluate SD performance of NAMAs), and thus the project is, also, carried out from a pragmatic perspective.

The inferential approach used within this thesis is basically inductive, coming from the pragmatic implementation of NAMA projects and aiming at finding an evaluation method to assess SD of NAMAs. There is no intention to create a theory based on the findings in real life (through project investigations and the survey and interview outcomes). It is rather the aim to describe the process of achieving insights of the perception of SD of different NAMA stakeholders. This is in line with what is described above regarding the combination of critical realism, pragmatism and phenomenology.

2.3 Methods

In order to obtain knowledge regarding SD and NAMAs, the first approach has been to make use of a literature review. The focus for this has been mainly on "sustainable development" and "sustainable development indicators". This brought a wide insight in the state of the art

regarding SD in social, political and natural science. However, the topic of NAMAs is relatively new and literature is limited, especially in respect to SD as assessments are to be undertaken just currently and results are to be foreseen. Hence, a survey has been sent to numerous NAMA associated entities. This method helped to get knowledge regarding the state of the art of NAMAs, including the perception of SD. In addition, a few expert interviews have been conducted in order to clarify certain aspects of the survey outcome and to get in-depth knowledge on SDIs and their assessment concerning NAMAs. This mixed-method approach helped to retrieve knowledge from different angles and *"[…] to arrive at a richer and more complete description of a phenomenon than by using a single approach"* (Yardley and Bischop, 2010, p. 361).

2.3.1 Survey

The purpose for using a survey within this thesis is the assessment of data regarding the perception of SD in the context of NAMAs. This data is used as one source for obtaining knowledge on that topic. The NAMA associated entities have become consulted through a partly quantitative, but mostly qualitative survey, which will be explained below (paragraphs 2.3.3 and 2.3.4). The reason for sending out an online survey and not conducting personal interviews is mainly due to geographic distance between the authors and the international participants, but also due to statistical reasons. The high number of institutions (implementing and supporting entities, hosting countries) and the time constraint to collect data is another reason for this survey. Interviews have been conducted with only a small number of experts in the field of NAMAs and CDM (see sub paragraph 2.3.2).

Because the survey acts as a cross-national study, a form harmonisation is necessary. Within this study, *input harmonisation* will be used (Körner and Meyer, 2005). This is, for every country or entity there will be the same mode (online survey) as the questions aim at the same approach (NAMA) and a generic and universal set of SDIs is the overall goal of this thesis. Hence, the participating entities are supposed to answer the same questions. However, most of the questions are open, thus there is the opportunity for collecting individual answers and opinions on the same topic. A pre-test has been conducted with experts on the field of climate change and those, who are familiar with statistical analyses. Modifications have been made according to the suggested changes regarding understanding and the overall amount of questions.

2.3.1.1 Survey participants

The following paragraph introduces the survey, which has been sent to several international institutions and has also been answered by those. Throughout the whole thesis the NAMA roles are understood as follows: by "hosting country" national implementing agencies[6] representing the country where the NAMA takes place are meant. By "implementing agency" external institutions, which facilitate the implementation of the NAMA through the provision of capacity building and technical support are meant. A third categorisation of a NAMA role is the "international funder". In addition, there is "others" which means institutions not involved in any specific NAMA implementation process, but contributing to the global NAMA discussion.

	Name of institution[7]	**NAMA role**	**Country**
1	Cooperación Nacional Forestal	Hosting country	Chile
2	Electro Power Industry of Republic Serbia	Hosting country	Serbia
3	NAMA Facility - Technical Support Unit	Implementing agency, international funder	Germany, United Kingdom
4	National Energy Conservation Center, Energy Conservation Fund	Hosting Country	Pakistan
5	National Energy Directorate	Hosting country	Uruguay
6	National Forestry Agency	Hosting country	Georgia
7	PEMEX (Petróleos Mexicanos)	Hosting country	Mexico
8	UNDP	Implementing agency[8]	
9	UNEP Risø Centre	Others	
10	UNFCCC	Others	

Table 1: Survey participants.

[6] As categorized by the NAMA registry.
[7] As stated by the survey participants in question 1 (see survey in Appendix I).
[8] UNDP is considered as an implementation agency because through its country offices it is involved in specific NAMA projects (e.g. UNDP manages the GEF founds for the implementation of NAMAs is Azerbaijan and Sudan).

2.3.1.2 Survey questions

A few of the questionnaires have been submitted without answers to any specific question besides the identification of the respondent. Nevertheless, those questionnaires will be considered during the analysis. The reason for this is the fact that those survey participants (unconsciously) submitted information about the level of SD perception regarding their NAMAs (see sub paragraph 2.3.3). The survey questions and the results can be found in Appendix I. The results will be summarised and analysed within chapter 5 (Analysis).

2.3.2 Interviews

Interviews have been conducted with the following institutions and partners:

- Karen Olsen (UNEP Risø Center (URC), Copenhagen)
- Professional Officer (UNFCCC, Sustainable Development Mechanisms (SDM) Programme, Bonn)

The interview with Karen Olsen from URC has been semi-structured. She is a senior researcher at URC and expert on NAMAs, in particular for MRV methods for SD. The intention for the interview with her was to retrieve information regarding her report on SD impacts of NAMAs (Olsen, 2013). Especially, understanding the nature of the "development first" and "integrated" approaches in the context of NAMAs was of interest, which is why the interview has been conducted. Another interview partner has been an expert on SD assessment of CDMs from UNFCCC. The interview with him has been impromptu, the transcript shows the conversation as remembered and it is presented in respect to the confidentiality required by the interviewee (see transcripts in Appendix III).

In general, the intention of the interviews was to gain in-depth knowledge on the perception of SD in regard to NAMAs. Therefore, the interview questions also aimed at this broad goal, but different answers led to different conversations and results. Nevertheless, the interviews were helpful to understand the grade of sustainability perceived by the consulted stakeholders and to understand the applicability of MRV methods of CDM to NAMAs.

2.3.3 Qualitative content analysis

The method used to retrieve relevant information from the survey responses and interviews, is a conventional content analysis. It is a qualitative content analysis, which aims at categorising data and sampling it in order to be *"[…] able to gain a richer understanding of a*

phenomenon […]" (Hsieh and Shannon, 2005, p. 1286), *here* the perception of SD in relation to NAMAs. Three coding words are of interest for this: *awareness*, *methods* and *implementation*. They have been developed by the authors of the thesis. Whereas the interviews have been analysed on the general content to retrieve information in order to answer the sub questions, the survey analysis has been based on the coding technique. This helped to understand the perception or grade of awareness of SD and to get to know (new) methods for measuring and implementing SD.

As of what regards the survey, the overall aim of using the following coding system is to group the respondents based on their level of SD perception in relation to NAMAs. The survey has been designed in a way that the questions become progressively more specific about the relation between SD and NAMAs. Making use of the abovementioned coding system will result in three levels of SD perception in regard to NAMAs. Each level of perception is related to a specific section within the survey. As further presented in the analysis, respondents end the survey at different sections. The survey respondents could have accessed the second or third section only as long as they provided answers to the previous sections. Due to this, levels of SD perception in relation to NAMAs can be revealed among the participants. The final grouping of the respondents regarding their level of SD perception will be used to answer sub question 1 and the state of the art of NAMA perception. The grouped results can be found in sub chapter 5.1.

The following codes have been used to give a summary of the results and concern question 9 to 24. Questions 1 to 8 are exceptional questions. They simply aim at understanding the background of the NAMA entity and should sway the participants in a known setting with easy, answerable questions.

1.) **Awareness**

The first section of the survey (questions 9 to 14) aims at understanding the grade of awareness regarding SD in relation to NAMAs. The title for those questions is "Sustainable Development Performance". However, and without making it obvious to the participant, the answers give indication on the awareness level of SD in the context of NAMAs. The answer of question 14 also shows how the participants balance the three dimensions of SD. Chapter 2.3.4 will further describe how question 14 has been analysed as it is a quantitative assessment.

2.) Methods

Questions 15 to 19 represent the second section of the survey. The questions aim at retrieving data regarding methods to assess SD through NAMA projects. In order to answer sub question 2, it will be made use of the "methods" code. Especially question 19 is of interest, as it shows aspects of SDI implementation in the view of NAMA entities, which is an indicator for answering the research question (see paragraph 2.3.4).

3.) Implementation

The last section of the survey (questions 20 to 24) seeks to find answers on possible implementations of methods, which assess the level of SD through NAMA projects. Questions 20, 22 and 24 are quantitative and aim to clarify certain aspects (see Appendix I).

2.3.4 Quantitative content analysis

Only a few questions from the survey were quantitative and closed. Question 14 is a nominal question. The question is of importance as it corresponds on a content level with the Bali Action Plan and the mentioning of the NAMA objective (UNFCCC, 2007). The research question seeks to investigate evaluation methods for an effective framework on NAMA SD assessment, which addresses the clarification of the term SD and is inevitably connected with the perception of SD (and the balance of the three dimensions) by NAMA associated entities. Question 19 is a nominal question and asks for the opinion on who should evaluate the SD outcomes. The question includes the option to choose an individual answer. This will be considered within sub chapter 5.2. Question 20 is a nominal question and will be presented by its percentage of "yes" or "no" answers. The respective answer allows for conclusion on the extent of implementation of SD MRV methods. Also question 22 is nominal and if answered with "yes", gives further information about evaluation data. Question 24 in its being the last question only aims on getting to know if further consultations with the participant would be possible and, like question 23, is not part of the analysis.

The overall scientific approach might be confused with phenomenology, but being on the methodological sphere, where methods are applied, it is considered as the appropriate way to analyse qualitative data and retrieve information which enables to answer the research question.

3 Context of the Analysis

The following chapter explains NAMA as well as the CDM and provides a basic necessary understanding of the concepts of the tools. It will be referred to these concepts within the Analysis (chapter 5). Furthermore, a literature review on sustainable development and several SD indicator approaches will be made. This serves an overview of SD evaluation methods and gives explanations, which will be referred to within in the Analysis (chapter 5) and the Discussion (chapter 6).

3.1 NAMAs in negotiations

In this paragraph a brief description of the evolution of the negotiations on NAMA is presented. The concept of NAMAs first emerged during the negotiations at the thirteenth session of the Conference of the Parties of the UNFCCC (COP13) in Bali in 2007. In the very last stage of the conference, the parties agreed in adopting the Bali Action Plan that promotes a new process to intensify the implementation of the Convention. This document includes, among others, the first official reference to the concept of NAMAs. Indeed, Decision 1/CP.13 launched:

"[…] *a comprehensive process to enable the full, effective and sustained implementation of the Convention through long-term cooperative action […]"* which considers *"[e]nhanced national/international action on mitigation of climate change*" (UNFCCC, 2007, Decision 1/CP.13, paragraph 1).

Under this area of work, reference to NAMAs is made by paragraph 1 b (ii):

"*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*" (UNFCCC, 2007, Decision 1/CP.13, paragraph 1 b (ii)).

It is also relevant to mention that the document states that developing countries will be asked to take "*[m]easurable, reportable and verifiable nationally appropriate mitigation commitments or actions, including quantified emission limitation and reduction objectives [...] while ensuring the comparability of efforts among them, taking into account differences in their national circumstances*" (*ibid.*).

As it will be further uncovered, on this base and on the aspect of "national relevance", the entire discussion related to MRV and evaluation of SD outcomes of NAMAs finds its foundation.

The second step in the history of NAMAs' conceptualisation was taken in Copenhagen during the COP15 in December 2009. According with article 4.7 of the Convention, which clearly states that mitigation actions taken by developing countries will be internationally supported, the Copenhagen Accord (UNFCCC, 2009, Decision 2/CP.15) introduced a new cornerstone in the NAMA discussion by putting the base for the creation of the NAMA registry: "*Nationally appropriate mitigation actions seeking international support will be recorded in a registry along with relevant technology, finance and capacity building support. Those actions supported will be added to the list in appendix II. These supported nationally appropriate mitigation actions will be subject to international measurement, reporting and verification in accordance with guidelines adopted by the Conference of the Parties*" (UNFCCC, 2009, Decision 2/CP.15, paragraph 5). With this paragraph the parties pointed out an important aspect of the discussion by clarifying that NAMAs can be both, supported or not supported by developed countries.

As an outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention during the COP16 in Cancun in 2010, the Conference adopted the "Cancun Agreements" which contributed to the development of the concept of NAMA and its implementation guidelines. In this context the differentiation between internationally supported and domestic NAMAs was stressed. In this regard, the agreements state that "[…] *developing country Parties will take nationally appropriate mitigation actions in the context of sustainable development, supported and enabled by technology, financing and capacity building, aimed at achieving a deviation in emissions relative to 'business as usual' emissions in 2020"* (UNFCCC, 2010, Decision 1/CP.16, paragraph 48).

Decision 1/CP.16 also invites developing countries to voluntarily inform the Conference about their intentions to implement NAMAs in order to facilitate the seeking of financial, technological and capacity building support. All the information gathered from developing countries about their intention of implementing NAMAs has been collected in a document titled "Compilation of information on nationally appropriate mitigation actions to be implemented by developing country Parties. Revised note by the secretariat." The decision puts effort on the support required by saying that "[…] *developed country Parties shall provide enhanced financial, technological and capacity-building support for the preparation*

and implementation of nationally appropriate mitigation actions of developing country Parties and for enhanced reporting by these Parties" (UNFCCC, 2010, Decision 1/CP.16, paragraph 52).

During COP16 the NAMA Registry was better defined in its structure and functioning (see sub paragraph 3.4) with the decision "[…] *to set up a registry to record nationally appropriate mitigation actions seeking international support and to facilitate matching of finance, technology and capacity-building support for these actions*" (UNFCCC, 2010, Decision 1CP./16, paragraph 53)

Further implementation within the conceptualisation process took place in Durban in the context of COP17, when the Parties reiterated the need of support from developed countries, precisely the role of the NAMA registry, by stating that it "[…] *should be developed as a dynamic, web based platform managed by a dedicated team in the secretariat*" (UNFCCC, 2012, AWGLCA/2012/CRP.10).

