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**ASSESSING THE CLEAN
DEVELOPMENT MECHANISM
CONTRIBUTION TO
SUSTAINABLE DEVELOPMENT IN
MEXICO (2005-2010)**

SETTORE SCIENTIFICO DISCIPLINARE DI AFFERENZA: SECS-P/06

Tesi di dottorato di Simone Lucatello, matricola 955413

Direttore della Scuola di dottorato

Prof. Gian Maria Zuppi

Tutore del dottorando

Prof. Massimiliano Montini

ABSTRACT

This dissertation explores the role of the Clean Development Mechanism (CDM), an offset mechanism under the Kyoto Protocol (art. 12) that allows the crediting of emission reductions from Greenhouse Gas (GHG) abatement projects in developing countries, and its contribution to Sustainable Development (SD) in Mexico. One of the growing concerns about the performance of the CDM under current international negotiations for the post Kyoto regime (2012) deals with its weak capacity to deliver on its environmental and SD objectives in countries where it is implemented. Through a sustainability assessment, the thesis analyzes *if and how* CDM projects in Mexico are fulfilling one of the main objectives for which it was created and to what extent during the period 2005-2010.

The main argument of the thesis – besides the criticism about the efficiency and efficacy of the CDM itself- is that considering the extreme flexibility of SD criteria established by the Mexican government through the Designated National Authority (DNA), CDM projects have a relative impact on SD in some key dimensions such as environmental, economical, and to a lesser extent, social one. CDM relation with SD and its contribution in Mexico is however a complex topic to understand, partly due to the vague definition of SD adopted at country level and stakeholders positions towards the CDM itself.

La tesi analizza il ruolo del Meccanismo di Sviluppo Pulito (MSP) - un meccanismo di compensazione previsto nell'art. 12 del Protocollo di Kyoto che consente l'accredito di buoni di carbonio derivati dalle riduzioni di emissioni di gas a effetto serra (GHG) per mezzo di progetti applicati nei paesi in via di sviluppo - e il suo contributo al miglioramento delle strategie di sviluppo sostenibile (SS) adottate nel caso del Messico. Una delle crescenti preoccupazioni a livello internazionale sulle prestazioni del MSP e per lo stesso futuro del protocollo di Kyoto (pst-2012) è precisamente la sua poca capacità di complementare o raggiungere gli obiettivi ambientali e di SS nei paesi dove viene applicato. Pertanto, attraverso una valutazione della sua sostenibilità, la tesi analizza *se e come* i progetti del MSP in Messico stanno compiendo con uno degli obiettivi principali per cui è stato creato e in quale misura, nel corso del periodo 2005-2010. L'argomento principale della tesi, al di là delle considerazioni sull'efficienza ed efficacia del MSP per se, è che considerando l'estrema flessibilità dei criteri dello sviluppo sostenibile stabiliti dal governo messicano attraverso la National Designated Authority (DNA), i progetti del MSP hanno un impatto relativo in alcune dimensioni chiave come quelle ambientali, economiche e, in misura minore, in quelle sociali. La relazione tra il MSP e il suo contributo allo SS in Messico è comunque un argomento complesso da analizzare, in parte dovuto alla vaga definizione di SS adottata a livello nazionale e le posizioni assunte dai diversi soggetti interessati alla realizzazione dei progetti nel paese.

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ACRONYMS AND ABBREVIATIONS

AAU Assigned Amount Units

AIJ Activities Implemented Jointly

AOSIS Alliance of Small Island States

AR-WG Afforestation and Reforestation Working Group

BAU Business-As-Usual

BCSE Business Council for Sustainable Energy

CC Climate Change

CDF Clean Development Fund

CDM-AP CDM Accreditation Panel

CDM Clean Development Mechanism

CER Certified Emission Reduction

CERUPT Netherlands's Certified Emission Reduction Unit

Procurement Tender

CH₄ Methane

CO Carbon Monoxide

CO₂ Carbon Dioxide

COP Conference of the Parties

COP/MOP Conference of the Parties serving as the Meeting of the Parties

CSD Commission on Sustainable Development

DNA Designated National Authority

DOE Designated Operational Entity

EB CDM Executive Board

EIA Environmental Impact Assessment
ER Emission Reductions
ERU Emission Reduction Units
ET Emissions Trading
EU ETS European Union Greenhouse Gas Emission Trading Scheme
FCCC (United Nations) Framework Convention on Climate Change
G77 Group of 77 and China
GCC Global Climate Coalition
GDP Gross Domestic Product
GEF Global Environment Facility
GHG Greenhouse Gases
HCFC-22 Hydrochlorofluorocarbon
HFC-23 Hydrofluorocarbon
IEA International Energy Agency
IETA International Emission Trading Association
IPCC Intergovernmental Panel on Climate Change
IISD International Institute for Sustainable Development
JI Joint Implementation
KP Kyoto Protocol
LFG Landfill Gas
LULUCF Land Use, Land Use Change and Forestry
MA Marrakech Accords
MDL Mecanismo de Desarrollo Limpio (CDM)
NDP National Development Plan
NGO Non-Governmental Organization
ODA Official Development Aid
OECD Organization for Economic Cooperation and Development
OPEC Organization of the Petroleum Exporting Countries
PCF Prototype Carbon Fund
PECC Programa estratégico de cambio climático
PD Project Developer
PDD Project Design Document
SBI Subsidiary Body for Implementation

SCC Special Climate Change Fund

SD Sustainable Development

SEMARNAT (Mexican Ministry of Environment and Natural Resources)

UNCTAD United Nations Conference for Trade and Development

UNEP United Nations Environment Program

UNIDO United Nations Industrial Development Organization

UNFCCC United Nations Framework Convention on Climate Change

WBCSD World Business Council for Sustainable Development

WCED World Commission on Environment and Development

WMO World Meteorological Organization

WRI World Resources Institute

WSSD World Summit on Sustainable Development

PART I

CHAPTER I: INTRODUCTION AND OVERVIEW

1.1 Background

The Clean Development Mechanism (CDM) is an offset mechanism under the Kyoto Protocol (art. 12) that allows the crediting of emission reductions from Greenhouse Gas (GHG) abatement projects in developing countries. The CDM has two purposes: it should assist developing countries in achieving sustainable development (SD) and help industrialized countries to reduce the costs of GHG abatement.

It is commonly agreed among scholars that the CDM has been very successful in many ways. One example is by generating carbon markets to stimulate emission reductions, among other benefits, but at the same time, the CDM has faced a number of challenges and weaknesses of different origins: complex governance procedures, unequal distribution of projects worldwide, questionable environmental integrity and technology transfer¹. Moreover, it has also been strongly criticized for not delivering one of its main purposes, which is achieving SD in developing countries. As a matter of fact, one of the growing concerns about the performance of the CDM under current international negotiations for the post Kyoto regime (2012) deals with its weak capacity to deliver on its environmental and SD objectives in countries where it is implemented. Several international assessments of the CDM and its impact on SD have begun to rise since the beginning of the Kyoto Protocol commitment period (2008), and all studies point to the fact that the CDM, if left only to market forces, fails to comply with its important aim of contributing to SD. Hence, the main question arises: Is the CDM fulfilling one of the main objectives for which it was created and to what extent?

¹ Olsen, Fehnann, *A Reformed CDM; including new Mechanisms for Sustainable Development*. Perspective Series 2008. UNEP Riso Center.

Understanding the relation between the CDM and its impact on SD is, however, a complex task in the research field. A multi-disciplinary research agenda is needed to grasp the intricacies of the multifaceted nature of understanding climate mitigation actions – such as those envisaged by the CDM - and its effects on SD in order to review both technical and critical elements in using the CDM (reformed or not) in host countries. (Bumpus, Cole 2010). Moreover, understanding the processes of SD in the CDM requires getting better and detailed knowledge of the ‘*black box*’² represented by the host country’s Designated National Authorities (DNAs), who are in charge of determining if CDM projects contribute or not to SD principles and practices in host countries.

Finally, when it comes to the sustainability assessment of the flexible mechanism such as the CDM, synergies and tradeoffs among climate change and SD must be better addressed and measured. Common indicators for evaluating both concepts must be further integrated and developed under new conceptual frameworks, as already suggested by the IPCC (Intergovernmental Panel for Climate change) in its 3rd and 4th assessment report (2002, 2007).

Moreover, the fundamental structure of the CDM as a market mechanism results in a preference for low cost emission reductions over SD effects, since the latter remain un-priced on the global market (cf. Ellis et al. 2007). The lack of significant SD effects in the various meaning of the term may in effect also be explained by conscious decisions by host countries (ex. DNAs) to let one of the dimensions (primarily economic development) override the others. This is what has been usually defined as the “race to the bottom” in SD practices.

Therefore, the need for assessing sustainability of CDM projects at the country level is crucial for understanding future directions for the Kyoto Protocol flexible mechanisms in the new climate change international regime after 2012. The relevance of understanding to what extent CDM projects are fulfilling or not with one of its building features plays a major

² Ibid, Bumpus and Cole, 2010.

role in defining recommendations for improving the mechanism impact and its governance.

This dissertation, through a sustainability assessment of CDM projects in the case study of Mexico (the fourth world largest recipient country for CDM and among the pioneers in Latin America to rapidly develop CDM institutional settings and improving CDM projects), wishes to contribute to the ongoing debate of how CDM projects are complying with SD objectives, by providing empirical evidence and findings at country level with the study case of Mexico.

An important issue is also the understanding of the SD concept and practice in Mexico. For developing countries, especially in Latin America, the SD concept has become, since the 1990s and the Rio Conference (Earth Summit), crucial for implementing new economic and development strategies, together with the efforts to comply with the Millennium Development Goals (MDGs).³ SD becomes the basis for environmental policies and, as it will be further explored, paves the way for current climate change mitigation and adaptation efforts in developing countries. But what kind of SD is Mexico promoting and under what political, economical and social conditions? This question is crucial to understand the framework under which CDM projects are promoted and implemented in Mexico. For this purpose however, it is important to clarify that no official SD definition is adopted in Mexico, nor has it stuck to any international definition. The National development Plan 2007-2012 only states that “*human sustainable development*” is a national priority, without defining it formally or explaining the concept. In this definition, it is interesting to underlie the importance given to the word “human”, since current national policies, at least at the official discourse level, are focused on human development as a tool to enhance the quality of life in Mexico. As a crucial issue for the development of the thesis, it was necessary to come up with a “guiding” definition of SD in Mexico, based on personal understanding of the concept handled both at official level, particularly within the Ministry of the

³ The MDGs are a set of 8 defined goals to be reached by developing countries within 2015 in order to reduce their poverty conditions.

Environment (SEMARNAT), Economics (ECONOMIA), private sector and related actors who are involved in the development of CDM projects in Mexico.

SD definition for Mexico:

The ability of Mexico to practice SD is affected by many factors, some of which are defined with the combination of different elements: (a) domestic policy actions, including steps taken toward the safeguarding of current economic policies open to free market economies (privatizations, deregulation, foreign investments) without depleting current and powerful natural resources (such as oil, gas, biodiversity); (b) financing from bilateral and multilateral lending institutions for dealing with environmental concerns; (c) private sector investments and clean technology development. d) enforceable environmental policies led by environmental services concepts and practices, e) public participation in decision making. f) verifiable and measurable standards to monitor progresses on some core environmental priorities for the country (air, water, soil). According to a personal view, the interaction of these factors forms the basis for an SD definition, practice and conceptualization in Mexico.

Using the above listed concepts, which will be further described and analyzed in chapter IV, the thesis explores the role of the CDM and its relation with the impact on local SD. For the sustainability assessment, the dissertation applies a methodology based on a work developed during a research period for the Phd fieldwork at the United Nations Environmental Programme (UNEP) Riso (2010), a specialized centre on Energy, Climate Change and Sustainable development in Denmark and during the fieldwork in Mexico in 2008 and 2009. UNEP Riso is considered among the world top centre for CDM studies and research around CDM and it

provides most of the current international insights on CDM data, performances, governance, carbon market and assessments.⁴

1.2 Objectives and research questions

Research around the CDM and SD needs further inputs and there is a clear demand to look for more evidence concerning CDM projects impact at country level. Addressing such an issue is crucial to provide more theoretically informed analysis of SD in CDM. Since much of the international literature claims that CDM projects have a relatively low impact in SD delivery, this thesis takes a closer look at a particular country. There is, in fact, a strong need to provide better and deeper knowledge of CDM impacts on SD at country level by enlarging the sample of projects analyzed, but also looking at the overall picture of CDM governance at local level, including economic and political settings. The case-study analysis looks at 65% of the overall Mexican projects registered to the UNFCCC. In statistical terms, this is a very confident sample for providing consistent results and findings. Concerning the SD-CDM methodology assessment, a mix of qualitative and quantitative tools is used and it will be largely explained in the related chapter.

The main argument of the thesis is that considering the flexibility of SD criteria established by the Mexican government through the DNA, CDM projects in Mexico have a relative impact on SD in some key dimensions such as environmental, economical, and to a lesser extent, social. Under some indicators used for the case study, contrary to some evidence found in other studies of mainstream literature, CDM is delivering some potential benefits to SD in Mexico mostly on the environmental pillar. This is mainly due to the mindset of CDM project developers in Mexico which is reflected in the PDD file and where the sustainable development concept is conceived under a narrow definition which encompasses mostly the

⁴ UNEP Riso publishes for example the CDM pipeline, the most reliable and up to date international database on CDM projects worldwide. www.cdmpipeline.org

*benefits to the environment*⁵. Few CDM benefits in the economic dimension of SD are also detected and they are often associated to the idea of infrastructure (buildings, roads, etc.). The social dimension is very poor; few projects look at the CDM benefits in terms of employment and only those related to renewable energies mention the issue of potential benefits to local indigenous communities. Among other findings, it is relevant to mention that technology transfer, which is claimed to be in general a major benefit of CDM projects, is instead happening at low level for a major emerging economy such as Mexico. Contrary to common belief, small scale projects seem to provide relevant SD benefits in the environmental sector and thus contributing more than large scale projects. Another important point of concern deals with the criteria established by the Mexican DNA authority which are considered quite flexible and broad. This leaves room for very large interpretation of SD compliance within the country and may not represent a big challenge for CDM project developers when submitting the project to the DNA. Therefore some crucial questions arise about the *dual flexibility* issue of the Sustainable development in the CDM. On one hand, are SD criteria established at national level *too flexible* to produce real benefits to the country? On the other hand, if the CDM itself, which by definition is called a "*flexible mechanism*" of the Kyoto Protocol (since it enables developed countries to meet part of their emission reduction commitments abroad delegating the SD issue to the host country), what can the CDM overall efficiency be in delivering SD purposes? Evidence and elaboration for each of the above mentioned points will be extensively provided throughout the fifth chapter and in the conclusion. The meaning of SD for the Mexican Government and its practice is of crucial understanding, as previously described.

The thesis has three main objectives. The first is to broadly review the link between CC and SD and how both concepts are assessed and measured at international level. It is argued that the CDM can be difficult to evaluate also because definitions and concepts for SD and CC are very broad and

⁵ Personal inference reached after the research analysis of 75 PDD files and with key informant interviewers.

it is necessary to rely on a common framework of indicators and methodologies to assess both concepts. A strong link between CC mitigation and SD is mutually reinforcing and viewing CC through an SD lens, would help developing countries to better address priority goals of climate related efforts as well as development concerns. The issue of measuring CC and SD is strictly linked to the previous idea and it helps to better understand the nexus between the two concepts.

Secondly, the dissertation will analyze the role of the CDM as an important and still unique tool under the current international CC regime for promoting SD in host countries and allowing Annex I countries to acquire CERs⁶ and so move towards the compliance of Kyoto targets. Although an imperfect mechanism under constant review and subject to criticism for its unequal project distribution, its environmental integrity and technology transfer, as well as complex governance procedures, the CDM has proved to be a mechanism that created an important carbon market, which generates a considerable amount of public and private investments to reduce GHG emissions in developing countries. Since the Kyoto Protocol entered into force in 2005, more than 5.000 projects have been approved with a cumulative expected total of 3 billion tones of reductions by 2012. In very short time, the CDM has been able to mobilize billions of dollars in public and private investment to reduce emissions in developing countries. However, talks are already undergoing for reforming the CDM in the post Kyoto scenario due to its questionable components and in particular its difficulties to deliver SD in host countries. It is in fact here worth remembering that for many developing countries and radical NGOs, when the CDM has lowered emissions in developing countries, it has often been a stunningly inefficient means of doing so. And when it does result in a project being built that lowers emissions locally, there is no global climate benefit because the CDM is at best a zero-sum game. Each so-called “emission reduction” generates an offset that just allows an industrialized

⁶ Certified Emission Reductions (CERs) are a type of emissions unit (or carbon credits) issued by the Clean Development Mechanism Executive Board for emission reductions achieved by CDM projects under the rules of the Kyoto Protocol.

country to keep on polluting. Part of this argument will be largely treated along the dissertation.

Thirdly, the thesis will look at the specific case of Mexico, a country which is very active in promoting national efforts to reduce climate change impacts and is the fourth largest recipient of CDM projects worldwide and the CDM contribution to SD. Mexico has been among the world countries which have taken very seriously the climate change problem, being a vulnerable country to CC impacts. Moreover, it is a country that also made important progress with the compliance of the national SD agenda. Many climate related policies and institutional settings have been put in place in the country in order to face the climate change problem and the CDM is certainly part of a larger strategy to cope with mitigation effects. But its relation with SD and its contribution is yet unclear, partly due to the narrow definition of SD adopted at country level. The three above mentioned objectives translate into a set of specific research questions, which have guided the research process.

Methodological Matrix

Thesis Objectives	Related research questions	Related Chapter
Analyzing and understanding the relation between CC and SD and the way they are assessed and measured;	<ul style="list-style-type: none"> - How are CC and SD concepts related, and how can they be assessed and measured under a common framework? 	II
To analyze the role of the Clean Development Mechanism (CDM), as an instrument of climate governance that can promote SD in host countries.	<ul style="list-style-type: none"> - Is the CDM a valid instrument for achieving SD in developing countries and to what extent? - Are current CDM assessment methodologies based on PDD files analysis reliable enough to prove CDM correlation with SD? 	III
To discuss the CC mitigation actions and SD policies in Mexico	<ul style="list-style-type: none"> - What kind of SD is Mexico promoting and how ? - Is Mexico implementing a two ways policy relationship between CC and SD; And is the CDM being implemented under the right conditions? 	IV
To explore the relation between SD and CDM projects in Mexico and assessing its impact in terms of overall contribution to SD at local level.	<ul style="list-style-type: none"> - Is the CDM contributing to SD in Mexico and to what extent? 	V, conclusions

1.3 Research methods employed

In order to explore the relation between the CDM and its contribution to SD, a set of research methods is used.

- ❖ Literature review (books, Journals and specialized articles)
- ❖ Stakeholder analysis of local, national and international actors in realizing CDM projects in Mexico, through a series of in-depth interviews with CDM project participants in Mexico, which helped to explain the experiences and perception of the issues analyzed as well as the project implementation.
- ❖ A qualitative and quantitative analysis based on a methodology that looks at the projects design documents (PDD)
- ❖ Quantitative tools, including the Pearson's coefficient, as a statistical tool to assess CDM potential contribution and benefits to SD in Mexico.