Following, during the COP18 in Doha the Parties established a specific Work Programme (NAMA-WP) under the Subsidiary Body for Implementation (SBI) to further the understanding of the diversity of NAMAs. The NAMA-WP aims at underlying assumptions and methodologies, sectors covered by NAMAs' implementation, global warming potential values used and estimated mitigation outcomes as long as technical, financial and capacity building support flows. The last step in the international negotiations on NAMAs has been reached in Warsaw during the COP19 in 2013. During the Conference the Parties agreed on *"[g]eneral guidelines for domestic measurement, reporting and verification of domestically supported nationally appropriate mitigation actions by developing country Parties*" (UNFCCC, 2013, Decision 21/CP.19).

3.2 Uncovering the concept of NAMAs

NAMAs are a young mitigation tool targeting developing countries that are being developed under the umbrella of the UNFCCC through international negotiations as described above.

Nevertheless, the concept of NAMA still manifests a high degree of uncertainty and difficulty in its definition. Often concerns are raised that the concept is immature and poorly understood and not completely utilized by developing countries (Tyler *et al.*, 2013). The concept and the definition of NAMAs is developing bottom-up based, referring to different types of activities that has been undertaken and named as NAMAs by developing countries.

One of the characteristics of NAMAs that makes the tool differ from previous mitigation actions targeting developing countries is the strong emphasis claimed by Parties on the predominance of a SD oriented interpretation of the tool. As indicated in the sub chapter 3.1 about NAMAs in negotiations, SD is always the frame in which the NAMA discussion tries to move forward towards a more comprehensive understanding of NAMAs.

The comparison with CDMs that will be presented during the analysis, underlines, among other aspects, what has been indicated as a "development first" approach which characterises NAMAs in opposition to the "environment first" approach that has been driven CDMs since their first conceptualisation (Olsen, 2013). The former approach refers to an integrative perspective that considers the three pillars of SD equally relevant in guiding the tool through its implementation. Social, economic and environmental spheres are uniformly placed at the base of the concept of NAMAs both at a conceptual level and at an implementation level.

NAMAs were framed into the context of Low Carbon Development Strategies (LCDS). The notion of LCDS derives from the Copenhagen Accord that describes it as the individual national contribution to international mitigation commitment. With the Cancun Agreement in 2010, the definition of LCDS has been further developed with respect to national development priorities. As the agreement states:

"*Parties should cooperate in achieving the peaking of global and national green-house 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*" (UNFCCC, 2010, 1/CP.16, paragraph 6).

This contextualisation of NAMAs is also reflected in the tool itself. Indeed, the characteristic of being "nationally appropriate" derives directly from the mentioned integrated perspective that is, according with the Cancun agreement, tailored to the national context (Sharma and Desgain, 2013).

In other words, NAMAs are understood to be integrative in their multilateral inclusion of social, economic and environmental aspects and designed with the most effective and precise consideration of the national needs and priorities (Sharma and Desgain, 2013).

3.3 Categorisation of NAMAs

Besides usual categorisations of mitigation actions based on the type of technology utilised, the sector of implementation and regional distribution, different attempts have been undertaken to classify the different types of NAMAs in order to contribute to the broader discussion aimed at defining the tool (Lütken *et al.*, 2011). The only classification officially existing so far and included in decisions coming out from negotiation processes is the one included in the decision FCCC/AWGLCA/2010/8 that differentiates only between unilateral (or domestic) and supported NAMAs. Concerning unilateral/domestic NAMAs, those actions are intended that do not require international support for their preparation or implementation. In contrast, supported NAMAs are those ones that benefit of international sources of support in terms of finance, technology transfer and capacity building.

Nevertheless, several other categorisations of NAMAs have been explored by stakeholders along the conceptualisation debate of the last years.

A relevant categorisation, that has also been used by the UNFCCC although not officially adopted in any decision yet, is the differentiation between Pledge NAMAs and Individual NAMAs. This separation generated spontaneously when mitigation actions in terms of NAMAs started to be submitted to the UNFCCC by Parties. Following Olsen's description of the two groups of entries it is possible to summarise that: Pledge NAMAs are considered as those submissions that aim at setting a target for developing countries to contribute to the GHG emissions reduction in the future context of new climate agreement expected to be signed in 2015, while Individual NAMAs are actions, in terms of policies, programmes or projects, that aim at reaching ad-hoc objectives decided within the NAMA itself (Olsen, 2013).

Another important and internationally applied categorisation of NAMAs is the one based on the type of action. This practice is used by several stakeholders in order to better understand the NAMAs in relation to their roles and interests. According with the shared literature on this regard, three main categories of NAMAs can be highlighted. To explain the following differentiation, a reference to GIZ (German Agency for International Cooperation) is proposed although, as mentioned, several different homogeneous descriptions of this categorisation can be found in literature.

According to these categories, table 2 describes the three different groups of NAMAs with examples for each group.

POLICY BASED	TARGET BASED	PROJECT BASED
• Public procurement guidelines • Feed-in tariffs • Tax reductions/exemptions • Building standards • Labelling schemes • Removing subsidies to non-renewable energies	• Energy efficiency target • GHG emission target • Renewable energy target • GHG emission below BAU • Mitigation target	• Point-source emission reductions • Energy efficiency measures • Direct interventions to avoid emissions

Table 2: Different NAMA groups based on type of action (based on GIZ, 2013).

It is to underline an important difference between NAMAs and CDMs. In fact, NAMAs can take the form of national policies and GHG reduction targets, whereas CDMs are exclusively project based (see sub chapter 3.5). This difference will be taken into account when the comparison between NAMAs and CDMs will be further considered in the Analysis.

3.4 The NAMA registry

Under the UNFCCC negotiations on NAMAs, a decision has been adopted during the Conference of the Parties at its sixteenth session to develop a web-based platform with the scope of recording NAMAs proposals and support offers (Lütken *et al*., 2011).

As mentioned in sub chapter 3.1, the NAMA registry has been developed in conformity with decisions 1CP/16. and 2CP/17. The registry has been implemented as a web-based platform with the double scope of on the one hand, recording NAMA proposals by developing country and sources of support provided, on the other hand, by developed countries and bilateral-multilateral organisations. On this base, the COP invites:

"[…] *developing countries Parties to submit to the secretariat information on NAMAs for which they are seeking support* [...]" (UNFCCC, 2010, Decision 1CP/16., paragraph 54) and

"[…] *developed country Parties to submit to the secretariat information of support available and provided for NAMAs*" (UNFCCC, 2010, Decision 1CP/16., paragraph 55).

During COP 17 the COP also agreed that:

"*Participation in the registry should be voluntary, and only information submitted expressly for inclusion to the registry should be recorded*" (UNFCCC, 2011, Decision 2CP/17., paragraph 45).

The registry also includes a separate section aiming at recording unilateral NAMAs seeking international recognition. Besides the objective of recording entries from both, seekers and provider of support, the registry is also tasked to reflect the technical, financial and capacity building support after the provision.

At the time of this research, the registry counts between forty and fifty NAMA entries and around ten sources of support available (UNFCCC, 2014 b). The NAMA submitted to the registry are classified in three categories: NAMAs seeking support for preparation, NAMAs seeking support for implementation and NAMAs for recognition. Whereas the sources of support only refer to the type of support provided, which are: financial, capacity building or technical.

The relevance of the registry for the current research is mainly linked to the use of the registry that the authors had made in order to highlight stakeholders involved in the NAMA implementation process. Indeed, the survey created as part of the following analysis has also been distributed among contacts that have submitted entries within the NAMA registry. Developing countries' National Focal Points and representatives of the different institutions providing support to NAMAs has been listed based on the NAMA registry database and thanks to the role of one of the author within the UNFCCC secretariat.

3.5 The Clean Development Mechanism (CDM)

The comparison between NAMAs and CDMs, in the context of assessing SD performances of both mitigation tools, lies in the fact that CDM can easily be seen as the precursor of NAMAs. In fact, when thinking about mitigation actions targeting developing countries the two considered tools are the main existing examples and the discussion about NAMAs itself often refers to CDM and their experience (Olsen, 2013). In addition, it has also been noted that in most of the cases, the DNAs in charge of assessing SD performances of NAMAs are the same institutions that plays the role of NAMA approvers for the submission of NAMAs to the NAMA registry (Olsen, 2014, see interview in Appendix III).

The CDM is a so-called flexible mechanism, which has been ratified under the UNFCCC Kyoto Protocol. The aim of CDM projects is to:

"[…] assist[ ] Parties not included in Annex I in achieving sustainable development and in contributing to the ultimate objective of the Convention, and to assist parties included in Annex I in achieving compliance with their quantified emission limitation and reduction commitments" (UNFCCC, 1998, Article 12).

By "*ultimate objective of the convention"* the following is meant:

"[…] to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner" (UNFCCC, 1998, Article 2).

Within a developing country,

"[t]he mechanism stimulates sustainable development and emission reductions while giving industrialized countries some flexibility in how they meet their emission reduction limitation targets" (UNFCCC, 2013 b[9]).

The CDM is a tool in the hands of developed countries to achieve their binding targets under the Kyoto Protocol. Among the three market-based mechanisms there is also the Joint Implementation (JI), which aims at European countries with economies under transition, and the emission trading system, which serves the market trade with, among others, certified emission reductions (CERs) deriving from the crediting of CDM projects. Meanwhile, there are about 7500 CDM projects registered, which take place in developing countries. Currently, the project activities count for about 1.5 mil CERs. In return, these credits can be traded on a carbon market and are also used by industrialised countries as a mechanism to reduce emissions and to meet the individual targets under the Kyoto Protocol (UNFCCC, 2014[10]).

The CDM has resulted in many projects, most of them with positive impacts on the project locations. A particular goal is the creation of sustainable development and technology transfer in developing countries (UNFCCC, 2012 b). However, critics have been raised through the years due to the low carbon price and thus the inefficient trade of CERs, which led many developed countries to phase out their investments in the CDM. This ended in unfinished projects and non-sustainable outcomes for many project locations (Cassanmagnago *et al.*, 2013).

MRV methods used for CDM projects are mostly quantitative, aiming on emission reduction calculations and job creation. Those calculations are easy to perform and serve as distinct indicators for the success of the projects (to *stimulate sustainable development and emission*

[9] See http://cdm.unfccc.int/about/index.html.
[10] See http://cdm.unfccc.int/.

reductions) (UNFCCC, 2013 b). There are five categorisations of methodologies for the CDM:

- Methodologies for large-scale project activities
- Methodologies for small-scale project activities
- Methodologies for large-scale afforestation and reforestation project activities
- Methodologies for small-scale afforestation and reforestation project activities
- Methodologies for carbon capture and storage project activities (UNFCCC, 2013).

Within the large-scale and small-scale CDM project activities the baseline scenario and the project scenario become compared. The difference in emissions lay for instance in the emission reductions per project activity. Different parameters (within this thesis it corresponds with the term indicator) help to make conclusions on the impact. Mostly, one differentiates between validation data and monitored data, whereas the latter means the captured energy or the saved methane in a project. Methodologies regarding afforestation and re-afforestation project activities are about land-use, GHG emissions or carbon storages through displacements of forests (UNFCCC, 2013 c).

It is necessary to mention, at this point, that assessments and MRV methodologies for CDMs has always been undertaken with a perspective that focuses more on the environmental outcomes of the actions. This can be attributed to the accountability in terms of GHGs emission reductions of CDMs and the high interest of stakeholders in this. What Olsen (2013) called "environment first approach" precisely refers to this aspect of CDM evaluations. More interest has been put on counting and monitoring CO_2 savings in comparison to other social or economic outcomes of the projects. This difference will be further stressed when answering the sub question related to the comparison between CDMs and NAMAs (see sub chapter 5.3). The assessment of SD regarding CDM projects is undertaken by the DNAs and thus, is up to national decisions. It leads to unclear assessment approaches and a lot of critique (e.g. see Corbera and Jover, 2012). Several methods of evaluating SD outcomes of CDMs have been implemented along the years. Some examples will be presented during the analyses in order to investigate their applicability to NAMAs' SD evaluation.

As highlighted in the beginning of the paragraph, a comparison between CDMs and NAMAs in terms of SD outcomes evaluation is part of the analysis undertaken further on in this thesis. It reflects sub question 3, and is a core topic of discussion in the investigation developed through the survey and the interviews (see sub chapter 5.3).

3.6 The concept of sustainable development (SD) in relation to this thesis

Not only since 1992 and the Rio Conference on Development and Environment or the foregoing so-called Brundtland Report from 1987 sustainability is a common term in use for describing the overall political will and long-term achievements for a liveable life on planet earth. For many years, SD has been discussed and included in political agendas (Borowy, 2014), also long before the Brundtland Commission published their findings and views regarding SD (Murcott, 1997). Furthermore, sustainable development describes the inherent connection between society, ecology and economy and – here seen on another level, though – the fourth factor of governance or institutions. However, *"[…] SD has slowly but surely begun to recede from the social-scientific radar screen. This has in large part been because of the fact that the SD concept could not overcome being seen as a nebulous knowledge claim which was too imprecise to generate a coherent set of hypothesis and body of research"* (Buttel, 2000, p. 61). This shows the need for a new and relevant discussion on sustainability in order to re-establish the once agreed common goal of "[…] *meet[ing] the needs of the present without compromising the ability of future generations to meet their own needs*" (Brundtland Commission, 1987, p. 43).

The authors want to emphasise that SD is not a defined process or rather term for understanding the modern way of living. But there is an overall common base of understanding SD as a triple bottom line (or with a fourth factor of governance), so that a working definition will be set up, which serves a better following throughout the whole report. In order to do so, the literature review serves as a methodological base for combining different views or opinions, which come from different scientific disciplines or political movements (Sawicki, 2002) and will summon up what is perceived as SD in general.

All efforts regarding empirical work and progress in SD building on theoretical frameworks of the conception of SD (triple bottom line etc.), do not succeed in the way theory tells. Combing the spheres of economy, ecology and sociality and balance those through political action and actual execution, does not necessarily result in SD. Also, integrating a fourth sphere of governance, or building up complex models is not a guarantee for success (Hodge, 1997). Moreover, lobbyism or financial reasons restrict the execution of a balanced project aiming at SD. The overall perception of SD and its application call for both, a generic definition (taken e.g. from the Brundlandt Commission Report) in order to understand the overall aim, and flexible and adaptable concepts for the implementation of small-scale

projects including the measurement tools, related to the spatial and temporal context (Pinter, 2013).