Concerning the assessment methods to evaluate the CDM benefits to SD, several approaches and methods have been developed by the mainstream literature. Some of them can be identified within the following categories:

1. *Guidelines*. The guidelines describe the aspects that should be considered in a project in order to ensure its contribution to SD. They are usually designed normatively in the host country by an authority designated for the development of CDM. (Markandya and Haelnes 2002)
2. *Checklists*. Specific questions are formulated and predefined answers are used to assess the compatibility of the project with a specific set of criteria. Checklists are used to assess the impact of the project activities on selected issues. (Olhoff et al. 1998, 2000, 2002)
3. *Multi-criteria methods*. Several sustainability criteria are defined and the projects are assessed with regard to each of them. Each criteria is described through a set of selected indicators. The criteria can be

weighted according to their relative importance, and then aggregated to express the overall utility of the project. Thresholds can be defined and projects activities that obtain scores higher than thresholds are considered as eligible. (Sutter 2003, Parreño 2005, Munda 2007).

4. *Cost benefit analysis*, under both definitions the process involves, whether explicitly or implicitly, weighing the total expected costs against the total expected benefits of one or more actions in order to choose the best or most profitable option.(Markandya, Nuñez, 2007)
5. *Qualitative methodologies based on taxonomies*, which look at the benefits offered by CDM project documents (PDD) and their potential impacts on SD. (Olsen, Fehnam, UNEP Riso 2008, Watson-Frankhauser 2009).

However, a literature revision of major academic papers and articles concerning the topic of CDM assessment and its effect on SD was undertaken and it showed the following interesting results. Existing literature on CDM assessment largely relies on the analysis of projects descriptions through the analysis included within the *Project Design Document (PDD)*, which is the key document involved in the validation and registration of a CDM project activity. The PDD is one of the three documents required for a CDM project to be registered, along with the validation report from the Designated Operational Entity (DOE) and the letter of Approval (IoA) from the above mentioned DNA (Designated National Authority).⁷ PDD files can be found in the United Nation Framework Convention on Climate Change (UNFCCC) database.⁸

Around the PDD analysis all the above mentioned techniques and approaches are used.⁹ The PDD analysis is one of the most used in the

⁷ Definition taken by the *CDM Guidelines booklet*,2002.

⁸ www.unfccc.int

⁹ Another way of assessing CDM performance in the literature is based on an evaluation “*on the ground*” of the projects. But this is very difficult to implement given that the international period of CDM implementation is still under way (up until 20102) and many projects are not yet completed. Moreover, for those projects already working, information

literature (Sutter, Parreno, 2007, Olsen Fehnam 2008; Michaelowa 2008; Boyd, Watson and Frankasuer 2009) and provides useful insights and information concerning overall CDM contribution to SD at country level based on a text analysis, together with other quantitative tools.

It is worth stating that project documents analysis does not reveal how projects are implemented and what is happening on the ground, but they can show if projects are taking into considerations the sustainable development criteria established by the DNA authorities for project submission.¹⁰ Since the nature of the methodology is qualitative, findings describe *how* CDM projects can contribute to SD but not *how much* the CDM really contributes to SD on the ground. Most of the studies mentioned look at the PDD files at aggregate level with sample studies around 10-15% of the overall number projects (is it statistically significant?) but only few studies have been looking into country level projects with larger samples. The project sample used in the dissertation looks at 62.5% of Mexican registered and submitted for validation projects under the UNFCCC data base. They are matched against the UNEP Riso pipeline, which is the most up-to-date source of CDM projects worldwide.¹¹ Concerning PDD analysis it must be also said that there is no unique methodology for sustainability assessment of all CDM projects at global level and there is definitely a need to look for international standards and procedures additional to national definitions to get better evidence and results for CDM implications at SD level in host countries.(Olsen and Fehmann 2008)

Finally and concerning the methodology applied in this work, which will be largely described in chapter V, it is here worth to remind briefly the main points of the evaluation procedure and content. CDM assessment and its impact on SD is carried out based on a methodology that looks at the text analysis of the Project Design Documents (PDD) submitted for validation at the UNFCCC and considers the claims of SD co-benefits made by CDM

cannot be easily found due to the lack of transparency from project developers and executers in the field.

¹⁰ Ibid.

¹¹ <http://cdmpipeline.org/>

projects themselves in the PDD¹². To assess economic growth and SD, some understandable and practical indicators are used. They are chosen based on the work by Frankhauser and other authors, which identify for the whole PDD-UNFCCC database some words common to all documents and useful to match SD criteria as such. Through this choice of indicators emerges a particular definition of SD that may not necessarily align with the Mexican DNA document that establishes SD criteria for project submission.

This is because it is necessary to encompass as many aspects of the numerous SD approaches as possible and to avoid tautological results. PDD are not finally searched for a claim of 'sustainable development' *per se*. When taxonomy is identified, 75 PDD out of 120 registered projects in Mexico (62.5% of the overall sample) are then searched for both primary and secondary keywords associated with indicators and word count results are summarized. The major flaw of this methodology ,however, is that final results represent the type of co-benefits that CDM projects can bring rather than the size or scale of such benefits. No ground level assessment is involved and definitely the evaluation is an "ex-ante" exercise.

Even though the methodology has limited reach, it must be said that it is currently the basis for most international assessment and evaluations on the CDM contribution to SD in developing countries. It is usually referred by the influential leading work of Olsen and Fehnann¹³ and the study done on aggregate level at more than 700 CDM projects (15% of the current global sample) document files. Finally, and in order to give more solidity to the qualitative analysis, all empirical findings are tested through the statistical tool of the correlation coefficient (Pearson's coefficient), which helps to examine the relationship between type of projects analyzed (x variable) and project characteristics (y variable). The exercise helps to

¹² Project PDD available from: <http://cdm.unfccc.int/Projects/Validation/index.html>

¹³ Fehnamm and Olsen; *Sustainable development benefits of clean development mechanism projects: A new methodology for sustainability assessment based on text analysis of the project design documents submitted for validation*. Energy Policy Volume 36, Issue 8. August 2008, Pages 2819-2830.

establish in probability terms a lineal relationship between the variables analyzed, in this case between Mexican project types and the relation with SD benefits in economic, environmental, social and physical terms. Results from the correlation coefficient analysis increase confidence in the previous qualitative findings.

1.4 Structure of the thesis

The thesis is divided in two parts and five chapters. Part I includes the current methodological chapter (1) and two general chapters related to the issue of CC and SD (chapter 2) and the Clean Development Mechanism (chapter 3).

In particular, the second chapter looks at the relation between CC and SD and the issue of measuring and assessing the impact of both concepts at practical level. One of the major problems when assessing both CC and SD is not only the lack of a formal integration of both concepts under a common framework but also the need of establishing common indicators and methodologies for their common evaluation. The third chapter looks at the CDM specifically (origins, current status and performance) as well as its operational and governance aspects. Some critics concerning the CDM and its implementation are also brought forward.

Part II of the thesis, which is the core of the dissertation, explores the case of Mexico. Chapter 4 provides a general understanding of the environmental governance in Mexico, looking at the sustainable and climate change policies. The aim of the chapter is to offer a framework to understand the national context under which CDM projects are carried out, to explore the kind of SD that is implemented in the country and check if it matches with CDM projects' intention to deliver SD itself. Chapter 5 then analyzes concretely the CDM in Mexico and its contribution to SD at local level. Starting from an overview of the institutional and legal settings (CDM governance at local level), together with the chapter provides an empirical analysis of CDM benefits contribution to SD, based on a PDD review and using a methodology largely described in the chapter itself. Further statistical tools are also applied in order to increase confidence on the

results. Finally, some conclusions related to the overall dissertation and answers to the research questions are drawn.

Matrix of Stakeholders for CDM projects in Mexico and their influence (High-medium-low)

Stakeholder	(Potential) Role in the CDM framework or in project implementation	Influence in the CDM framework or project decision making	Interests in project development and CDM
Mexican Ministry of the Environment (Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT) and CICC (Intersecretarial commission for climate change)	HIGH: Promote carbon sequestration projects to reduce GHG emissions	HIGH. Focal Secretariat for the CDM National Authority	Capture foreign direct investment through the CDM investment window
National Institute for Ecology (Instituto Nacional de Ecología)	HIGH: Promote and conduct research in environmental services payments; Generate scientific country-data (emission trends, regional sectoral baselines) to help the government prepare UNFCCC meetings Assess government environmental public policy	HIGH. Advise the government in the use of the climate change related scientific information and its implication over UNFCCC negotiation issues; Advise the government in legal and economic policy development for the promotion of a national system for ecological services payments	Develop innovative research Policies
Multilateral lending agencies (World Bank, UNDP, Foundations)	HIGH: Support inter-governmental cooperation through private financial flows and new investment frameworks	HIGH. Their investment levels in the next years are likely to determine the possibilities to kick-start sustainable carbon projects with high social benefits at the local level	Promote environment and development sound investment; Promote cross-scale capacity building programmes
Academia (UNAM, CONACYT, COLMEX,	MODERATE: Academics have been active policy advisors through	MODERATE. Their scientific role may still be important as the CDM	Capture funds for new research activities in CDM related

UAEM, UIA, ECOSUR and others) Centro Mario Molina (think thank)	climate change related academic reports and providing direct information to INE and advice to government officials	develops, particularly in the areas of baselines development, carbon sequestration potential for projects' institutional analyses	activities or environmental services valuation and implementation frameworks
Mexican Carbon Fund (FOMECAR/National Bank for Foreign Exports),	MODERATE: It supports national efforts through a fiduciary fund for developing projects and assisting on legal issues	MODERATE. They act as external actors with potential in the future development of Programmatic CDM and for the establishment of a Cap & Trade system	HIGH. They promote projects but for several reasons cannot be so effective. They also capture CDM-investment for projects implementation
Mexican Private Sector	LOW-MODERATE It is increasingly playing a more dominant role, particularly if Mexico adopts mitigation commitments in the near future or specific companies envision competitive advantages by engaging in the CDM framework	LOW-MODERATE. National financial institutions may act as financial intermediaries between international investors and local CDM-project developers and strengthen the economic and institutional viability of projects. From the national emitters' perspective, they may progressively participate in carbon-trading national schemes or may adhere to existing pilot carbon-trading tenders	LOW-MODERATE: Economic opportunities, High participation in national carbon trading schemes, increase environmental performance is needed together with capacity development
NGOs and civil society	LOW-MODERATE: Promote and develop carbon projects; Some will be interested in becoming local partners of Designated Operational Entities for projects validation and certification	LOW-MODERATE. Some have more power than others due to having been key actors in Mexican environmental policy, conducting certification and monitoring activities or lobbying for policy reforms	LOW. Main interest is to influence processes at macro level such as climate change negotiations;

CHAPTER II:

SUSTAINABLE DEVELOPMENT, CLIMATE CHANGE AND THEIR ASSESSMENT: FRAMING THE CONTEXT

Given that the dissertation looks at the issue of evaluating the Clean Development Mechanism (CDM), a tool related to climate change mitigation actions but created with the aim of contributing to SD in the countries where projects are implemented, it is necessary to briefly explore the relation between CC and SD and the issue of measuring and assessing the impact of both concepts at practical level. One of the problems still unsolved in the debate among the relation between CC and SD is not only the formal integration of the two concepts into a unique paradigm but also the problem of measuring and establishing valid indicators for assessing the impact of both concepts under a common framework. In fact, a wide range of methodologies, tools and indicators are currently used to evaluate both concepts, although separately and there is definitely a need to provide new and integrated methodologies to overcome such a barrier. One of the cases in which some integrated methodologies between the two concepts are applied, can be found precisely when assessing the CDM, which offers a clear nexus among the two mentioned concepts.

It is herein argued that synergies and tradeoffs between the two concepts are relevant and varies among sectors, systems and regions and they can overlap at epistemological and methodological levels. CC entered the development arena as part of the environmental considerations of the wider agenda of SD in the middle of the 90s and it seems now taking over the SD world agenda due to its potential heavy consequences and impacts as well as the larger amount of money available for facing it. But crucial questions remain to be addressed: how are both concepts going to be integrated in future actions on climate change and how current evaluation and assessment of climate change effects implicitly reflect the adoption of SD principles?

The first part of the chapter deals with a critical literature review of SD and CC while the second one analyses the problem of measuring and assessing both concepts in practice. An important part of the chapter copes with a personal analysis of the lack of consensus at political and scientific level concerning SD and CC concepts both at theoretical and practical level. It is argued that the variety of definition and practices adopted within the SD arena, as well as the raise of the CC issues, poses a complex task for those who translate those concepts into operational frameworks, such as the Clean Development Mechanism itself.

2.1 Sustainable development and climate change: a critical review

SD and CC have been running in parallel for the last two decades until the Intergovernmental Panel on Climate Change (IPCC)¹⁴ in the 4th Assessment report (2007) made a strong case for their union. CC and SD interact in many ways and in a circular fashion (Munasinghe 2007). According to IPCC findings, CC will have an impact on prospects for SD and in turn, alternative development paths will certainly affect future CC. From a climate perspective, which will be taken into account in this thesis, development pathways also increase and determine Greenhouse Gases (GHG) emissions levels and they have strong implication for mitigation strategies as well. Making development more sustainable by changing development paths can make a significant contribution to climate goals. (IPCC 2007).

However, CC and SD are by definition very broad issues that include a wide range of short-term and long-term policy goals, and the application of SD concept to CC studies has led to a number of theoretical and practical issues. This is particularly true for developing countries that since the time of Rio Conference on Sustainable Development in 1992, have adopted SD as a guiding principle for implementation and action in environmental, economic and social fields. For developing countries the combination of efforts to combat global CC and the pursuit of SD must be tackled together. Any global climate regime must have sustainable development as a central goal, at the declaratory as well as operational levels. (Markandya, Haelnes 2002). For developing countries (that now contribute roughly half and the most rapidly rising component of global emissions), the climate issue is, in its essence, a development issue. In fact, a great variety of organizations, ranging from government agencies, international organizations, local governments, ministries, NGOs have using the term as a tool for promoting projects, programmes and even national agendas (like for example Central American

¹⁴ The IPCC assesses the scientific, technical and socio-economic information relevant for the understanding of the risk of human-induced climate change and belongs to the World Meteorological Organization.

states) experiencing and producing different kinds of results, including institutional settings, practices and policy orientation towards the concept. Debates on CC and SD emerged in the research and policy fields in the late '80. On one side, the concept of SD finds its origins in the Bruntland Report, better known with the title of "Our Common Future", in 1987 by the World Commission on Environment and Development under the definition of *"development that meets the needs of the present without compromising the ability of future generations to meet their own needs"*. The 1992 Rio Earth Summit clearly placed SD as a common interest of all countries, developing as well as industrialized; a common interest around which related north–south bargains and issues could then be built on, including CC. The 2002 World Summit on Sustainable Development (WSSD) has tried to reinstate the concept to its intended place at the center of all environmental policy and topics such as climate change should then be considered part of the overall SD policy. This controversial point will be further treated and explained along the thesis.

In general terms, there is a broad consensus that the SD concept requires the adoption of a comprehensive and integrated approach to economical, social and environmental processes. However, discourses of SD have historically focused primarily on the environmental and economic dimensions (Barnett, 2001), while overlooking the need for social, political and/or cultural change (Barnett, 2001; Lehtonen, 2004; Robinson, 2004). Recently, the importance of social, political and cultural factors as well as concepts like poverty, social equity, institutional governance, are slowly but continuously getting more recognition within the international debate of SD. The environment-poverty nexus is in fact well recognized and linkages between SD and the achievement of the Millennium Development Goals (MDGs) for example have been clearly articulated and explored by several authors (Jahan and Umana, Sachs, Banuri 2003). They argue that while the challenge of SD is a common one, countries have to adopt different strategies to advance SD goals that

can derive in different but not coordinated activities. However, the variety of definitions for SD has raised concerns about definitional ambiguity or vagueness (Meadowcroft, 1997; Pezzoli, 1997; Mebratu, 1998). In response, it has been argued that this vagueness may constitute a form of constructive ambiguity that allows different interests to engage in the debate, and the concept to be further refined through implementation (Banuri and Najam, 2002; Robinson, 2004). The concept of SD is not unique in this respect, since its conceptual vagueness bears similarities to other norm-based meta-objectives such as 'democracy,' 'freedom,' and 'justice' (Lafferty, 1996; Meadowcroft, 2000). Major critics of the term SD point to the fact that the term can be used to support cosmetic environmentalism, sometimes called greenwashing, or simply hypocrisy (Athanasidou, 1996; Najam, 1999) or that SD is inherently delusory. Some critics have argued that because biophysical limits constrain the amount of future development that is sustainable, the term SD is itself an oxymoron (Dovers and Handmer, 1993; Mebratu, 1998; Sachs, 1999). This leads to argue for a 'strong sustainability' approach in which natural capital must be preserved since it cannot be substituted by any other form of capital (Pearce et al., 1989; Cabeza Gutes, 1996). Others point out that the concept of sustainable development is anthropocentric, thereby avoiding reformulation of values that may be required to pursue true sustainability (Suzuki and McConnell, 1997). While very different in approach and focus, all these criticisms raise fundamental value questions that go to the heart of present debates about environmental and social issues. With no doubt and over the past few years, SD has become *a catchphrase* for almost all the fields of study, including politics which have embraced it as the new paradigm of development. The above literature review indicates, however, a fragmentation of practices and uses of the concept and a lack of consistency in its interpretation. More important, while the all-encompassing nature of the term gives it conceptual strength, its current formulation by the mainstream of

SD thinking and practice requires major intellectual clarity and rigor in its use (Lelé 2002)¹⁵.

Concerning climate change, evidence is compelling; thousands of scientific publications and in particular the work done by the Intergovernmental Panel of Climate Change (IPCC) - which was set up by the World Meteorological Organization and the United Nations Environment Program - have concluded that the warming of the Earth's climate system is unequivocal and human activities "are very likely" the cause this warming¹⁶. All studies mentioned in the different IPCC reports, converge on the estimation that global average surface temperature during the last century, has increased by 0.74 degrees Celsius. The Fourth Assessment Report (IPCC 2007a) is widely recognized as the principal authority for objective information on CC, its potential impacts, and possible responses to these. This part makes frequent reference to IPCC reports 1 and uses the IPCC definition of climate change. According to this definition, climate change "*refers to a change in the state of the climate that can be identified (e.g. 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. It refers to any change in climate over time, whether due to natural variability or as a result of human activity*"¹⁷.

In fact, many GHG emissions remain in the atmosphere for long periods of time and as result of global warming they will continue to affect the planet and its natural system for several hundred year to come even if emissions were curbed substantially today. But global GHG emissions have roughly doubled since the beginning of the 1970s and current estimates indicate that these emissions will increase in between 25 and 90% from the year 2000 to 2030 both in industrialized and developing countries. The result of these increased emissions will lead to a further rise in global temperatures to a threshold of 2-

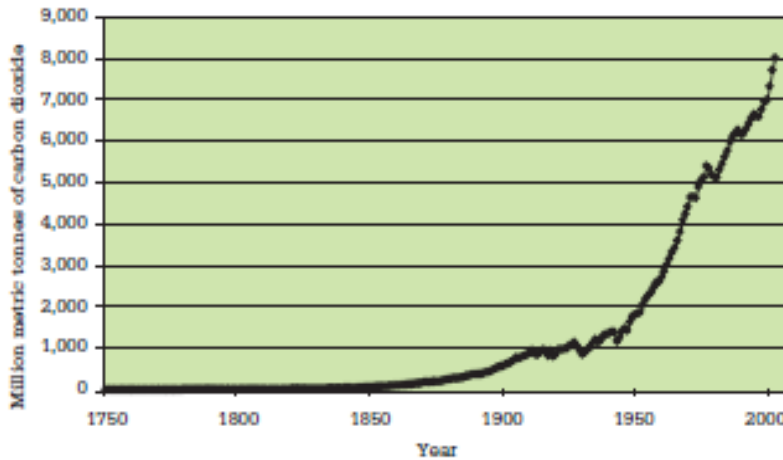
¹⁵ Sustainable development: a critical review 2002 . In World Development.