For the purpose of a common understanding of SD, the following working definition of SD will be considered as applicable throughout the whole report:

Sustainable development, as understood within this thesis, means the balanced economic, environmental and social development between societies and nature, whereas any undertaking does not make the future generations worse off compared to nowadays and where future approaches lead to an improvement in global development. Furthermore, climate change mitigation, adaptation, social security, less poverty and famine as well as equity among people is to be achieved (own definition based on Brundtland Commission, 1987).

The working definition has its origin in the Brundlandt Commission's definition, but includes thoughts of several UN-conferences regarding development and environment. Especially, facing the critical aspects of:

- "*Present versus future generations;*
- *Economic versus environmental perspectives;*
- *North versus South;*
- *Scientific accuracy versus political acceptability*" (Borowy, 2014, p. 5).

These critical aspects have been constraints for creating the working definition. The mentioned aspects have been foci in the Brundtland Commission's report and are major factors in nowadays SD discussions (Borowy, 2014).

The definition might miss aspects, which seem fundamental to others. However, it serves the goal to provide a clear understanding throughout the following chapters. The reason for not including the nowadays discussed fourth sphere of "institutions" or "governance" is the manifestation of institutions in the execution process of SD. That is, another level of SD performance is touched upon, which is certainly a mattering factor within the NAMA policy, but not relevant in the understanding of SD for this thesis. The authors are aware that this might enrich the whole topic of sustainability. Nevertheless it would open another discussion, which shall not be part of this thesis. In order to clarify the relationship between SD and NAMAs (considered as generic mitigation actions) a statement from the fourth IPCC report is adopted. Therein the coexistence of mitigation actions and SD is described as a two-way relationship (IPCC, 2007). The "climate first" approach on the one hand underlines a context

of action in which GHG emission reductions are pursued as primary objective and SD implications are taken as side effects of the mitigation actions. On the other hand, the second approach, "development first", considers the relation like a development challenge where SD is the objective and e.g. the possibility of decoupling economic growth from GHG emissions is considered as a co-benefit. In the following research, none of the two visions is entirely adopted. Indeed, as it will be considered within the Discussion (chapter 6), it seems more realistic to consider a complementary interpretation of the coexistence of the three SD objectives. The adoption of the two different perspectives can strongly affect the consequent ways of evaluating SD outcomes (Olsen, 2013).

3.7 A literature review on sustainable development indicators (SDIs)

Deriving SD as a global development approach from the previous abstract, it can be concluded that a measurement of a grade of sustainability is difficult to undertake, due to unclear common goals, many influencing factors and weighting problems (Sutter and Parreno, 2007). However, it is important to set up indicators in order to measure, rank and inform about the development of so-called sustainable objectives. Results of measurements indicate whether the objectives are met or not. Indicators help defining the criteria for the measurement to be undertaken. It is relevant to underline, that *"[…] the outcomes […] are depending on the simplification of the concept of sustainable development represented in the selected indicators"* (Sutter and Parreno, 2007, p. 90). Nevertheless, such a simplification can make it clear to the interpreter, whether the results are acceptable or not. Furthermore, not only context familiar decision-makers, but also the public population can be easily informed, which is often claimed as a necessary step towards sustainable development (Meadows, 1998).

Freedman and Jaggi (2010) discuss that regular disclosures of GHG emissions of companies (but also applicable to nation states) are required in order to reveal success and give incentives for further SD commitment. Clarkson *et al.* (2008) distinguish between *soft* (e.g. credibility and performance indicators) and *hard* (e.g. firm profile and initiatives) disclosure items for firms. Those items are influential to the firm's profile and acceptance in society. Clarkson *et al.* (2008) hereby mean that voluntary disclosures are beneficial for the company's performance and branding. This is applicable to national approaches, where for instance mitigation actions show a willingness to invest and care for the future. NAMAs are thus an

evidence for commitment to SD of developing countries and give credibility to funding entities that investment is not only necessary, but also valued.

However, measuring the grade of SD is important in order to see how effective mitigation actions are. Several approaches will be introduced, whereas the selection is made on the findings in literature, which cover a broad range of different methodologies characterised by heterogeneous perspectives in relation to SD (e.g. economic, descriptive or with CDM relation). The applicability of those approaches will be investigated in relation to NAMA SD assessment. The summaries of SDIs help to give a short overview regarding recent approaches in the context of SD assessments and will be picked up when answering the sub and research questions (see chapter 5). In the following the selected approaches will be introduced.

The most common approach of assessing SD through indicators is the Pressure-State-Response-Framework (PSR), further developed as Pressure-State-Impact-Response-Framework (PSIR) and the Driving-Forces-Pressure-State-Impact-Response-Framework (DPSIR). They all have in common, that given some pressure on the environment the assessment of the state of the art is possible, which leads to a response from society (e.g. through environmental policies). Including an impact assessment or defining the driving forces for certain pressures, gives a more precise picture of the state of the environment and how to react in order to develop towards sustainability (Segnestam, 2002). However, imprecise selection of criteria to explore the state of the art of the environment, often leads to imperfect results and policy-advices. Segnestam (2002) therefore calls for well-selected small numbers of indicators, which should aim on the following:

- Direct relevance to objectives (What is the environmental problem?)
- Direct relevance to the target group (Who needs which information?)
- Clarity in design (Who is the audience?)
- Realistic collection of development costs (What's the benefit of the indicator?) (Segnestam, 2002).

The PSR aims at monitoring the environment on a regional, nationally or global level, without having detailed suggestions at hand, but rather develop individual *state-responding* ways to engage into SD and allow for policy advices. This is line with the NAMAs and should matter in future negotiations and the development of MRV techniques.

Genuine Savings (GS):

This is an economic measure, aiming to show weak sustainability by comparing the saving rate and the sum of the depletion of man-made and natural capital, being the national income. According to Pearce and Atkin (1993), re-invested savings lead to stable aggregated capital stock and a constant consumption rate:

$$\mathrm{GS} = \left(\frac{\mathrm{S}}{\mathrm{Y}}\right) - \left(\frac{\partial m}{Y}\right) - \left(\frac{\partial N}{Y}\right),$$

where S is the saving, Y the income, ∂m is the depletion of man-made capital K_m and ∂N the depletion of natural capital K_N. It is a form of weak sustainability, as K_m and K_N are seen as identical and thus *"[…] if countries fail this weak test of sustainability, they will not pass a sterner test"* (Hanley *et al.*, 1999, p. 59).

The reason for mentioning the GS is the relevance of it in literature, especially the adoption of the economic measure by the World Bank, which plays a major role in international development negotiations (Hamilton and Clemens, 1997 and Pillarisetti, 2005) and is an active member of the NAMA Partnership[11].

The Bellagio STAMP:

This principle-based approach is used by the Organisation for Economic Co-operation and Development (OECD) and the International Institute for Sustainable Development (IISD). The Sustainability Assessment and Measurement Principles (STAMP) provide guidance for developing Sustainable Development Goal Indicators (SDGIs), which is a manifested aim of paragraph 250 in the Rio Declaration (Pinter, 2013). STAMP consider a wide range of meaningful development goals:

1. Guiding vision (as a goal of achieving human wellbeing within the limits of the biosphere)
2. Essential Considerations (like spatial, ecological, economic and governance spheres)
3. Adequate scope (a temporal and spatial coverage for preparation of policy-relevant scenarios)
4. Framework and Indicators (SDGIs must be complementary and in sync with Millennium Development Goals (MDGs[12]))
5. Transparency (during the indicator selection)
6. Effective Communication (and clear goals without possibility of misuse)

[11] For details on the NAMA Partnership, see http://www.namapartnership.org/.
[12] For details on the MDG, see http://www.un.org/millenniumgoals/.

7. Broad Participation (of public, experts and policy-makers)
8. Continuity and Capacity (ongoing monitoring, analysis, reporting which requires capacity and resources) (Pinter, 2013).

The Bellagio STAMP is considered as a guideline and do not provide exact measures, but as they are broad enough to apply to different projects (MDGs, climate change mitigation, poverty reduction, etc.) they might be a possibility for the SD assessment of NAMAs. Those differ in scale and goal and thus have a need for particular assessment strategies. Within the Analysis it will be referred to this approach.

Becker (2005) suggests an ecological framework for selecting indicators regarding SD. The author claims that: *"It's […] important that indicators not only measure but indicate what is to be achieved […] [because] without a framework, indicators can easily proliferate and be little more than a conglomeration of disparate data"* (Becker, 2005, p. 88).

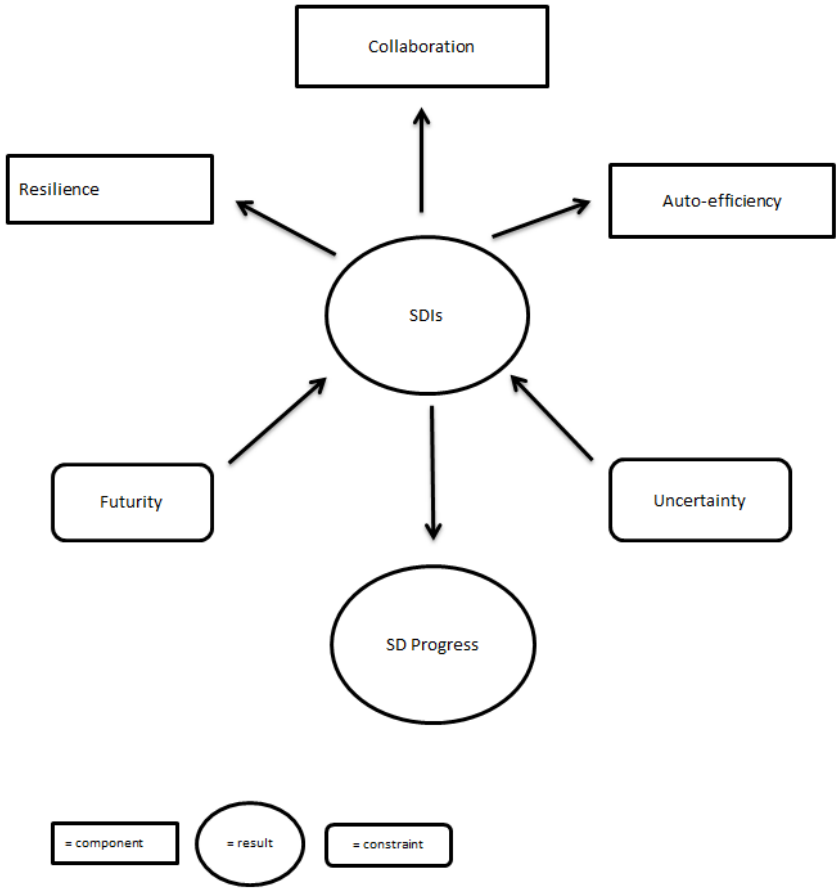

Figure 3: Framework for SDI development and progress evaluation (acc. to Becker, 2005, p. 90).

Figure 3 shows the straight connection of components and constraints in order to result in a SD progress and SDIs. The ecological components are:

- Resilience (Diversity, Stability and Adaptability)
- Collaboration (Inclusivity, Compatibility, Contribution) and
- Auto-sufficiency (Carrying Capacity, Low entropy integrated systems),

Those components can be transformed into sustainability concepts, such as:

- Product diversity, sustainable resource use and education
- Population reduction and renewable energies and
- Social equity, suitable land-use and low negative health impacts (Becker, 2005).

Inevitable constraints are futurity, which is an immediate part of SD and the inter-generational equity, as well as uncertainty, which is linked to unpredictable incidents of ecological or social systems (Becker, 2005). This thought will be picked up within the Analysis (chapter 5).

The MATA system:

Experience with the CDM shows, that sustainability is measurable, but needs more than just a few indicators, like in the MATA system concerning the environmental factor. The MATA system suggests a mathematical way to assess the grade of SD of CDM projects. This can easily be applied to NAMAs, as the outcomes of the NAMA need to be sustainable in the end and assessed accordingly. Within the Analysis Chapter, the MATA system will be picked up.

The Multi-Attributive Assessment (MATA) is based on the Multi-Attributive Utility Theory (MAUT) and applied to the CDM, can be regarded as a *"[…] holistic overview assessment of sustainable development contribution of CDM projects"* (Sutter and Parreno, 2007, p. 77).

Five steps lead from identification of S indicators to finally the interpretation of results regarding sustainability (S).

1. Identification of S criteria (c_i)
2. Defining indicators (I):
    a. Specification of Is
    b. Utility functions of Is (u_i)
3. Weighting the criteria (w_i)
4. Assessment of CDM project (P)
5. Aggregation and interpretation of results: $w_i\ u_i\ [c_i\ (P)]$

$$U(P) = \sum_{i=1}^{n} w_i\ u_i\ [c_i\ (P)]$$

The authors Sutter and Parreno (2007, p. 78) emphasise: *"The advantage of MAUT is that indicators can be measured in the units that best suit the nature of each specific criterion […]"*, which is useful regarding different systematic circumstances, for instance in different developing countries with different initial endowments and development goals. Sutter and Parreno suggest the following for an economic indicator for CDM projects, which is the employment generation (EG):

$$EG = \frac{(\mathrm{JP} - \mathrm{JB})}{\mathrm{CERp}}$$

Whereas J_P is the total amount of jobs created per month by the project, J_B the baseline comparison of jobs created per month through the project and CER_p the Certified Emission Reductions of the particular project.

For a social indicator, the authors suggest the Normative included into the *Analytical* Stakeholder Approach, which means the consideration of several stakeholders' rights, weights and benefits[13].

Concerning environmental indicators, they look at the improvement of local air quality and use the internal rate of return (IRR) of the CDM project to measure the change compared to the baseline:

$$\Delta\, IRR = IRRp - IRRbaseline$$

Finally, they emphasize that *"[…] the outcomes […] are depending on the simplification of the concept of SD represented in the selected indicators"* (Sutter and Parreno, 2007, p. 89).

Having included CDM experience, the following assessment of SD is also related to the CDM and gives an idea for SD assessment methods for NAMAs, which will be elaborated within the Analysis (chapter 5).

The Energy and Resource Institute (TERI) (2012) evaluated several CDM projects and made a report on "Assessing the Impact of the Clean Development Mechanism on Sustainable Development and Technology Transfer". The investigation includes a wide range of indicators in order to conclude on SD and technology transfer of different CDM projects. A summary of the findings regarding most used criteria by DNAs for the evaluation of SD impacts of CDM projects can be found in table 3:

[13] See Mygind, 2001.