¹⁶ IPCC, TAR 2001.

¹⁷ IPCC 2007, IV Assessment Report. Synthesis report. Contribution of working group I,II,III.

3 degrees Celsius, which is considered the limit beyond which it may impossible to avoid dangerous interference with the global climate system.¹⁸

Table I: Global carbon dioxide emissions from fossil fuels, 1751-2004



Source: IPCC 2007

Therefore, as GHG and temperatures increase, the impacts from climate change are expected to intensify and become more widespread, with the worst effects to be felt in developing countries, which have less historical contributions to GHG emissions, compare to industrialized countries. Contrary to the SD concept, CC is quite compelling and based on solid groundings, given the physical bases that nurture its evidence. Although SD and CC may share many similarities, both deal with human impact on the environment, they remained largely divided in the literature and in practice for a long period of time. Debates around CC and SD run in parallel for about two decades and were discussed and analyzed in different institutional fields: the natural sciences and social/human sciences. The so-called “*historical divide discourse*” among SD and CC is largely described and reported in the literature (Cohen, Demerit et al. 1998, Markandya and Halsnaes 2002,

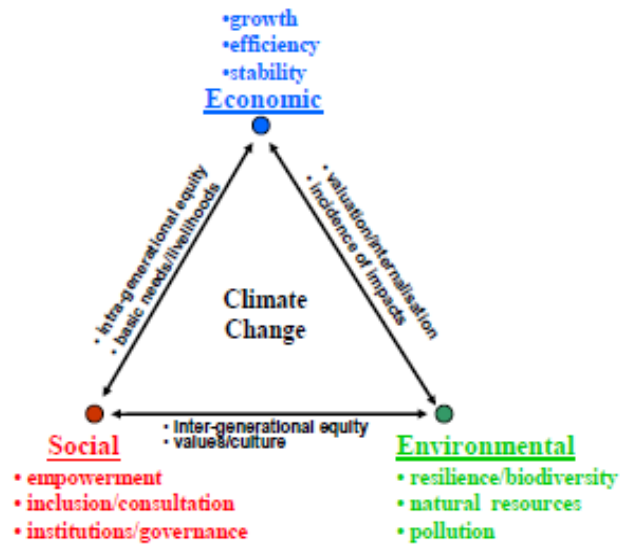
¹⁸ Ibid.

Michaelis 2003, Najam, Rahjam et al. 2003). But it was until the year 2002, with the publication of the Third Assessment report (TAR) by the IPCC and the World Summit on SD in Johannesburg, that the need to link CC and SD as a common framework for integration of the two concepts were made clearer. One of the main results of the IPCC third assessment report was the process to bring into the climate change discussions scientists from other disciplines, especially economics and other social sciences more generally, and from different geographical regions. A conclusion of the TAR was that the ultimate goal of the Climate Convention: the stabilization of atmospheric greenhouse gasses (GHG) is dependent on development paths and socio-economic choices as much as on climate policy.¹⁹ This conclusion was groundbreaking and one of the main arguments used for framing future CC policies into the SD agenda worldwide.

Other contributions to the debate use similar arguments, the so-called “*development first approach*” (Davidson, et al. 2003) which starts from development priorities and integrates climate change vulnerability and GHG emissions considerations, provides a framework for reconciling development and climate concerns (Beg et al., 2002; Davidson et al., 2003; Agrawala, 2005; Bradley and Baumert, 2005; CCAP, 2006; Halsnæs et al., 2008; O’Brien et al., 2008). The resulting climate-inclusive policies aim at development with low vulnerability to CC and development with low greenhouse gas emissions. They look for synergies and for a rational consideration of possible trade-offs between the different dimensions of sustainability. The Development first approach also points out the weakness of a policy architecture which favours cost-effectiveness of CO₂ reductions over equity issues, mitigation over adaptation and global carbon trade over SD.

¹⁹ Munasinghe, CC and SD linkages: points of departure from the IPCC TAR.

Table II: Sustainable development triangle: key elements and interconnections with climate change.



Source: Munasinghe, 2007

2.2 Two-way relationship between SD and climate change

Since 2002, emerging literature has dealt with a range of issues identifying synergies, tradeoffs and empirical models between CC and SD. Many of the contributions tried to formulate climate change as a development issue, given the fact that for many developing countries, which now contribute for half of the global emissions and are growing fast, the climate issue is mainly a development problem rather than an environmental problem (World Development Report 2010). Around the debate between North and South or industrialized vs. Developing countries, there has been since 2002 an important body of literature dealing with the issue, that can be labelled as the “*View from the south*” (Sokona, Najam, Munasinghe, Rahjman 2002, 2003 et al.); the view is mainly focused on the fact that SD is missing from the climate change debate and moreover any solution to climate problems will have to

come from within the development process, and to start, rather than to begin, with developing countries.

Parallel to the above mentioned literature, a number of international journals begun to rise, such as *Climate Policy* that published in 2003 a special supplement on the relation between CC and SD (Grubb 2003) and included some guidelines for future debates on the topic with the following themes: 1) Views from the South, Equity, Adaptation and Poverty, Sustainability and Clean Development Mechanism (CDM).

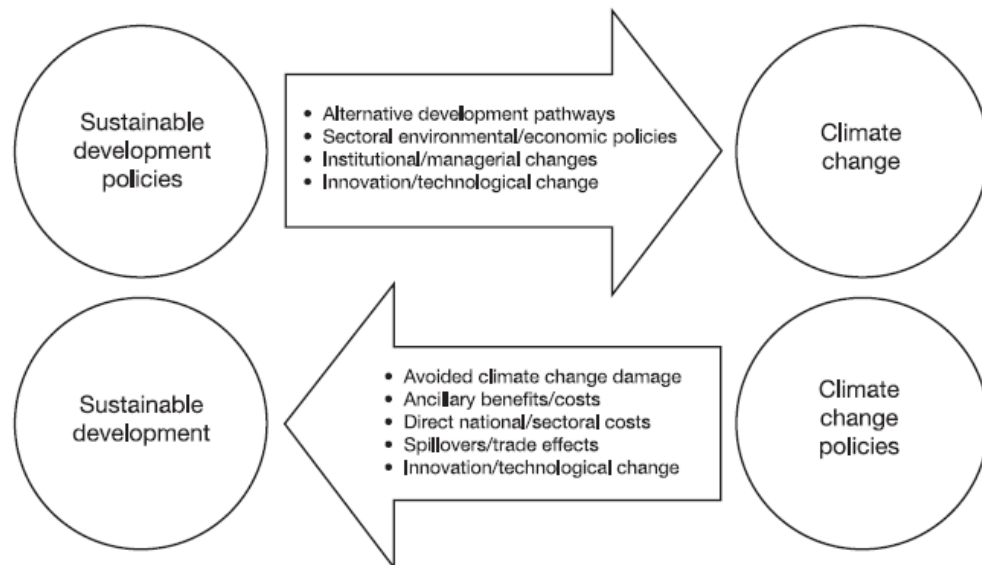
Combating CC is, therefore, vital to the pursuit of SD; equally, the pursuit of SD is integral to lasting CC mitigation. The pursuit of SD is a clearly stated goal of both the UNFCCC and the Kyoto Protocol (see, for example, the preamble and Articles 2 and 3 of UNFCCC and Articles 2 and 10 of the Kyoto Protocol).

Currently, there is wide recognition that adverse impacts of CC are among the contributory factors why SD efforts of the developing countries will not be achieved. This, however, can be addressed if CC adaptation strategies are mainstreamed in SD plans of the country (Huq et al., 2003). Currently, efforts to mainstream climate change mitigation and adaptation in development works are making little headway. This is attributed to the very little interaction of the CC community with the national development planners both in developed and developing countries. Along the debate, some of the previous contributions from Munasinghe (1997), Gupta (1997) were brought again into the discussion, by conceptualizing problems of equity and poverty alleviation.²⁰

²⁰ Equity is in fact a constant issue since the beginning of the debate between CC and SD, revolving around the notions of justice as the core of the global conflict over emissions reductions targets. Studies by Muller (2002) Berk, Metz, (2002), Gherzi, Hourcade, (2003) deal with different principles for equity and share the view that developing countries will play a significant role in determining the success of the multilateral climate change regime under the UN Framework Convention on Climate Change (FCCC). It is equally widely understood that, consequently, success will not be forthcoming unless the key concerns of these countries - particularly those pertaining to inequities - are sufficiently taken into account in the future development of the regime.

With the entry into force of the Kyoto Protocol (2005) and the publications of the IPCC 4th assessment report (2007), as well as the Stern Review on the economics of climate change (Stern 2006) a new attempt to link the two concepts is brought forward. The terms of reference for the IPCC Fourth Assessment Report made explicit and extensive consideration to the links between CC and development; the implications and effects of the interactions of both concepts cross-cutting and must relate aspects of mitigation, adaptation and SD as well as their links with financial resources and technology, the so-called two-way relationship.

Table III: Two-way relationship between CC and SD



Source: Munasinghe, Sustainomics 2004.

The outcomes of the IPCC 4th assessment report made much clear the link between the natural science background, the economic, social and political implications of climate change. The IPCC states that “warming of the climate system is unequivocal” and the Stern Review²¹ stresses that “ignoring climate

²¹ The Stern Report argues that the damages from climate change are large, and that nations should undertake sharp and immediate reductions in greenhouse gas emissions.

change will eventually damage economic growth” while “the benefits of strong, early action considerably outweigh the costs.” These findings resulted in a spread of studies and literature in many fields, leading to the explosion of the climate change issue worldwide. Currently, discussion on climate change includes economic, social and institutional dimensions.