I.	**To assess economic and technological benefits of CDM projects:**
1.	Additional investment generated
2.	Employment generation
2.1	Number of jobs created for the local community
2.2	Quality of jobs created
3.	Income generation
4.	Contribution to sustainability of balance of payments
5.	Clean energy development
6.	Contribution towards improvement of technologies
II.	**To assess environmental benefits of CDM projects:**
1.	GHG emission reduction
2.	Impact on environment
3.	Impact on air, water and land resources
4.	Impact on solid waste generation and disposal
5.	Impact on conservation/promotion of biodiversity and ecosystems
6.	Contribution to resource sustainability
III.	**To assess social benefits of CDM projects**
1.	Quality of life of locals
1.1	Poverty reduction
1.2	Impact on human health
1.3	Inclusion of development activities to support the society
1.4	Accessibility of local services
1.5	Promotion of local industries
2.	Effective public/community participation in project design, planning and implementation
3.	Capacity/skill/knowledge development
4.	Consistency with/contribution to national, provincial and local development and sectoral priorities

Table 3: Summary of most used criteria to assess SD benefits of CDM projects (acc. to TERI, 2012, p. 33).

The researchers claim that *"[…] countries set their own SD definitions and criteria, should remain – in order to ensure country specific indicators that are aligned with local socio-economic conditions and respect national sovereignty"* (TERI, 2012, p. 38). This is in line with the NAMA objective of contributing to SD in a *nationally appropriate* way. The authors of the TERI study (2012) give a summary of CDM stakeholder suggestions regarding a better incorporation of DNAs' work with SD and CDMs, which will be picked up in chapter 5:

- Embedding SD criteria in project verification stage
- Enhancing the dialogue between DNAs to share ideas on best practices, SD criteria etc.
- Monitoring of SD benefits by host countries
- Need for improved communication between the UNFCCC Secretariat and DNAs (TERI, 2012).

In order not to pre-empt the investigations regarding sub question 3, a comparison of CDM MRV methods with NAMAs will be made within the Analysis (sub chapter 5.3).

The summaries of SDIs and the introductory debate on SD MRV methods for NAMAs help to give a short overview regarding recent approaches in the context of SD assessment. The following chapters will frame the thesis with theories on development studies and environmental debates. The analysis chapter elaborates how SD assessment becomes undertaken through different NAMA stakeholders. In addition, the abovementioned approaches will be picked up in order to conclude on general proceedings regarding SD assessment and evaluation in relation to NAMAs.

4 Theoretical Framework

"In effect, the lens of theory enables us to evaluate practice and policy against criteria that we deem appropriate […]" (Gray *et al.* 2010, p. 3)

This chapter frames the modern topic of NAMAs with theories on economic and environmental development. Some of the theories might seem outdated, but they all give explanations about global movements regarding economic and ecological incidents. In addition, the theories are related to SD to the extent of understanding the mentioned global developments as responses to economic growth and environmental development, which need to be considered in order to provide a living in an economic, environmental and social balance.

Modernisation theory hereby serves as an explanation for the development of societies from primitive towards modern, industrialised or service oriented. Ecological modernisation could be regarded as a response to ecological disasters, which occurred through industrialisation processes. Degrowth and resilience thinking are modern approaches of explaining nature's vulnerability and the connection with human actions and impacts.

In the following the mentioned theories will be shortly introduced and applied to NAMA. However, there is no intention to deeply interpret the theories in relation to NAMAs. Rather, they will give ideas of the development of socio-ecological relations and how to respond to changes. The theoretical approaches will be picked up within the analysis in order to find linkages regarding development and environmental theories and actual policy implementations.

Arat (1988) states, that the level of democracy and socioeconomic development are positively correlated. Modernisation theory shows how societies reach another level of development, mostly through a democratisation process. Since the inequity of global development (North-South conflict), climate change and SD are on the agenda, the global North[14] wants to help the disadvantaged global South going towards a better, stable and a fair future[15]. The Kyoto Protocol, the CDM and the NAMA show efforts (and still could be regarded as compromises) to achieve this. Nevertheless, as Arat (1988) emphasises, countries in the global South mostly miss the initial endowments, so that own (economic) development is hard to achieve. Instead,

[14] By global North those nations are meant, which are industrialised and on the Northern hemisphere, including those nations, being industrialised and on the Southern hemisphere.
[15] See Sachs and Santarius, 2007.

the South is depending on the North and the global division between the rich North and the disadvantaged South is still evident. This draws on dependency theory, which will not further be touched on within this chapter[16]. Instead, modernisation theory will be further applied as it is in line with this thesis and its theme of global development and environmental improvements through mitigation actions.

Stages of economic growth are what Rostow (1959) calls the development of states. Rostow (*ibid.*) assumes that a state - given distinctive resources - allows for economic development, whereby different stages have to be undergone. These stages are ranging from 1) agriculture or traditional society, via 2) specification, 3) take-off or industrialisation and 4) diversification towards 5) mass consumption (Rostow, 1959). Technologies, which are further developed and brought to less developed countries, are a leapfrog towards modernisation, whereby the industrialisation process is skipped. Beck (1986) speaks of a *new modern era*.

However, economic growth is an inevitable undergoing of states, which we consider as "developed" or "industrialised" or the so-called global North. Nevertheless, this viewpoint is nowadays in heavy critique as it does not consider several factors like resource exploitation, pollution or wealth and happiness, which are strongly connected to sustainable development. Southern countries do not necessarily need to undergo those stages and might step into the *new era* without Rostow's evolutionary process. NAMAs could help engaging into climate friendly solutions even though countries so far miss adequate technologies.

Different socio-economic and ecologic thoughts derive from the mentioned concerns regarding modernisation and economic growth. On the one hand, it is ecological modernisation, a discipline originating from environmental studies and finding its manifestation in social science, which will be presented first. On the other hand, there are the approaches of degrowth and resilience. Those will be presented later on in this chapter.

Ecological modernisation can be described as the response of environmental circumstances during the 1980's and 1990's (Buttel, 2000). In this regard two notions are important to mention:

1. Environmental movements during the 1980's and the addressing of *"[…] transformative sectors of metropolitan regions of the advanced industrial nations"* (Buttel, 2000, p. 60) and

[16] See Cardoso and Faletto, 1971 or critique by Smith, 1997 and Sachs, 2003.

2. Sustainability notions which have been *"[…] originally developed toward the South […] and the primary renewable sectors in nonmetropolitan or rural places in the South"* (Buttel, 2000, p. 60).

This shows the original thought behind environmental and sustainable movements. It furthermore, raises the question if ever since the two notions have been addressing the same conceptual approach by e.g. helping to develop the South, reducing environmental degradation or balancing economic growth between the North and the South.

Referring to sub chapter (3.6) on sustainability, it is hardly surprising that different approaches of politicising or economising environmental concerns lead to various debates and *nebulous* concepts, all more or less aiming at the harmonisation of the economic, ecological and social spheres. Ecological modernisation *"[…] thus fulfilled a wide variety of needs and filled several gaps in social-environmental thought"* (Buttel, 2000, p. 60). It is the combination of different claims and *"[…] relationships between environment, economy, society and public policy"*, Waele (1992, p. 52) concludes. Mol (1997, p. 138) describes *"Ecological modernization as theory on social continuity and transformation […] and political program for change."* Hope is definitely a mattering factor here, as the awareness about pollution through industrial processes and globalisation raised during the 1980's and environmentalists as well as social scientists called for a new political paradigm, concerning nature's imbalance, also including inequity in global development (Buttel, 2000). NAMAs could address these concerns and help to push towards this new political paradigm as it compromises the MDGs and nature's imbalance at the same time.

Mol and Spaargaren (2007, p. 35) when discussing environmental modernisation theory, emphasise: *"At the roots of the environmental crisis are the culture and structure of western industrial societies as they were shaped over two or more centuries. All attempts to remedy the problem without basically questioning the overall structure and culture are bound to fail."* Although linked to western or developed countries, one can link this notion also to Southern countries, which have not undergone industrialisation to the extent the North did. *Westernisation* (Sachs, 2003) is the term for developing those countries which is closely linked to Rostow's stages of growth (Rostow, 1959).

The CDM could be announced as a western idea with a western establishment style in developing countries – failing due to many reasons, but clearly also due to non-appropriate infrastructure and no consideration of given political stability and social security.

Furthermore, and in relation to the CDM and SD, Banuri and Gupta (1998, p. 89) claim that *"[…] within each country, these projects will tend to be concentrated on the most prosperous segments of society and thus may exacerbate intra-national inequities as well."*

Mitigation policies are a way to help developing countries leapfrogging to clean development through current policies via ideas and technology (Boyd *et al*., 2009). The current policy is NAMAs and is supposed to contribute to not only a clean, but also balanced development. On the one hand, this means helping to progress in developing countries regarding infrastructures, e.g. renewable energy provision. On the other hand, increased employment, better income distribution and social security must be achieved, under the guidance of experienced institutions and countries. However, *"[…] projects that will hasten and help in leapfrogging to better technologies are clearly in but the underdeveloped infrastructure may restrict these types of projects"* (Banuri and Gupta, 1998, p. 89).

"[…] pathways are available that, if followed with judicious policy and leadership, could effectively mitigate emissions and simultaneously increase energy security and offer new opportunities for development" (Boyd *et al.*, 2009, p. 665). Criticising the CDM, though, Boyd *et al. here* show, that an effective policy on climate change mitigation should be carefully considered and ensure *"[…] that equity is a central issue at post-2012 policy debates"* (Boyd *et al.*, 2009, p. 671). The NAMA approach with its aim on emission reductions within national suitable circumstances concerns this claim (UNFCCC, 2007). The post-2012 (or post-KP) era is thus concerned with the inevitable approach of achieving SD and climate change mitigation at the same time.

The question remains, if economic growth is the key to even and sound development in the global South. The so called "capital gap" still prevents the South from engaging into the next steps, proposed by the North and hinders appropriate development (Barbier, 2010). Northern countries need to invest in order to help leapfrogging and provide capital, whereas mitigation actions could be regarded as functioning mechanisms to achieve this because local capacity building will be improved. The Analysis chapter will investigate this.

So-called degrowth approaches criticise the uncontrolled consumption and production and material flow of Northern societies, not allowing for sustainable growth in the South. Proponents of this ecological economics movement (including the *à la francaise* point of view, Martínez-Alier *et al.*, 2010) see a need in decoupling "happiness" from "capital growth". What makes economic growth unattractive is the immediate connection of consumption and production or use of energy and growth of waste respectively. Personal

happiness has thus to be decoupled from the growth perspective. People's mind-set towards "the bigger the better" and macro political decisions have to be made in accordance with nature's balance and societal equity and compatibility. However, *de-growth*, *green-growth* or *the new green deal* are not assessed long enough to be found as an applicable long-term strategy for sustainable development or even combating climate change and rebound effects are a common known problem (Radkau, 2010 and Seidl and Zahrnt, 2010). In this regard, it is important to mention the French movement of degrowth or *décroissance* as it goes beyond the consumption/production perspective. Within this view especially its advocates claim a need for developed countries to de-economize the reality and to suppress the craze about land, labour and capital. The reduction of economic growth and at the same time the utilisation of given factors like land or products in a sustainable way could also lead to reasonable consumption patterns, which in return reduces people's carbon footprint[17] and general environmental damages (Latouche, 2006 and Seidl and Zahrnt, 2010).

Climate change is a challenge for socio-economic as well as social-ecological relations. Those relationships are intra- and interdependent systems and vulnerable through the various impacts of climate change. Related to this thought, a mattering concept is resilience. It means an (eco-) system's functioning as kept stable "*[…] through flexibility and diversifying functional dependence*" (Tyler and Moench, 2012, p. 312). This explanation originates from ecological studies. However, it has long been adapted by social sciences, where resilient societies or eco-systems are seen as the key to adaptive management (Folke *et al.*, 2002).

In this regard, adaptation mechanisms can be mentioned. Focussing on climate change and socio-economic systems, it means to foresee impacts of climate change, act according to the vulnerability of human and eco systems in order to decrease negative impacts of climate change, such as danger (Smit and Wandel, 2006). The anticipation that the affected systems cannot cope with climate change comprises the assumption that they are not resilient enough to withstand any negative impacts. The adaptive capacity is hence indicating to what extent adaptive management has to be undertaken (*ibid.*). Although NAMAs are mitigation actions, they also anticipate the vulnerability of societies (in the South) and thus aim at decreasing negative effects of climate change. Furthermore, adaptive management (or *here* mitigation actions such as NAMAs) helps to improve the resilience of societies. Resilience or *resilient thinking* in social sciences means flexible learning and re-organising or rebuilding systems without destroying the original functions (Boyd and Juhola, 2009). Such systems can work

[17] The carbon footprint means the indirect and direct resulting greenhouse gas emission caused by human activities/productions (Galli *et al.*, 2012).

without human interference, in biological eco-systems. In environmental management and politics, it aims at:

- Complexity, feedbacks and non-linear development
- Decision-making tools for uncertainty risk
- Multi-scale adaptive governance (Boyd and Osbahr, 2010).

All three areas touch upon international development and if improved or developed, they might be helpful in climate change issues. Boyd and Osbahr (2010, p. 630) furthermore claim, that *"Organisations […] often lack the frameworks and tools needed to address climate change risks and uncertainties."*

It is hence of high importance to establish tools which are general enough to be applied anywhere in the world and regarding different issues tackling climate change, poverty or starvation on the one hand, and flexible enough to be applied to specific projects and purposes in changing settings, on the other hand. NAMA has the potential as a tool to contribute to improved living conditions. In chapter 5, investigations will show to what extent it addresses SD in different settings with diverging problems.

In 2007 the IPCC defines resilience in the following: *"The ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity of self-organisation, and the capacity to adapt to stress and change"* (IPCC, 2007[18]). The fact, that the IPCC approaches the topic of resilience, leads to having a look at *climate resilience*. Certainly, a climate system is a too complex structure to speak about flexibility. Being independent from human direct interference, but being affected by human actions in general through e.g. GHGs, the climate system cannot be announced as resilient. The term climate resilience is rather aiming at man-made systems, such as cities, which can be build resilient or adaptable to climate change (see Tyler and Moench, 2012).

A definition for sustainability by Constanza (1994 as cited in Murcott, 1997, p. 49) at the same time brought resilience on the agenda: *"Sustainability: An ecological system is healthy and free from "distress syndrome" if it is stable and sustainable, that is, if it is active and maintains its structure (organization) function (vigor) and autonomy over time and is resilient to stress."* In that sense, resilience and sustainability are connected. As a discussion on that topic would go far beyond the approach of this master thesis, the authors only want to highlight, that both, sustainability as well as resilience are connected with human interference

[18] See http://www.ipcc.ch/publications_and_data/ar4/syr/en/annexessglossary-r-z.html.

into eco- or climate systems. Human development can harmfully affect nature's ability to sustain resilience.

The objective of this thesis is to find an effective framework for SD outcome assessment of NAMAs. Topics of resilience and degrowth are mattering in this regard as they aim on nature's and people's vulnerability as a result of human development. According to Constanza sustainable development would stabilise an ecological system (as cited in Murcott, 1997). In that sense, NAMAs are a response to imbalanced development. If the mitigation tool can verifiably help to balance human (economic and social) development in a sound environment, climate change impacts may be reduced, resilience be improved and vulnerability of ecosystems lessened. SD outcomes are the results, but the key to show the extent of SD through NAMAs, are the methods. They will be investigated within the next chapter. In addition, the theories presented in this chapter are basic and natural components of the perspective adopted to uncover, according with the research design, the mechanisms and structures that generate NAMAs and their SD outcomes. Concepts like ecological modernisation, sustainability and degrowth can naturally find their place when deeper uncovering generative mechanisms as showed in figure 2 because it shows the connection of global political structures and the applied mechanisms, which result in the economic, environmental and social outcomes (events) of mitigation actions.

The theoretical framework is a rather broad frame for the whole context of sustainability, in which NAMAs are manifested. It has thus not been the intention to apply each of the described theories to NAMAs, but to give an idea about the theoretical background of the sustainability and climate change debate. Referring to figure 2, the theoretical framework manifests itself within the mechanisms stratus and is thus an inevitable component of the whole functioning of the concept of NAMAs.

5 Analysis

This chapter investigates SD evaluations regarding NAMAs. It further aims at answering the research and sub questions. The sub questions will guide through this chapter by means of which the investigations will be conducted. Making use of the literature review, the survey, the interviews and a study case (see sub chapter 2.3 for the methods) provides the necessary base for the analysis. The survey, which has been sent to several NAMA associated institutions has been analysed based on a qualitative content analysis[19], in particular with a coding system (see paragraph 2.3.3) on the three categories of *awareness*, *methods* and *implementation* concerning SD and NAMAs and is regarded as a method to answer the first as well as the second sub question. Moreover, the survey helped to understand the perception of SD regarding NAMAs and to get to know if MRV methods for SD assessment have been considered by the respected institutions. For answering the third sub question an example of a NAMA within the housing sector in Mexico will serve as base for understanding the applicability and differences regarding the MRV methods of CDM and NAMA. In the end of this chapter, the research question becomes answered.

As has been mentioned, the sub questions serve as a guide through the analysis. The three questions touch upon the perception of SD in relation to NAMAs, the methodologies to evaluate SD outcomes of NAMAs and the applicability of CDM experience to NAMAs. It is intended to answer each sub question by referring to the mentioned methods and at the same time interpreting the outcomes. After the Analysis, a discussion is going to pick up topics, which have not been touched upon within the analysis (chapter 6). References will be made to respective chapters within the thesis.

5.1 Investigations in relation to the state of perception of SD in NAMAs (sub question 1)

The following sub chapter is going to make use of the abovementioned methods in order to answer the first sub question, that is:

1) *Which is the state of the art of the perception of SD implications in relation to NAMAs?*

[19] Except questions 14, 19, 20, 22 and 24. Question 14 and 19 have been used for interpretations regarding the level SD perception. Statistics deriving from the survey generally underline certain aspects of the qualitative interpretation of the data.

According to decision 1/CP/16, paragraph 48 (UNFCCC, 2010), SD is inevitably connected to NAMAs. Also NAMAs' "development first" approach clearly states the connection of NAMAs and SD (Olsen, 2013). The sub chapter (3.7) on SD indicators shows that a variety of assessment methods have been developed (and partly applied) throughout the years in order to conclude on SD outcomes. However, none of these methods have been applied to NAMAs in particular (that this is to some degree possible, shows the investigation in relation to sub question 2). A reason for this is that NAMA is a relatively new tool. A so far missing discussion on SD and NAMAs with all relevant stakeholders could clarify the objectives of NAMAs (since different entities seek for different targets) and in addition define the term SD. As the concept is still not defined in the name of NAMAs it remains *nebulous*. Lütken *et al.* (2011) reported about the NAMA objectives and claimed needs for better results regarding SD assessment compared to the CDM through determining responsible heads for the NAMA project, the exact execution as well as a definition for actions, which derive from the strategy (Lütken *et al.*, 2011, p.7, see also sub chapter 3.7).

Making use of the coding technique, where different levels of perception regarding SD can be concluded through categorising the survey into three sections, it is possible to state the stage of SD perception of the consulted institutions. According to this interpretation of the responses, the survey's outcomes are here utilised in order to categorise the position of the participants within three levels of perception of SD in relation to NAMAs (*awareness*, *methods* and *implementation*). Figure 4 shows the results of the abovementioned analysis.

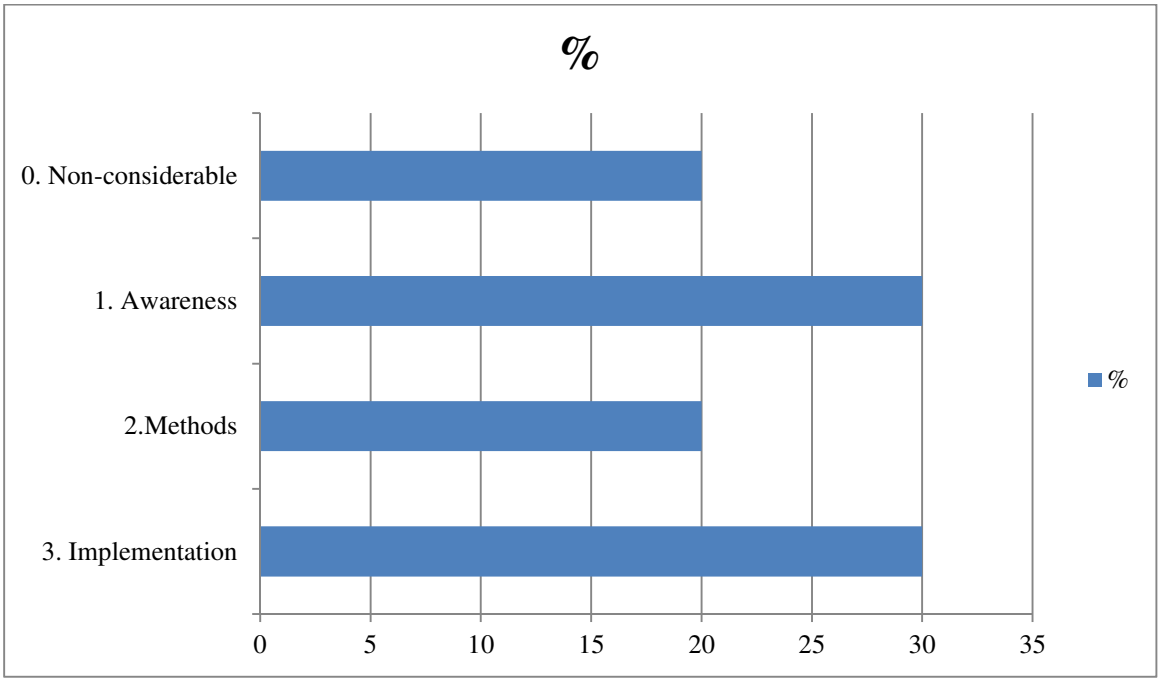

Figure 4: Levels of perception of survey participants (own figure, based on survey).

The results show a certain degree of balance in the participants' positions in relation to their level of perception of SD in NAMAs. Although it is necessary to mention that the percentages provided are based on the ten survey responses collected and any generalisation is applicable based on these outcomes.

Looking at the percentages (figure 4) it can be derived that 20 % of the respondents submitted the survey only answering introductory questions (from 1 to 8) related to their role in the NAMA process and the specifics of their NAMAs. These participants did not provide any answer for sections 1, 2 and 3 that involve a more specific consideration of SD aspects. For this reason they have been included in category 0.

The first level of perception of SD in relation to NAMAs is the one represented by questions from 9 to 14 and called by the authors *awareness*. Through the answers to these questions it has been intended to obtain a first generic impression from the participants about the perception of SD in relation to NAMAs. For example, in relation to question 9 *"Which is the primary reason of pursuing SD through the implementation of NAMAs?"* (see Appendix I, question 9, answers 3-4-5) and focusing on hosting countries only, this means that some of the developing countries contacted (they each represent a hosting country) stressed the role of NAMAs in supporting the development and the achievment of GHGs emissions reduction targets and policies set at a national level. Answer 6 to the same question introduces the importance of NAMAs in terms of attracting international investments in the hosting country. What highly differs between the position of the hosting countries and the one of the remaining (mainly UN) organisations is the perception of the main challenges related to the pursuing of SD through NAMAs implementation. Indeed, while the hosting countries are generally highlighting the challenge of obtaining financial support when answering to question 10 *"Taking into account previous experience of tools aimed to achieve SD while promoting mitigation actions (e.g. CDM, JI,...), which might be the main challenges of pursuing SD through the implementation of NAMAs?"* (see Appendix I, question 10), the other organisations commonly agreed that one of the main issue in relation of SD pursuing and evaluation in NAMAs is due to the broadness of the concept. Answers 1 and 2 to question 10 are explanatory of this position. While hosting countries emphasised the importance of financial support in order to implement NAMAs and therefore achieving SD benefits, the other organisations focused their attention more on the difficulties related to the variety of possible NAMAs and the resulting need of more inclusive and sophisticated structure for the assessment of SD performances compared to the CDM experience.

In fact, questions 9 to 14 serve the purpose of showing the understanding of SD in the relation to NAMAs and the specific considerations of each of the three spheres of SD. Understanding the perception of SD of NAMA stakeholders is valuable for concluding on effective methods for NAMA SD evaluations. According with the results, 30 % of the respondents reached this first level of perception by giving their overall understanding of the relation between SD and NAMAs and the importance of pursuing SD through NAMAs (see figure 4).

Question 14 *"How do you weight the importance of the three dimensions of SD in respect to the NAMA/NAMAs you are involved with or in respect to the common understanding of NAMAs?"* (see Appendix I, question 14) is of special interest because it shows that in relation to NAMAs, the consulted entities have different perspectives on the importance of the three dimensions of sustainability:

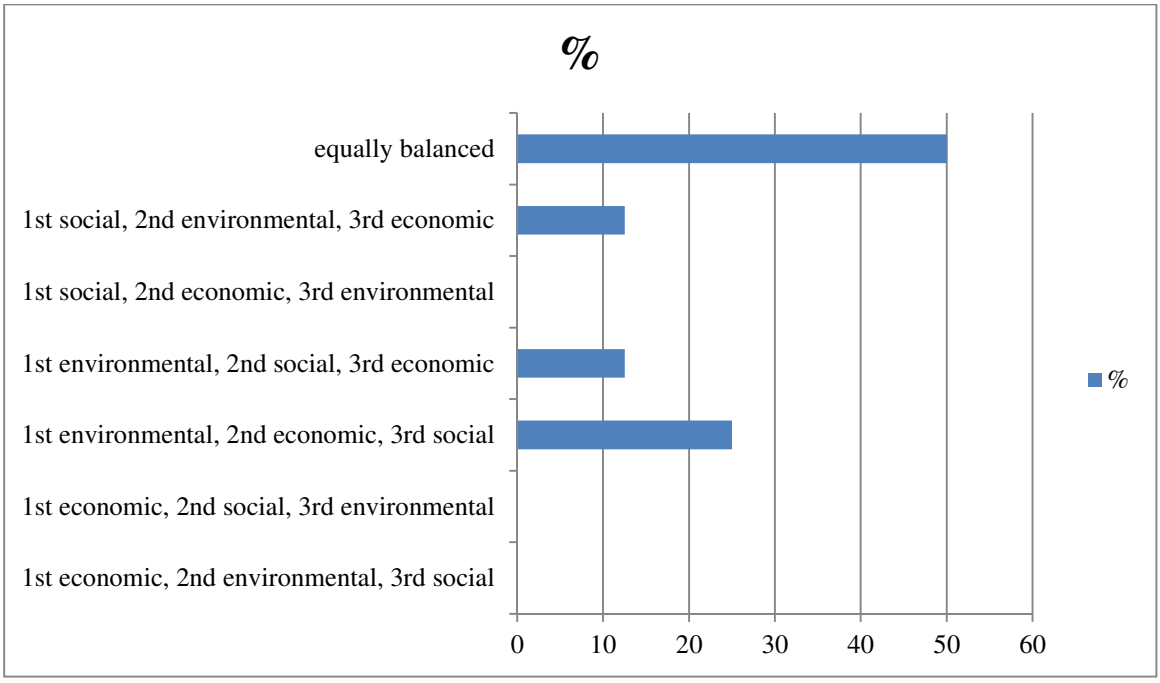

Figure 5: Weighting of SD dimensions in percentage related to each survey participant (own figure based on survey).[20]

Regarding figure 5 one can state, that, most survey participants answered this question with "equally balanced" (4 entities). Two entities weigh the three dimensions of SD as 1st environmental, 2nd economic and 3rd social. One entity gives the environmental dimension of SD more weight than the social and the economic dimension. Another entity sees the social dimension as more important than the environmental and economic ones.

[20] See figure a7 in Appendix I for absolute numbers.