At this time, CC and SD are linked in some international reports (OECD 2005, World Bank 2007, 2008, 2009, 2010, Human Development Report 2007), and other disciplines, such as developmental studies, international relations, international law, government studies, health studies. In particular, within the studies of international development, climate change and global poverty have attracted considerable attention, based on the assumption that climate change cannot be fought without considering the rising energy needs of poor people and countries, nor can we effectively address global poverty without accounting for the impacts of climate change on agriculture, disease patterns and severe weather events, all of which particularly impact the poorest countries. (Prowse, Leo Peskett and Brauholtz, 2007). As previously mentioned and from the perspective of developing countries, CC presents significant threats to the achievement of the Millennium Development Goals (MDGs),²² especially those related to eliminating poverty and hunger and promoting environmental sustainability. An increasing body of evidence points to the disproportionate negative impact that climate change will have on the poorest countries that, ironically, have contributed least to the problem. (UNDP, World Bank, DFID, OECD, 2007 and 2008). Poverty alleviation is, in fact, a core objective for national governments in developing countries. CC is threatening the realization of these policy objectives, because the poor are among the most vulnerable to climate change. Improved access to clean energy will help local development and reduce health problems from indoor air pollution caused by traditional fuel use. So, poor people can benefit most

²² The Millennium Development Goals, adopted in 2000 following the UN Millennium Declaration, set 8 clear and defined goals for global poverty reduction by 2015.

from mainstreaming climate change into development policy (see also Jerneck and Olsson, 2008; O'Brien et al., 2008). The challenge is to make better use of the core instruments of poverty reduction policies, such as the Poverty Reduction Strategies (IMF/World Bank, 2005) and sector-wide approaches that are vital to get access to multilateral and bilateral assistance and broadly to the Official Development Assistance – ODA.²³

Another recent stream of CC and SD studies concern the role of institutions in shaping a better institutional environment for mitigation and adaptation processes. The link between the two was given by the implementation of the Clean Development Mechanism (CDM), as a tool to promote SD in developing countries and curbing emissions in the industrialized countries (Olsen 2007). Although the topic will be treated further on in the thesis, most of the literature on CDM and institution building stresses the important for CDM projects to be effective within a solid host country institutional framework (Figueres 2004, 2005, Michaelowa 2006, UNEP Risoe 2005).

As shown in this review, there are many ways to deal with the two concepts although much work still needs to be done in empirical terms to support the link between the two concepts.²⁴ Both have tended to develop their own language and collection of acronyms, communities of interest, policies, business²⁵, negotiating skills and implementation mechanisms, such as the CDM which is meant to provide an example of the possible practical linkages between the two concepts. However, the link between theory and practice of CC and SD must be strengthened. In current times, there is a risk that such powerful frameworks, which are used for negotiating environmental issues, as well as, a tool for systemic change among industrialized and developing countries can turn to an ineffectual and promising practice in the international

²³ Kok M, Metz B, Verhagen j, Van Rooijen S, Integrating development and climate policies: national and international benefits. Climate Policy 2009.

²⁴ T. Banuri and al.: *Setting the stage: climate change and sustainable development*. Climate change review, 2001.

²⁵ An entire new industry sector is building up around climate change, covering renewable energy (wind, solar, wave, biofuels), carbon trading, carbon offsets, technology development, carbon capture and sequestration, and disaster insurance, etc.

diplomatic rhetoric. Current international negotiations status on climate change clearly reflects this situation.

2.3 The “*politization*” of the discourse on sustainable development and climate change

The rise of SD since the 1980s both at theoretical and practical levels has been accompanied by its use and exploitation within the political arena, with increasing emphasis more on the discourse related to the concept of sustainable development rather than practical advances in development practice. Since 1990s, it can be argued that the SD concept has focused more on its meta-narrative value which permeated the discourse for example within the Millennium development goals, in the governance field, in the civil society and NGOs rhetoric and even into the somewhat nebulous concept of Corporate Social Responsibility (CSR). A derivation of the use of the concept in this manner, led to a broader consideration of the term "sustainable development" to be too closely linked with continued material and economic development, leaving aside other important dimensions of SD such as the environmental and social ones. Concerning CC, theory and policy discourse reveals an array of initiatives stemming from different interpretations. Most CC policy is currently in less radical, reformist approaches to SD that are market based and utilitarian, exemplified by a focus on energy efficiency and international political agreements. Some climate change discourse and policy is related to more radical interpretations of SD, principally concerning equity, resource and consumption limits as well as climate justice concerns.

Going back to the issue of an SD concept trapped into a political discourse, there are in fact over 100 definitions of sustainability and SD and they fit depending upon international as well as local circumstances. SD concept political differentiation and its misuse, stem in part from tensions between economic and ecological values. Green development for example, is generally differentiated from SD in that the former prioritizes what its proponents consider to be environmental sustainability over economic and

cultural considerations. However, a distinction between different degrees of sustainability should be made. The policy debate on SD currently focuses on the sustainability of the economy and to lesser extent to the environment, which is also the debate about the relation between natural capital (the sum total of nature's resources) and man-made capital. This for example the SD approach adopted in developing countries, like Mexico. According to this broad explanation, it can be found an approach to both weak and strong sustainability. In particular, a weak sustainability concern views that states that as long as total capital remains constant, sustainable development can be achieved. Policy proponents of *weak sustainability* believe that economic growth is beneficial, as increased levels of income lead to increased levels of environmental protectionism. Conversely, those who envisage political discourse of *strong sustainability*, that natural capital and man-made capital are only complementary at best. In order for SD to be achieved, natural capital has to be kept constant independently from man-made capital. Under these views, SD has rapidly become the dominant idea, or discourse, shaping international policy towards the environment. Social meanings of SD were introduced in the already mentioned report *Our Common Future*, or Brundtland Report. The Report popularised the notion of SD so successfully that it has since been taken up by almost every international institution, agency and NGO.

The principles of SD underpinned the Rio Earth Summit agenda where approval was given to the *Agenda 21* document outlining a 'global partnership for sustainable development'. This massive document addresses a wide range of environmental and developmental issues and is intended to provide a strategy for implementing SD throughout the world. The UN Commission on Sustainable Development (CSD) was created to monitor and promote the implementation of *Agenda 21* in each country. By the mid-1990s most industrialised countries had published national SD strategies, and many local authorities have launched Local Agenda 21 strategies. Concerning Agenda 21, it can be briefly said that it was shaped largely by Northern elites

(governments in close association with large transnational corporations) and concensed during the Rio summit in 1992. Much of the environmental movement was co-opted into this process and remains profoundly weakened by its continued involvement. Agenda 21 sells a vision of global ecology which defines the major problems of the Earth in Northern elite and scientific terms (global warming, population growth, species extinction) while largely ignoring the key environmental issues as defined by the majority of the people, both in the North and the South. Agenda 21 has also been successful in selling a concept of sustainable development which continues to promote the “Enlightenment” goals of progress through economic growth and industrialization at all costs, at the expenses of the environment and the south. Agenda 21 also advances the globalisation of radical libertarian market systems, providing a framework for defending the environment based on the payment for environmental services (PES) and all the neoliberal technical responses to environmental concerns. The core idea of PES is that external beneficiaries make direct, contractual and conditional payments to local landholders and users in return for adopting practices that secure ecosystem conservation and restoration.

The wider use of SD practices derived from the Agenda 21 has extended far beyond government and went into the world of business and civil society. International institutions such as The World Bank has sought to change its poor reputation with environmentalists by publishing environmental reports, holding regular seminars and sponsoring research on a wide range of environmental issues. The World Bank also hosts the Global Environmental Facility (GEF), which is the institution responsible for channelling financial assistance for SD from Northern to Southern nations. The World Business Council for Sustainable Development (WBCSD), formed in 1995, is a coalition of 125 international companies from 30 countries and over 20 industrial sectors, with the broad aim of developing 'closer cooperation between business, government and all other organisations concerned with the environment and sustainable. Many trade associations have also declared

their support for sustainable development; for example, the insurance industry (which potentially has much to lose if climate change leads to rising sea levels, floods and storms) issued a *Statement of Environmental Commitment* in March 1995 signed by over 50 leading insurance companies. These international efforts have been then widely replicated at the national level, following the 1992 Rio Summit, where state-sponsored round-tables have brought together representatives from all sections of society--politicians, business, trade unions, churches, and environmental groups, consumer groups--to discuss how sustainable development can be implemented. But despite this widespread enthusiasm, the precise meaning of SD and its practical use remains elusive.

A central feature of SD as a policy paradigm is that it shifts the terms of debate from traditional environmentalism, with its primary focus on environmental protection, to the notion of sustainability, which requires a much more complex process of trading off social, economic and environmental priorities. The promise of SD is that it seems to offer a way out of the economy versus environment impasse: growth is seen as a 'good thing' because it enables less developed countries to develop and so improve the standard of living of their impoverished citizens, while the material quality of life in the North can be kept saved. SD therefore involves a process of change in which it supposes that somehow, core components of society, together with investments, technologies, institutions, consumption patterns and so forth, come to operate in harmony with ecosystems. These characteristics of SD attracted a wide array of supporters, but they also make the concept highly contestable. The core principles also beg unresolved political questions. For example, if we look at the definition posed by the Bruntland report, what are the basic needs? Should they reflect the needs of citizens for example in the USA or Rwanda? How far will the living standards of rich industrialised nations have to be adjusted to achieve sustainable consumption patterns? Different answers to these questions produce conflicting interpretations of SD and they are the roots of current ambiguities

and misinterpretation or misuse of the concept in political terms. Consequently, policy-makers have been able to pick and choose for example from the contradictory ideas in the already mentioned Agenda 21 document while the endless publication of reports, books and guides seemed to have fuelled as much disagreement as it has encouraged consensus around the concept itself. The proliferation of meanings and use of the terms therefore, underlie *'different interests with different substantive concerns trying to stake their claims in the sustainable development territory'*²⁶. With the passing of time and the spreading of the SD discourse, key interests have begun to identify SD as a tool to satisfy its own purposes. Thus an African government might emphasise the need for global redistribution of wealth from North to South in order to eliminate poverty, while an industrialized country or transnational corporation may look at sustainability as a paradigm to overcome poverty, provide for human welfare and keeping the growth sustainable while preserving the environment. At the end of the above reflections, does it matter that so many versions of SD exist and that there is so much disagreement about its meaning? As previously mentioned and compared to such powerful concepts such as justice and democracy, SD development is widely seen as a simply as a 'good thing' and has a generally accepted common-sense meaning within broad boundaries. Can therefore such a wide-ranging set of ideas be turned into practical policy proposals? Although for example the wide-ranging Agenda 21 document contains many practical suggestions, there is no compact toolkit setting out the policies and instruments needed for sustainable development. The nature and the degree of support and the use of SD will then vary in many ways. Different actors will attribute different meanings to each principle of SD and how far each principle is turned from rhetoric into reality will also depend on which version of sustainable development is in play. Without a clear meaning almost anything could be said to be sustainable. A universally acceptable definition is needed, with a list of measurable criteria against which it would be possible to judge

²⁶ (John Dryzek, *The Politics of the Earth*, 1997, p.124)

progress towards sustainability. Policy-makers would also benefit from a clear technical definition to help them implement SD in practice.

Concerning CC, the topic is also been trapped in a strong political discourse. Despite the alleged neutrality of the concept (almost everybody agrees that we must do something against global warming), the topic has been recently charged with geopolitical and geostrategic connections. International negotiations on climate change are very much linked to political and national interests, in particular with reference to energy and economic issues. Has it usually happens with politics, an environmental issue such as climate change, turned to be the centre stage of world future developments, linking economic, security, social and environmental issues. At present, public discussion of CC tends to be partial and disparate. Loosely connected debates hinge on the evidence that climate change is occurring and estimates of its potential impact; the prospects for agreeing an international framework for an economic response to, for instance, carbon trading; others envisage the potential for technological innovation that could solve the problem and many scenarios are drawn with the aim to emphasise the necessity for dramatic lifestyle changes in both industrialized and developing countries. Compared to SD, CC has also moved to the centre stage of public concern in a remarkable way and in a very short space of time and it has assumed a very large presence in discussion and debate across the world. The topic is spawning an immense literature produced by scientists, academics and journalists. Many books, likewise SD, have been written about the “politics of climate change”, they tend to be about such international agreements but also a clear division can be spot among the CC debate. Three different positions can be distinguished in this respect. First, there are the climate change sceptics, who claim the case that present-day processes of global warming are produced by human activity is not proven. Fluctuations in climate are produced by natural causes and have been a constant feature of world history and nowadays there is no difference with past situations.

Others accept that CC is happening and that it is humanly induced, but argue that the threat it poses has been largely exaggerated and much is still needed to be investigated in order to prove the relation between scientific evidence and the real threat to humanity. For them, other world problems, such as poverty, Aids, or the possible spread of nuclear weapons, are both more worrying and present more pressing dangers than CC. The sceptics have dwindled significantly in numbers in recent years as the science of CC has progressed, but they still get a significant hearing.²⁷ Secondly, there is a mainstream view about CC, of those who strongly believe in the publications of the IPCC. The IPCC has had an enormous influence over world thinking on climate change—in so far as there is a consensus about its extent and dangers, it has played a large part in building it. Those who are sceptical about CC see the IPCC as the enemy of free and proper scientific thinking. However, there is a further divergence of opinion today, between the mainstream and authors and researchers who think climate change poses even greater, and more urgent, threats than is ordinarily acknowledged and immediate actions are needed.

Thus, the CC debate and discourse is highly polarized and politicized and likewise SD, CC practices are spreading and representing a wide range of epistemological and operational aspects. Again, as in the case of SD, CC has been recently characterized by the influence of economics and in the light of the previously mentioned Stern report, a “package” of economic measures (costing impacts, carbon markets, mitigation and adaptation models) have become the central tenet. Economic growth is required to reduce poverty, and the environment can be then valued through the market in a “green growth” approach. This is currently the main issue, together with the idea that anthropogenic climate change – due to high level of GHG emissions from industrialized processes, is perceived as a problem of energy provision and the combination of supply and demand sides. A final remark must be done with reference to populism around CC: in political terms, at international,

²⁷ A. Giddens; *The Politics of Climate Change*. London 2008.

national and local level, climate change concerns has been focused on the creation and adoption of a mixture of adaptation and mitigation actions. Results on the ground level, need however to be further proven since many of the actions in the past 10 years have been mostly confined to wealthier economies, who mostly contribute to the problem. The mainstreaming adaptation and mitigation discourse is just beginning to enter the developing world, while substantial arguments such as equity and responsibility (limit of emissions), ecological debt and others, are still played in larger political scales (Washington, Brussels, London, Tokyo) or international negotiations. So, how can such different perspectives on SD and CC can be translated into a framework for policy actions and more specifically how such a mosaic of concepts and definitions can offer a solid background for the implementation of the CDM within developing countries? And how would we expect good results from the CDM when the broader picture is so shaky and undefined? Bearing these critics and contradictions in mind, chapter 4 will analyze the concept of sustainable development in Mexico, how it is brought forward and how CDM can contribute to the country improvement of SD policies. To make it more complex, it is worth noting that Mexico applies its own concept of SD as well as CC practices who are based on national strategic, economic and political interests.

2.4 Sustainable development, climate change and the Millennium Development Goals in Latin America

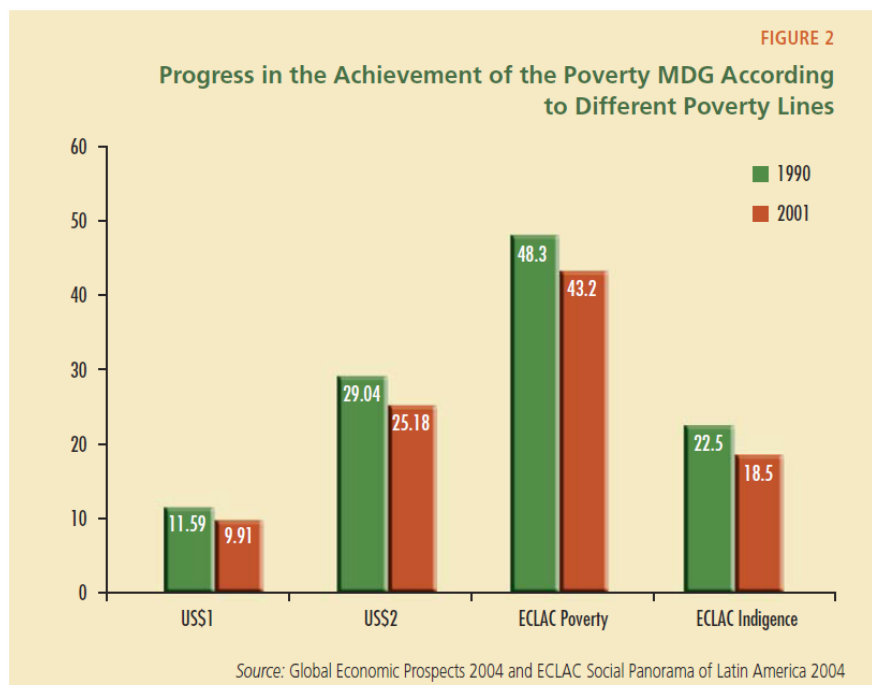
In the large group of world developing countries, SD and CC are necessarily associated with the Millennium Development Goals (MDGs), an overarching scheme of international cooperation adopted by the UN in the year 2000 which aims to reduce poverty worldwide by 2015. While many developing countries remain the most vulnerable to the threats produced by CC, they have limited capacity to address the climate crisis and forging better national SD policies. This is also the case of some Latin American countries, including Mexico. In this section, it will be briefly analyzed the relationship between climate change policies in Latin America vs. the compliance of the MDG goal n.7, which specifically addresses the topic of SD. Progress so far toward achieving the MDGs in Latin America has been mixed. Latin American countries still face the challenge of promoting innovative solutions and integrated policies that simultaneously generate economic and social well-being, foster productive development and guarantee environmental sustainability. Shortcomings with respect to environmental governance, however (particularly as regards mechanisms for measurement, financing, technology transfer and coordination between the global, national and local levels), have resulted in the inequitable distribution of the costs and responsibilities involved, to the detriment of the most disadvantaged countries and sectors, which also have to contend with local environmental challenges in their own development processes. (UNDP: 2008). Even though progress to reduce poverty has been insufficient, the region is on track to meet the goal of reducing by half the proportion of people suffering for example from hunger between 1990 and 2015. Other significant progresses have been made in reducing the percentage of the population with less than the minimum consumption of food energy, the elimination of gender disparities in primary and with respect to the goal of reducing the maternal mortality ratio, there is an increase by three quarters between 1990 and 2015. With respect to the goal of halting the spread of HIV/AIDS and the incidence of

malaria and other major diseases by 2015 and beginning their reversal: the number of people infected with HIV increased between 2002 and 2004. However, for the environment MDGs (n.7), which is of main interest for his thesis, the scope of environmental sustainability in Latin America (and the Caribbean) presents a great challenge. Current situations point to a very serious deterioration of the environment and a depreciation of natural capital, which has significant impacts on health, productivity and income, physical vulnerability and the quality of life. (IADB, 2008)

One complexity in monitoring MDG7 progress is lack of a framework or means of integrating different components of environmental sustainability. While MDG7 contains elements that contribute to environmental sustainability, when added together, they do not yield a full portrait. Issues such as the availability of quality arable land and the productivity of fish stocks for example are not flagged and tracked in the framework. This weakness can be exacerbated at the national level if countries mechanically adopt the global set of targets and indicators without explicitly linking them to national priorities and policies, local context, and sub-national or ecosystem specificities. That is also happening in the case of Mexico. Moreover, unlike the other MDGs, there are no universal standard quantitative targets set for MDG7, nor a universal understanding. Indeed, Target 9 under MDG7, '*integrating the principles of sustainable development into country policies and programs and reversing the loss of environmental resources*', is the only one of 18 MDG targets that is qualitative rather than quantitative. The fact that Target 9 is the sole qualitative MDG target, coupled with the holistic and complex nature of environmental sustainability, makes it especially challenging to measure progress toward this target at the global and country levels. There is also no blueprint for integrating the principles of sustainable development into country policies and programs. Analysis of country reports on progress towards achieving the MDGs reveals that monitoring and reporting on reaching MDG7 needs to be strengthened significantly.