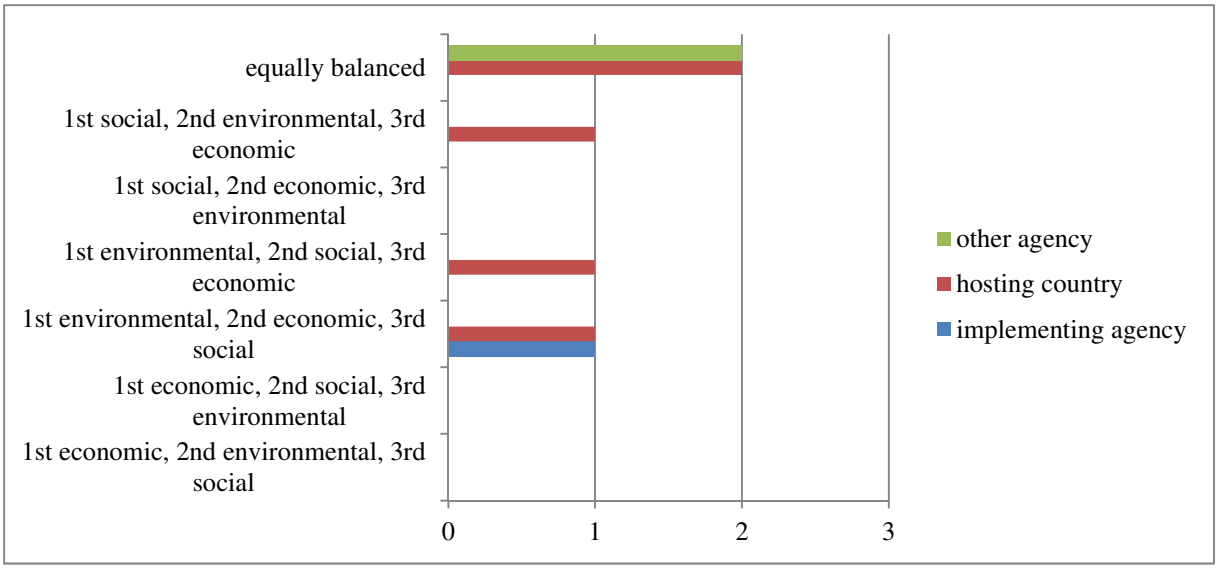

Figure 6: Weighting of SD dimensions groupted by survey participant types (own figure based on survey).

From figure 6 it can be derived that two hosting countries as well as two "other" agencies equally balance SD. One hosting country gives the social dimension more weight than the environmental and the economic dimensions. Another hosting country weighs the environmental dimension higher than the social and economic one. One implementing agency and one hosting country see the environmental dimension as more important than the economic and the social in relation to their NAMA.

The fact, that the entities weigh the importance of the three SD dimensions differently, leads to a conclusion on divergent perceptions of sustainability. This will be discussed within chapter 6.

The subsequent level in the perception of SD in relation to NAMAs, named *methods*, refers to questions from 15 to 19 (see survey in Appendix I). This level reflects a stage of perception that adds to the understanding of SD in relation to NAMAs a methodological component for their assessment. A common positioning among hosting countries is visible in relation to question 19. In this regard, almost all of them agreed on the fact that the entity that should execute the assessment of the SD performance of NAMAs is the hosting country itself (see Appendix, question 19). When looking at the remaining entities, it emerges that implementing agencies should be the actors pursuing the SD assessment of NAMAs (see Appendix I, question 19). This differs from the opinion of hosting countries which mainly indicate themselves as favourite actors for the SD evaluation of NAMAs.

Indeed, the 20 % of all participants which, according with the results, populate the *methods* category provide examples of indicators and a few methodological approaches for the assessment of SD outcomes from NAMAs. Some of the participants, which fall under the

category “other” or “implementing agency”, are able to highlight possible indicators for the SD assessment of NAMAs even if not directly involved in the implementation of any specific project which is due to their role as research institutes, some of them with a specific focus on SD impacts and assessment. The UNEP Risø Centre is one of these organisations that are undertaking precise studies on the assessment of SD in NAMAs. The contents of this study are part of the following analysis as of the further discussion.

Looking at the second section of the survey, the analysis also shows that some ideas for methods or SD indicators are mentioned multiple times. This is an evidence for not much controversy on that topic, or a small degree of SD perception regarding NAMAs. However, some indicators (like gender equality as a social indicator) have been pointed out, which do not appear in literature in the first line[21] (see sub chapter 3.7). This shows again that the SD perception differs among the stakeholders (see survey in Appendix I, answers to question 15 to 17). Again, a mattering factor is the missing definition of SD in relation to NAMAs. However, most theoretical approaches aiming at SD are going far beyond the measurable impact and call for global policy-making and broad implementation of various targets and e.g. touch upon democracy, environmental-economic linkages or burden sharing[22] (Valentin and Spangenberg, 2000). Political targets like burden sharing in the EU (to ensure that each EU-15 member state meets the target of the national agreed emission reductions) or emissions reductions among developing countries are linked to resilience thinking and could enhance green growth in order to eventually evolve into SD. In the field of mitigation actions, it is possible to set broad targets for the NAMA and individual ones regarding the specific NAMA projects. As the latter are closely linked to the field of policy-making, there should be an integrated thinking of targeting climate-resilience and green growth in order to comply with the definition of sustainable development (e.g. the one by the Brundtland Commission, 1987).

The highest level of perception of SD in relation to NAMAs within the survey has been reached by 30 % of the participants (figure 4). This level, named *implementation,* includes those respondents that besides a general understanding of the role of SD in NAMAs and a more or less accurate provision of indicators and methodologies for the evaluation of SD outcomes, also mentioned that some evaluation processes have been already undertaken or are currently under implementation. However, the answers from questions 15 to 23 (see

[21] The CDM and NAMAs in its missions to comply with the MDGs also consider gender equality, but the indicator does not become discussed much in relation with SD in current scientific literature.
[22] See details here: European Commission (2012).

Appendix I) show different stages of implementation of SD evaluation processes among developing countries (see Appendix I, question 20). Some of them have not implemented any SD assessment on their NAMAs, and only few have mentioned that some sort of evaluation has been already undertaken with the support of external developed partners (see Appendix I, question 21, answer 1). In most of the cases, no data is available yet in relation to the SD evaluation of NAMAs. This shows the general early stage in the SD evaluation discussion about NAMAs but, at the same time, a different degree of development, in the same regard, among hosting countries.

All in all, 20 % of the consulted NAMA stakeholders are not even considered as being in the *awareness* stage (category 0 in figure 4). 30 % of the survey participants are within this first level. Another 20 % are considering *methods* for SD assessments regarding their NAMAs, however the methods are not implemented yet due to various reasons. 30 % of the survey respondents can be placed within the third level of SD perception, this is *implementation*. Those entities have not only considered SD MRV methods, but also implemented some in order to assess the SD impacts of their NAMAs. This shows that the level of SD perception differs among the different stakeholders. The result from question 14 further proofs this (see survey in Appendix I, question 14). The state of the art of the perception of SD implications on NAMAs shows different perspectives according to different NAMA stakeholders. Regardless of whether considered as a research object (like by URC) or as an effect of the NAMA establishment, the SD implications in relation to NAMAs are treated as an inevitable connection due to the Bali Action Plan (UNFCCC, 2007). However, by some stakeholders the SD implications are not considered at all or are directly related to the assessment methods, which are in return, regarded as either missing or to be decided since the concept is still new and not assessed yet.

5.2 Investigations in relation to methodologies and indicators (sub question 2)

This sub chapter is going to investigate the findings of the analysis in order to conclude on sub question 2.

2) *Which methodologies and indicators can be useful for evaluating SD outcomes of NAMAs?*

In the following, the methodologies and indicators for evaluating SD outcomes will be investigated through the literature review on SDIs from sub chapter 3.7 and applied to NAMAs. The results from the survey (see Appendix I) give further ideas for applicable

methodologies as they are derived directly from NAMA stakeholders. A case study illustrates the investigations with an example of a NAMA in Mexico (box 1).

Soft disclosure items (see Clarkson *et al.*, 2008) are relevant factors as they could indicate to what extent SD performance is happening under NAMAs. As NAMAs are voluntary mitigation actions and Clarkson *et al.* (*ibid.*) speak of voluntary disclosures for firms, it is applicable to suggest those items in order to reveal commitment to SD and show funding entities that the investments in the NAMA lead to improved sustainability (see sub chapter 3.7).

The DPSIR Framework is a response to pressures on the environment. It makes use of criteria to assess the state of the art of the environment in order to react accordingly. NAMAs are responses to climate change and could be regarded as *"direct relevance to the target group"* (Segnestam, 2002, p. 13, see sub chapter 3.7). Compared to the Genuine Savings (GS) approach, the DPSIR Framework is a rather broad concept. Since NAMA projects find their execution in a variety of fields (e.g. energy supply, transport, infrastructure), the DPSIR seems applicable in the sense of appropriate responding to a particular pressure (e.g. an environmental problem) in a local (national) context. The GS, by contrast, concerns the national capital stock and in its being a purely economic assessment, does not consider social impacts. It is obvious, that the World Bank makes use of the economic measure of GS in order to reveal SD (Hamilton and Clemens, 1997). This seems inapplicable to SD assessments in general, however it is a national approach and allows for quantitative outcomes, which are convincing to stakeholders and serve the public understanding, which is what Segnestam (2002) claims. Furthermore, the GS could be regarded as disclosure items (Clarkson *et al.*, 2008). Like Segnestam's suggestions on the improvement of the DPSIR Framework, the Bellagio STAMP emphasises the need for a transparent, the purpose adequate assessment of SD (see sub chapter 3.7). This is important concerning NAMAs because through the Bellagio STAMP the applicability to different and individual NAMA projects could be provided. The non-economic and descriptive guidelines provide the possibility to assess individual indicators, depending on the project and the targets.

The ecological framework suggested by Becker (2005) (see figure 3 in sub chapter 3.7) emphasizes the importance of a comprehensive framework for SD assessment. Moreover, the author states that using ecological frameworks, like resilience or auto-efficiency leads to the improvement of sustainability concepts like product diversity or population reduction. In relation to NAMAs it is important to make use of a technique which not only shows the direct

effects on SD through e.g. job creation, but also to find ways to cope with uncertainties (e.g. vulnerability or hazards) and unpredictable incidents of the future (which is part of the SD definition by the Brundtland Report). Becker (2005) addresses those uncertainties with a technique, which includes the components of collaboration, resilience and auto-efficiency to address the SD progress and at the same time the performance of SD indicators, which in return are part of the comprehensive framework in order to measure the SD progress. Adaptive management can be improved through the perspective of ecological concerns, when seeing through this perspective what can be done in order to reveal SD progress.

The CDM is a mitigation tool, which allows developed countries to invest into clean technologies in developing countries and at same time earn CERs for trading on the emission trading markets. SD is aimed at as well as technology transfer and as emission reductions (UNFCCC, 1998). It is a sort of leapfrogging towards a modern society and green growth. Climate change impacts are of growing concern, so developed countries help those countries which are negatively affected by climate change and do not obtain the necessary capital to mitigate and adapt to climate change. CDMs and NAMAs can be thus considered as responses to climates change and a form of ecological modernisation (see chapter 4).

Like NAMA projects, CDM projects help Non-Annex I countries to engage into SD and emissions reduction or saving with the help from outside (Annex-1 countries). Also, many evaluations on SD outcomes resemble those evaluations on NAMA SD outcomes when assessing e.g. emission reduction or job creation. A case study of a NAMA project in Mexico will serve as an example for how to apply the experience from the CDM to this NAMA. The following example is the first NAMA which has been implemented and focusses on the sustainable housing sector in Mexico (see box 1 below). This case has been selected due to its popularity within the NAMA discussion platforms and the accessibility of information on its regard. As this example has been investigated and documented to a wide extent, it seems appropriate to take such a far assessed project in order to exemplify how SD outcomes become addressed and to what extent it can be made use of known CDM methods.

Example of Housing NAMA in Mexico

In 2012 the Department of Energy & Climate Change (DECC) of the United Kingdom together with the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) decided to jointly support the Mexican Government in the implementation of the Sustainable Housing NAMA. The British-German cooperation, launched in the NAMA Facility, financially helps the government to push forward sustainable urban development and renewable energies in Mexico. The reason for the Mexican government to invest into renewable energies and ecofriendly housing is due to the demographic development in the country. Since 160 million inhabitants are expected to live in Mexico by 2050, the urban development has to react towards the population demands of real estate and energy supply. Seven million new houses will be needed to address these demands. By providing energy efficient or passive houses, the NAMA can contribute to emission reductions and make it affordable to also lower income classes. Figure a11 (see Appendix II) shows the steps, which the NAMA facility, the Mexican National Housing Commission (CONAVI) in cooperation with other implementing and funding agencies undertake during the four-year NAMA. The starting point has been undertakings in the housing sector by the Mexican government. For further development, those undertakings have been transformed into the first NAMA project. Different housing examples are in line with eco housing and passive housing standards and are made affordable to also lower income households through the provision of soft-loans or grants by international donors and funders (Transport NAMA database, 2014; figure a11 in Appendix II).

The overall objectives of the NAMA are to:

- improve federal, state and local level capacities on energy efficiency and sustainable housing, establish building codes and legislative frameworks
- support the development of a local market for environmentally friendly technologies
- promote and incentivize energy efficient instruments
- foster application of more ambitious energy efficiency standards by providing investment grants for incremental costs and include additional eco-technologies (International Partnership on Mitigation and MRV, 2014).

As this NAMA is about sustainable housing, a range of indicators for SD outcomes has been pointed out, which can be found in table a2 in Appendix II. Table a2 involves indicators, which include social and political co-benefits, health co-benefits as well as economic co-benefits. Since the NAMA is under implementation, measurements to assess the benefits are either not yet undertaken or not published. Nevertheless, it is possible to conclude that the above listed indicators are covering as many benefits as possible (Navarro *et al.*, 2013). Furthermore, the example shows how a NAMA can contribute to economic welfare of lower income population strati and at the same addresses economic, social and environmental issues (see table a2 in Appendix II).

Box 1: Example of housing NAMA in Mexico (based on Navarro *et al.*, 2013).

The MATA system by Sutter and Parreno (2007) addresses the economic, environmental and social outcomes of CDM projects. Adopting a quote taken from sub chapter 3.7, in which the authors state the advantage of that system, allows for application to NAMAs: *"The advantage of the MAUT is that indicators can be measured in the units that best suit the nature of each specific criterion"* (2007, p.78). Since NAMAs cover a broad range of developing countries and mitigation projects, the individual assessments of each SD dimension is of importance. A general equation could not cope with the initial endowments or technical differences of each NAMA. With regard to table a2 (see Appendix II) it can be derived from the Mexican example that *here* also the energy component, the social sphere and the economical benefits become addressed and not only the emission reductions. The MATA system proposes equations related to each SD dimension. The Mexican NAMA addresses those sustainability components, which can be regarded and measured as a co-benefit through the project implementation. As it is an assessment related to the CDM, the MATA system will be further examined within sub question 3.

Also the TERI study (2012) investigates assessment techniques for the SD implication of CDMs regarding economic (and technical), environmental and social benefits of the projects. Furthermore, the study includes a suggestion that the DNAs should keep on being the entities which define SD *"[…] in order to ensure country specific indicators that are aligned with local socio-economic conditions and respect national sovereignty"* (TERI, 2012, p.38). Again, this is applied to the CDM. However, the criteria to assess SD benefits (see table 3 in sub chapter 3.7) seems adaptable to NAMAs, which is a proof for the possibility of applying the CDM methods regarding SD to NAMAs. To what extent this pertains, will be investigated in sub chapter 5.3 and discussed in chapter 6.

Looking at the survey results, especially the answers to question 15 to 17 (see survey in Appendix I) indicate methodologies for the SD outcomes of NAMAs. As already touched upon within sub question 1, some indicators become stated multiple times, e.g. GHG emission reductions as a measure for environmental improvements. This measurement plays a major role in mitigation actions, which can also be derived from the MATA system (Sutter and Parreno, 2007) or the TERI study (2012). Also in the case of NAMAs, emission reductions are a driving indicator for SD impacts. Other suggestions deriving from the survey results regard environmental indicators are related to forestry management, biodiversity, afforestation and forest restoration rates. A suggestion for an economic indicator, which becomes mentioned in the survey, is GDP growth in a sector (e.g. energy sector) or income increase through the NAMA. Whereas the latter is certainly a positive impact and a mattering factor in

developing countries with low income rates, GDP growth does not show the impact for the population as the GDP apportions on national accounts and not on individual households. This thought touches upon the degrowth movement (see chapter 4). The GDP shows the monetary value of produced goods or services within a country. But economic growth is, especially in developing countries or those with emerging markets, mostly connected to industrial growth and thus environmental degradation. Certainly, the GDP is an indicator for the economic outcome of actions like a NAMA project. However, it misses a sustainable component. As NAMAs are in the context of sustainability, it should rather be aimed at decoupling the economic growth from the success of NAMAs in relation to sustainability. The reason for stating this is that the financial benefits - especially in developing countries with corrupt governments – mostly remain within the rich class of population and lower income households do not participate in shareholding. This is line with what Banuri and Gupta (1998) and their concerns regarding SD outcomes from the CDM (see chapter 4). It would be a drawback for the NAMA SD outcomes, if an economic indicator, like GDP growth would be taken for achievements in SD contribution.

Other economic indicators, which becomes pointed out in the survey are economic alternatives for owners of degraded land, import statistics or the unit price development of one MWh after NAMA implementation. Social indicators, which have become indicated in the survey, refer to gender equality, education and health improvements. Assessing the improvement of health is a known procedure in CDM MRV techniques (see MATA system in sub chapter 3.7) and becomes often assessed through local air quality measurements or the decrease rates of diseases. Also the other mentioned suggestions for indicators are mostly known. Nevertheless, they all suit the assessment of SD outcomes. One answer to question 18 regarding applicable methodologies goes beyond the report by Olsen (2013) and suggests the Global Reporting Initiative (GRI)[23] to be included in the methodology for SD assessment of NAMAs. This further proofs the unbalanced degree of SD perception in relation to NAMAs. However, the idea of including the GRI differs from the other (few) suggestions for evaluating those indicators. The GRI develops global guidelines for sustainability reporting. The framework is comprehensible for firms or organisations, and in the case of answer 2 to question 18 (see Appendix I, question 18), also suggested for NAMAs. Relating the GRI to NAMAs could provide pressure for NAMA projects to at least comply with the GRI standards and publish regularly, in a known frame, the sustainability achievements. Certainly, this might

[23] See details here: https://www.globalreporting.org/Pages/default.aspx.

lead to a low degree of sustainability disclosures (as simple marketing purposes) and stricter methodologies need to be developed in order to apply it exclusively to NAMAs.

As a summary it can be concluded, that several SDIs are applicable to NAMAs. The ones, which have been described above are considered as suitable, as they cover on the hand, the broad range of fields that NAMAs address. On the other hand, since NAMAs are a new approach, with little or no evaluation, yet, it seems appropriate to await further development, in order to conclude on best practices. However, through the CDM, experience is gained on SD assessment methods. As some assessments address the same outcomes and units, the CDM experience plays a major role in MRV development for NAMAs (Olsen, 2013). The following sub chapter (5.3) will summarise lessons learned from the CDM and will again make use of the case study of the NAMA project in Mexico.

5.3 Investigations in relation to the link between CDM-methods and NAMAs (sub question 3)

As the CDM is an experienced procedure (political and on the project level), MRV methods are given (UNFCCC, 2013) and might be applicable to NAMAs. Making use of the conducted interviews with NAMA and CDM experts (see paragraph 2.3.2), together with the literature review on the CDM (sub chapter 3.7) and including the work under UNFCCC and UNEP Risø Centre, leads to the answer of sub question 3:

3) *How could NAMAs make use of experience from CDM's methods to asses SD performances?*

Compared to the CDM, NAMA does not fear the market prices of carbon and hence does not face the following problem regarding MRV: *"[…] some stakeholders questioned the usefulness of such a [monitoring] system. They have argued that while a greater scrutiny on SD was important, a more rigorous system might be counter-productive and drive the market price down […]"*. However, and what could be encountered with NAMAs as well is the concern of *"others* [who] *feared that incorporating SD criteria into the verification process would increase the transaction costs further"* (TERI, 2012, p.39).

Learned from the CDM, the NAMA needs to have an objective of SD, hence a clear definition in order to avoid the following criticisms for the CDM project design documents (PDDs):

- Meaningless definition of SD
- Detrimental projects (to SD)
- No monitoring possible without definition (TERI, 2012).

There are several concerns made regarding the CDM and SD. Gillenwater and Seres (2011) summarise why the CDM has not been contributing to SD and capacity building:

- insistence of national governments on preserving sovereignty over their domestic development decisions
- no programmatic CDM or program activities
- developing countries avoid implementing policies to reduce GHGs in order to continue receiving revenues
- lack of capacity (economic, administrative, technical) in developing countries to take on strong commitments (*ibid.*).

It is hence of importance, to consider those aspects in order to learn from the CDM. In their research, Lütken *et al.* (2011) state that NAMAs are more precise than CDMs and try to achieve better results in terms of SD and capacity building through asking for:

- *"how would the initiative (the NAMA project) be implemented*
- *who would be responsible and who would be targeted*
- *when would a timely action have to be launched?"* (Lütken, 2011, p. 7) and stating that
- *"[…] while general appropriateness determination is built into the low carbon development strategy process it is still a specific criterion at the level of defining actions flowing from the strategy"* (*ibid.*).

Though not totally specified to the individual NAMA (due to the recentness of this strategy), Lütken *et al.* (2011) and Hinostroza (2012) show that future mitigation actions are to be in line with capacity building and SD, which is manifested in the Bali Action Plan (UNFCCC, 2007, Decision 1/CP.13, paragraph 1 b (ii)): *"[…] NAMAs 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."*

Olsen (2013, p. 12), working on the same approach of NAMA guidance at UNEP Risø Centre, states that *"[…] [i]n line with the CDM Policy Dialogue recommendation a strong approach to SD impacts assessment can inform the assessment of NAMAs for SD."* Nevertheless, *"NAMAs go beyond measurement of emission reduction to include MRV of SD impacts of NAMAs from the design stage"* (Olsen, 2013, p. 17) and include:

- SD metrics and indicators at a national or programmatic level
- Small number of indicators specific to project that align with overall criteria
- Establishment of reporting requirements and deadlines
- Stakeholder consultation (*ibid.*).

Finally, Olsen (2013, p. 19) summarises four elements toward a new approach for assessing and promoting SD targets:

1. A development first, co-benefit approach to identify national SD objectives
2. Design of NAMAs including SD indicators, stakeholders and safeguards against negative impacts (integrated approach)
3. Financing of NAMAs and being informed about SD impacts for promotion of transformational change and low carbon and sustainable development
4. Certification of credited NAMAs (*ibid.*).

Olsen (2013) has been publishing the most recent report on NAMA and SD. In her working paper, Olsen emphasises the applicability of CDM experience to NAMAs. Hence, and as no other experience on mitigation actions and SD MRV methods is known yet, the CDM MRV methods are the state of the art base for SD assessments for NAMAs. According to Olsen (*ibid.*) the NAMA differs in the SD evaluation in particular in the "development first" approach, which emphasises the importance of developing the hosting country, especially in a sustainable manner. In the case of the Mexican NAMA one can state that the "development first" approach has been achieved since from the beginning it has been intended to address different population classes within Mexico and not only a private sector (see box 1).

The MRV methods used by the CDM are quantitative and thus help to have a clear understanding on the outcomes of the respected CDM project. SD objectives are often explained through indicators like job creation or the amount of reduced pollutants. *"A need to invent new dimensions for assessing SD of NAMAs goes along with the possibility of using some of the existing criteria"*, Olsen states *"[…] because the technologies are the same in NAMAs and CDMs […]"* (Olsen, 2014, see interview in Appendix III) and *"[…] in line with the CDM Policy Dialogue recommendation a strong approach to SD impacts assessment can inform the assessment of NAMAs for SD"* (Olsen, 2013, p.12).

Within the investigation of sub question 2, the TERI study (2012) has been mentioned. It can be taken as an example for already conducted researches regarding SD assessment in relation to mitigation actions. As this study assessed the impact of the CDM on SD, certain aspects have to be considered when doing the same for NAMAs. Looking at table 3 (see sub chapter

3.7), it can be stated that in order to assess SD benefits according to the specific NAMA project, more criteria could be useful. Especially, the concerns claimed by CDM stakeholders in relation to the DNAs' work has to be considered within NAMAs as well because national authorities overview the projects. Those concerns (among others) are:

- Enhancing dialogue between DNAs to share ideas on best practices
- Need for improved communication between UNFCCC and the DNAs
- Increased transaction costs
- Meaningless definition of SD (TERI, 2012).

The MATA system by Sutter and Parreno, 2007 is a possibility to understand how to address SD outcomes in terms of quantification of economic, social and environmental impacts. The example from Mexico shows, that in particular those indicators become addressed, which are considered as direct targets (emission reductions, renewable energy installation) or as co-benefits deriving from the NAMA (Navarro, 2013). A completely quantitative assessment is here avoided, as it would not cope with the challenges of sustainable development, which can be seen in indicators like "job creation" or "community creation" (see table a2 in Appendix II).

The results from the direct confrontation with the UNFCCC are of particular interest for the answer to sub-question three. From the impromptu interview with an UNFCCC programme officer, with experience on SD assessment of CDMs, a significant tendency emerged. Indeed, the interviewee reported that the UNFCCC secretariat is investigating the possibility of an internal cross-programme action between the two units respectively dedicated to CDM SD assessment and NAMAs. The purpose of the joint activity is to transfer parts of the capacity developed in years of CDM experience within the NAMA context. The joint action sees the involvement of both professionals from the CDM consolidated environment and from the younger NAMA unit. Due to the similarities of the two tools, possible interconnections and useful applications of CDM assessment frameworks to NAMAs are thus investigated (see interview in Appendix III).

This trial is being implemented following a sectorial approach, in force of which SD assessment frames are investigated for individual mitigation actions sectors. Studies have been already conducted within the SDM programme of the UNFCCC secretariat for the SD assessment of some possible NAMA sectors. Due to the confidentiality of the sources of information no more specific reference to the mentioned activities can be provided here.

In this regard, the publication of some of the mentioned pilot studies is expected by the end of 2014. Besides the impossibility of presenting results or detailed descriptions about those studies, what is relevant at this stage of the analysis is the overall tendency emerging from the described process. In fact, for the authors it is significant that the UNFCCC, which can be considered as the context in which both tools find their conceptualisation, is itself investigating the possibility of making use of the CDM experience and apply it to NAMAs. In this case the CDM experience is considered in terms of capacity and competencies of a dedicated team that have been working on CDMs for years. This can be interpreted as a clear manifestation of capacity transfer tendency from the CDM sphere to the NAMA.

The extent to which the CDM MRV experience is applicable to NAMAs is limited by the same concerns made in regard to the CDM, which are e.g. a lack of capacity or no driver for implementing mitigation actions in developing countries (see above, Gillenwater and Seres, 2011). A proof that these concerns coincide with concerns regarding NAMAs can be found within answers 2-4-6 to question 10 from the survey (see Appendix I, question 10).

However, NAMAs are, unlike the CDM, on a policy level targeting sub sectors or policy creation. In contrast, CDMs are project based and have different endowments. This means, a project can be assessed in terms of SD regarding its actual outcomes (based on internationally agreed guidelines). A whole sector or a newly implemented policy cannot be assessed in the same way, at least not to the extent of giving clear calculations of e.g. emission reductions. A NAMA, which aims on driving sectors towards sustainability, can take directions towards the addressed goals of a whole country, but it will take time to measure the SD outcomes. Here, the "development first" approach in terms of aiming at policy innovations for developing countries differentiates the NAMA from the CDM. The "integrated approach" of NAMAs furthermore shows that methods like stakeholder consultations are taken into account to address SD benefits as well as negative impacts of NAMAs (a mattering factor in the Mexican NAMA). This means, the nationally decided policy will be assessed on a local level in order to gain most knowledge about the SD impact of the NAMA (Olsen, 2014, see interview in Appendix III).*"Looking at what CDM was, in terms of the first mitigation mechanism for developing countries makes us realize that it is where all the knowledge about MRV for these kinds of action is"* (Olsen, 2014, see interview in Appendix III).The CDM methods for SD assessment are limited, but addressed according to the CDM purposes. For NAMAs, *"[…] aspects such as institutional and transformational elements are important"* (Olsen, 2014, see interview in Appendix III) and need to be assessed regarding SD outcomes additionally.

4.5 Investigation of the sub questions in order to conclude on research question

The research question will be answered by summarising the results of the sub questions.

How can the SD outcomes of NAMAs be evaluated in order to be regarded as an effective framework for SD assessments?

In order to find an effective framework for SD assessments of NAMAs, it needs a comprehensive understanding of the tool itself and at the same time knowledge regarding how to address SD outcomes. Since NAMA is a new concept and a few NAMA projects are just in the SD outcome evaluation stage, it is here intended to give a summary of what has been found through the investigations above as well as describing what is needed for SD outcomes of NAMAs in order to be assessed effectively.

From the results of the survey questions, it can be derived that there are four important factors needed to find a framework for NAMA SD evaluation. The first factor is the call for a discussion on SD in relation to NAMAs to find overall SD targets, which are not only quantitative. This includes also a common understanding of the term sustainable development. Countries address SD differently (see TERI, 2012 in sub chapter 5.3) because they have individual views on the term. This can be positively validated or negatively. What is important is that the overall understanding of SD in relation to the NAMA tool should be the same in order to develop it further. UNFCCC and UNEP Risø Centre are currently working on MRV methods and the upcoming SBI session in June 2014 in Bonn[24] will contribute on the controversy of SD and NAMAs. Indeed, the different levels of SD perception in relation to NAMAs of different NAMA stakeholders (see sub chapter 5.1 and survey in Appendix I) call for more controversy on the topic. Since the "development first" approach is expressed, there should be a clear understanding of how to achieve SD and how to address it among all stakeholders. The fact, that NAMA stakeholders weigh the three dimensions of SD differently is a further proof for a missing discussion and setting of development targets (see Appendix I, question 14).

Another factor for an effective framework on SD outcomes evaluation of NAMAs is to provide incentives to focus more on SD (in the name of the "development first" approach). This does not mean to provide any kind of financial help, just in order to promote NAMAs. It is rather meant to promote NAMAs in developing countries in a way that those countries see the mitigation tool as an incentive to engage into SD. Disclosure items play a role in this and the idea of including the GRI would help to show efforts made in SD (see sub chapter 5.2). In

[24] See details here: https://unfccc.int/meetings/bonn_jun_2014/meeting/8031.php.

addition, displaying SD achievements is relevant for funding agencies. It is thus of importance to incentivise the development of effective MRV frameworks also among hosting countries and to show that reporting SD achievements is attracting further investment in the respected country, which is in line with the result of survey question 9 (see Appendix I, question 9).

A third mattering factor for a SD assessment is the inclusion of quantitative methods. The Genuine Savings are applicable for SD outcome assessment to a limited extent. This is, since the GS include human and natural capital and their national creation or destruction e.g. resource depletion becomes addressed with this (Everett and Wilks, 1999). But too many factors, which delimitate the progress of SD are not included in the GS (like water or air pollution). Although being adopted by the World Bank, (an institution participating in the NAMA Partnership) the GS does not cope with the demanding aspects of SD. Furthermore, in its broad anticipation it does not seem appropriate for the assessment of SD through individual NAMA projects.

The CDM makes use of many quantitative assessments for SD evaluation (see e.g. MATA system, sub question 2). The experience from the CDM is useful in developing a framework for SD MRV of NAMAs because it is the so far only long assessed mitigation tool and also addresses SD. Learning from the failures and making use of approved techniques is an advantage for the NAMAs (see sub chapter 5.3). The MATA addresses individual units within the CDM projects. However, the TERI study (2012) revealed that local socio-economic conditions play a major role for SD progress. NAMAs thus need individual indicators, based on an overall framework, which covers also qualitative aspects.

Qualitative assessments are the fourth and last factor to be described as an important factor for framing the SD outcome evaluation of NAMAs. The DPSIR-Framework suggests a way of reaction from the ecological incident until the response. NAMA can be regarded as a response to climate change and the state where mitigation actions are a necessary undertaking. However, as the state is not of importance in this regard, but the methodology to assess the outcomes of the reaction towards the impacts (climate change), only the broadness of the DPSIR approach is an aspect to be considered within NAMA MRV methods. Another broad concept is the Bellagio STAMP (see sub chapter 5.2). It would suit the overall framework of SD for the NAMA tool, but needs to be adapted in order to cope with the aspects of individual NAMAs projects. The ecological framework by Becker (2005, see sub chapter 5.2) includes the ecological components and shows that learning from ecological concepts like resilience

can help to frame the measurement techniques of the SD progress. Depending on the NAMA, the ecological dimension of SD can be strengthened by including resilient thinking.

In relation to the metatheoretical positioning of the research (see sub chapter 2.2) one can conclude that different aspects belonging to the stratus of generative mechanisms have been uncovered. Indeed, the outcomes of the answers to the three sub-questions summarised above derive from both, the analysis of structures (e.g. institutional differences in CDM in NAMA) and the events (SD outcomes characteristics) and they lead to uncover those intermediate mechanisms (lying in the generative mechanism stratus) that include, among others, SD assessment methods. In line with the critical realistic interpretation, it is visible how the analysis relates to the applicability of the CDM experience to NAMAs brought to the following different conclusions: from an events perspective (SD outcomes) CDM and NAMAs can be considered very similar since they can generate similar SD benefits, but from a structures perspective some relevant differences have been highlighted (e.g. "development first" approach vs. "environment first approach", DNAs shift, different political implementation rules and context.). Therefore, as concluded above, the experience of CDM SD assessment can partially find applicability in the NAMA context although new mechanisms are needed in order to match with the requirements emerging from the ongoing NAMA conceptualisation process.

All in all, it can be concluded that an SD assessment of individual NAMA projects needs both, quantitative measurements like from the CDM (e.g. job creation) and those qualitative assessments, which show the contribution of a NAMA e.g. regarding community creation (see Box 1) or nature conservation. An overall framework needs to include those individual NAMA assessments and should build upon a common understanding of the term of SD and needs to have the long-term goal to achieve e.g. (climate-) resilience or degrowth in order to result in SD. An effective framework for SD outcome evaluation thus comprises a range of indicators that on the one hand, reveal individual outcomes of the NAMA projects and on the other hand, show the contribution towards long-term achievements in global sustainability.

6 Discussion

This chapter aims on discussing some of the aspects revealed in the Analysis (chapter 5) and those aspects, which have not been touched upon so far.

Regarding the outcomes of the research question it can be stated, that the NAMA needs a comprehensive framework for assessing SD outcomes. This means, not only on an individual base, but also on an overall base with a common understanding of SD among all NAMA stakeholders. It could be announced as a disappointment in case the upcoming sessions will not capture the inclusion of socio-ecological and socio-economic movements like resilience or degrowth. Since the ecological modernisation is a known concept, it would be possible to adopt aspects of it within the NAMA MRV evaluation.

A very interesting outcome from the survey is the weighting of the three dimensions of sustainability (see Appendix I, question 14). The survey participants have been asked to indicate their personal view of how they balance the economic, environmental and social sphere in regard to their NAMAs. From the analysis of the results of question 14 (see sub chapter 5.1) it can be concluded that hosting countries and implementing agencies have different views on how to weigh the three dimensions of SD in respect to their NAMA. As sustainability is generally perceived as an equilibrated process, it is surprising to find only four entities, which indicated "equally balanced" as their view of sustainability in regard to NAMAs. Moreover, one UN-agency chose "1st environmental, 2nd economic, 3rd social". This is surprising because in accordance with the "Future we want", a result of the Rio+20 Conference on sustainability development, SD is perceived as an simultaneously process of achieving economic and social development while supporting and conserving eco-systems and the sustainable management of resources (UNESD, 2012). Hence, UN-agencies should have the same understanding of the term. However, the survey asked in question 14 for the perception of SD related to the NAMA the participant is involved with. That is, the answers are linked to the respective NAMA. This could be interpreted as a need for supporting certain dimensions (for instance the environmental one) within a hosting country because it is more affected than the others (e.g. the social one).

The "development first" approach in the report by Olsen (2013) clearly states that the achievement of development improvements, namely sustainable development, has a priority in NAMAs. Contributing to SD in the NAMA country is a goal, manifested in the Bali Action Plan (UNFCCC, 2007). There seems to be a missing debate on how to address SD in the

context of NAMAs. That is probably one factor, for why there has not been any progress in developing MRV methods for SD outcome (in respect to the NAMA policy, it shall be not forgotten, that the policy is new and methods are under investigation). If the "development first" approach would include a defined way of achieving SD in a hosting country, it might be possible to uncover needs, which have a priority to be addressed at in the NAMA region. Certainly, the actual needs in a hosting country lead to the implementation of a NAMA. Nevertheless, putting the SD goal into another context, that is a long-term goal of balancing the dimensions, would put the focus on how to achieve this balance through the NAMA project, rather than achieving SD because all dimensions have been addressed at the same time.

That is, there shall not be *the* overall goal of promoting SD, but a balance of the SD dimensions to be achieved. An explanation for why some survey participants did not balance sustainability equally can be that they have different priorities in respect to their NAMA. This is an experience already made in connection with the CDM: *"[…] it should be noted that the actual definition of SD and what constitutes it differ according to what different host countries consider as their development priorities"* (TERI, 2012, p. 53). Interestingly, this exactly touches upon the meaning of NAMAs, as individual project have individual needs. From the perspective of hosting countries, the SD goal could be considered as individual dimensions and each dimension has to be more or less strengthened, according to the country's needs, which would be thus *nationally appropriate*. In the long run and in the perspective of implementing and funding agencies and including hosting countries, a balance of the three SD dimensions can be achieved through focussing on one dimension first.

Spangenberg (2002) wishes to include a fourth sphere to build a prism of sustainability – the institutional sphere. In his paper, he indicates the missing points in SDI development:

1.) Comprehensive frameworks with a small amount of indicators in order to sum up indicators to indicate policy priorities

2.) Clear policy targets for all four dimensions, but on different levels of society, interlinked and if possible quantifiable (Spangenberg, 2002).

Within this thesis, the fourth dimension of institutions regarding sustainable development has not been included. The reason for this is first of all that it is only partly useful in order to conclude on SD evaluation methods according to NAMAs (and within the short timeframe not adequate). Secondly, it opens a totally wider and different discussion, which is certainly interesting and important for future considerations of SD, but again does not lead to a

conclusion in SD assessment in the context of NAMAs as the dimension of institutionalism is on another level such as environment, economy and society. The manifestation of NAMAs is furthermore directly linked to the institutional sphere as it is a governance approach in the name of climate change mitigation. However, the NAMA project itself is implemented in a bottom-up process (Olsen, 2013) and *here* regarded as a pragmatic approach.

Surveys that have been submitted without replying to the questions, except for indicating the entity name, have been considered as partly valuable for the analysis as the coding scheme could have been applied at least to a small extent. However, it is relevant to mention that the provision of no answer can be interpreted as missing interest in the topic of SD in relation to NAMAs. That is, in return, a clear sign for missing awareness of the relevance of the topic of SD. As NAMAs are to be implemented in the name of sustainability and capacity building, the consideration of SD and its evaluation methods should be manifested within each NAMA entity's undertakings. The fact, that some entities, among others a UN institution, have not been providing any input on the survey, could be indeed interpreted as deconstructive or at least non assisting in the process of finding effective MRV methods for SD.

Generally, it has been a limitation to the research that only a few NAMA entities have been replying to the survey. However and in respect to the limited amount of time for conducting research as well as the limited number of established NAMAs, it can be concluded that the results provide a basic understanding of how SD and SD methods are perceived among NAMA stakeholders.

Olsen (2013) states that there are no official MRV guidelines or SDIs yet, but under consideration. Moreover, she admits that *"[…] looking at what the CDM was […] makes us realise that it is where all the knowledge about MRV for these kinds of actions is"* (Olsen, 2014, Appendix "interview"). This is interesting because it can be interpreted as the objective of sustainability has been stated without knowing how to measure the achievements. But, since SD is not a new discussion, it is astonishing that after the failure of the CDM (here, in regard to not hitting the target of SD), the same risk might manifest again.

Already in 1987 and in the completion phase of the Brundtland Report in Tokyo, MacNeill declared in a press conference: "*As we come in Tokyo to the end of our task, we remain convinced that it is possible to build a future that is prosperous, just, and secure. But realizing this possibility depends on all countries adopting the objective of SD as the overriding goal and text of national policy and international co-operation. […] A successful transition to a SD through the year 2000 and beyond requires a massive shift in societal objectives*" (Borowy, 2014, p. 153). What later resulted in Agenda 21 of the UN Rio declaration from 1992, is by far not achieved. Even in 2014, little has been done to engage into overriding goals.

It is questionable that through NAMAs there will be a significant greater impact on SD compared to the CDM. Nevertheless, the approach of aiming at *nationally appropriate* actions seems to promote effectively and thus, NAMAs is a tool for targeting SD, even though MRV is still to be enhanced. Decades after the Rio Conference on Environment and Development in 1992, is seems necessary to finally conclude on criteria and SDIs in order to progress in mitigation actions, in a global scale and on a national level of establishment.

7 Conclusion

Sustainable development, climate change mitigation or resilience are topics being on the political agenda for years. However, assessments of sustainability through mitigation actions are rare. After experiencing the limits of the CDM in addressing SD in developing countries, the new mitigation tool NAMA shall enhance the achievement of SD. As the latter is manifested within the context of SD, is it important to assess the outcomes of SD in order to measure the success. As MRV methods are missing so far, this thesis aims at uncovering evaluation methods which address the SD outcomes of NAMAs. Through the development of the thesis it has been possible to note that most of the uncertainty to SD assessment of NAMAs can be attributable generally related to the young life of the tool. The uncertainty gravitating around its conceptualisation and the different perception of SD in relation to NAMAs among the stakeholders might also contribute to the difficulties in assessing SD outcomes.

Looking at future perspectives, the investigation *here* presented can be enhanced first by enlarging the scope of stakeholders contacted since it has been raised that investigating the state of the art of SD perception in relation to NAMAs is a fundamental starting point for uncovering frameworks for SD evaluation of NAMAs. More methodologies could have been considered in a longer term project. The experience from CDMs and its applicability to NAMAs can be also investigated through a deeper cases comparison that, however, would require the availability of more specific data regarding NAMAs, which are still difficult to obtain at this stage of the tool's implementation.

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