In fact, it is clear that, for the region, the fulfillment of the stipulated targets would in no way “ensure environmental sustainability”. In general, there is a lack of proportion between the broad formulation of Goal 7 and the specificity of the targets and indicators proposed. This underscores the need to pursue efforts to measure the sustainability of development. In seeking to define and harmonize official national environmental statistics, institutes of statistics and other national agencies in the region need to agree on common criteria for measuring the sustainability of development.

Figure II: MDGs and the achievement of poverty in Latin America



After this brief sketch of MDGs and SD, few personal comments can also be added. The first deals with the fact that progress towards the achievement of the MDGs and in particular the MDG7 can be seriously affected by CC effects and its impacts. Since the MDGs treat environmental sustainability as a sub-goal rather than a precondition for development, and since most development advances have relied on a fossil based growth model, there is an inherent conflict between the development agenda and required mitigation actions. To resolve the dichotomy between development and the climate agenda, it is

important to build on activities that decouple emission growth from development achievements. This is the case of most developing nations in Latin America, such as Mexico, Brazil, Chile and Argentina, who all carry on two paths of development, based on the exploitation of natural resources and the de-carbonization of the economy. Secondly, it is necessary for those countries, to apply nationally defined strategies to achieve mainstreaming of adaptation and mitigation: different options exist to enhance integration of climate issues into development. Depending on national circumstances, ministries of the environment (usually charged with climate policy) could be strengthened, or ministries responsible for development could be moved by availability of external funding. Specific adaptation or climate change strategies also have the potential to drive integration into other policies.

A third important point can be the importance of taking actions towards MDG, mitigation and adaptation as investments for the future: required actions can be regarded as two large investment packages, comprising political, financial and capacity investments: a low-carbon development investment package into energy- and climate security (renewables, energy efficiency and energy grids), and a climate resilient development investment package into MDG related actions of socio-economic development, poverty reduction, access to food and water, health interventions, as well as, more specific interventions into climate expertise or risk reduction. As the organization German Watch points out *“it is important to avoid trade-offs between MDGs and climate agenda: Transformation in poverty alleviation, in adaptation and mitigation requires public and private investments in the order of hundreds of billions of dollars. A political framework needs to be developed to incentivize private investment necessary for mitigation actions. This includes high mitigation targets in developed countries to foster carbon markets. This would allow for example development assistance to focus on development objectives and co-benefits in delivering mitigation actions. In adaptation a concept of additionality should be*

*applied on the side of resource generation, to ensure new resources and to avoid a shift of money”.*²⁸ Although treated extensively in chapter IV, and considering the case of Mexico in particular, it can be said that, that SD implementation policies to fulfill MDGs goals, SD and CC in Mexico are undermined by the great challenges faced by the country in broader political, economic and social conditions.

2.5 Measuring climate change and sustainable development

Whenever there is an attempt to establish an assessment or to provide empirical evidence of related effects between CC and SD, research do come across with the problem of measuring such impacts and setting up reliable and strong indicators to assess those impacts. One response has been the development of greatly improved monitoring, analytical techniques, and standards, in order to verify claims about sustainable practices. The complexity of measuring CC and SD relies on two important issues: concerning CC there is no single instrument measuring it but there are instead thousands of measuring devices spread across the globe, on land, under the sea and in the air. In the climate change measurement the main problem to face is the concept of uncertainty²⁹, which can modify scenarios and predictions in considerable ways. While the SD concept is not only difficult to define with precision but it also difficult to be measured and several dimensions and indicators must be taken into account at the same time (economic, environmental, social and political) when used.

According to the TAR- IPCC, measurement not only gauges but also spurs the implementation of SD and can have a pervasive effect on decision-

²⁸ *The millennium development goals and climate change: taking stock and looking ahead.*
<http://www.germanwatch.org/klima/klimdmg10e.pdf>

²⁹ Uncertainties can be classified in several different ways according to their origin. Two primary types are ‘value uncertainties’ and ‘structural uncertainties’. Value uncertainties arise from the incomplete determination of particular values or results, for example, when data are inaccurate or not fully representative of the phenomenon of interest. Structural uncertainties arise from an incomplete understanding of the processes that control particular values or results, for example, when the conceptual framework or model used for analysis does not include all the relevant processes or relationships.

making (Meadows, 1998; Bossel, 1999). In the CC context, measurement plays an essential role in setting and monitoring progress towards specific CC related commitments both in the mitigation and adaptation context (CIESIN, 1996-2001). This section provides a brief overview of existing approaches to measuring CC and SD in countries and international institutions. As will be seen, there is much diversity among these approaches and, yet, a considerable degree of commonality with respect to themes and individual indicators.

Starting with CC, it can be said that the climate system is a complex, interactive system consisting of the atmosphere, land surface, snow and ice, oceans and other bodies of water, and living things. Climate is often defined as 'average weather' and it is usually described in terms of the mean and variability of temperature, precipitation and wind over a period of time, ranging from months to millions of years. Countless empirical tests of numerous different hypotheses have now built up a massive body of Earth science knowledge. This repeated testing has refined the understanding of many aspects of the climate system, from deep oceanic circulation to stratospheric chemistry. Sometimes a combination of observations and models can be used to test planetary-scale hypotheses. models. Climate science in recent decades has seen an increasing rate of advancement, particularly in field research and notably through the evolution of measuring climate change methodology and tools, including the models and observations that support and enable the research. During the last four decades, the rate at which scientists have added to the body of knowledge of atmospheric and oceanic processes has accelerated dramatically. Main instruments used when measuring CC can be summarized in the following table:

Instruments	Description
Temperature	When measuring climate change, this is primary and can be measured or reconstructed for the Earth's surface, and sea surface temperature (SST).
Precipitation	rainfall, snowfall etc) offers another indicator of relative climate variation and may include humidity or water balance, and water quality
Biomass	vegetation patterns may be discerned in a variety of ways and provide evidence of how ecosystems change to adapt to climate change.
Sea Level	measurements reflect changes in shoreline and usually relate to the degree of ice coverage in high latitudes and elevations
Solar Activity	It can influence climate, primarily through changes in the intensity of solar radiation.
Volcanic Eruptions	like solar radiation, can alter climate due to the aerosols that are emitted into the atmosphere and alter climate patterns.
GHG emissions	This is the last and important indicator used. Human induced activity through mainly CO ₂ emissions can alter the climate variability.

Source: personal elaboration based on the IPCC 4th AR

Therefore, in understanding global climate changes it is necessary to combine many disciplines, including oceanography, meteorology, geomorphology, geology and paleoclimatology as well as combining interdisciplinary studies, including social sciences. A final remark when measuring CC deals with the role of above mentioned uncertainty concept. Uncertainty plays an important role in limiting the predictive capacity of our results and it can lead to errors, as it happened in some occasions. Advancement in studies related to the understanding and treatment of uncertainty are already undergoing in scientific community from different approaches.

Concerning SD, the establishment of indicators to assess its impact has been a major issue since its inception. Many countries and institutions have begun to establish indicators as a key opportunity to move environmental issues higher up the policy agenda alongside economic and social issues and

indicators have also been instrumental in promoting the concept in a much clearer way than can be achieved through national SD strategies alone. (OECD 2008). Agenda 21 explicitly recognizes the need for quantitative indicators at various levels (local, provincial, national and international) of the status and trends of the planet's ecosystems, economic activities and social wellbeing (United Nations, 1993). The need for further work on indicators at national and other levels was confirmed by the Johannesburg Plan of Implementation (UNEP, 2002). As pointed out by Meadows (1998), indicators are ubiquitous, but when poorly chosen create serious malfunctions in socio-economic and ecological systems. Recognizing the shortcomings of mainstream measures, such as GDP, in managing the SD process, alternative indicator systems have been developed and used by an increasing number of entities in various spatial, thematic and organizational contexts (Moldan et al., 1997; IISD, 2006). Development indicators are also driven by the increasing emphasis on accountability in the context of sustainable development governance and strategy initiatives. In their compilation and analysis of national sustainable development strategies, Swanson et al. (2004) emphasize that indicators need to be tied to expected outcomes, policy priorities and implementation mechanisms. As such, the development of indicators may best be integrated with a process for setting sustainable development objectives and targets, but have an important role in all stages of the strategic policy cycle. Once priority issues are identified, SMART indicators: indicators that are specific, measurable, achievable, relevant/realistic and time-bound, need to be developed.

Figure III: Macro indicators used to measure SD

Approaches	Description
Socio-natural sectors (or systems) approach	It focuses on sustainability as an equilibrium between the three pillars of sustainable development (environmental, economic and social) but which overlooks development aspects
Resources approach	concentrates on sustainable use of natural resources but ignores development issues
human approach	based on human well-being, basic needs
Normative approach	It foresees sustainable development in normative terms (rules, regulations, laws, etc.)

Source: (personal elaboration based on Boulanger 2004)

It is worth remembering that indicators used in SD typically builds on a conceptual framework serving as a link between relevant world views, sustainability issues and specific dimensions of the problem. Some of the more common ones include the pressure-state-impact framework (DPSIR) and capital-based frameworks covering social, environmental and economic domains. Another commonly accepted framework uses a classification scheme that groups sustainability issues and indicators according to social, ecological, economic, and in some cases, also institutional categories. Several indicator systems developed at international and national level have adopted a capital-based framework following the above categories. As it can be seen, there is a very broad list of items, tools, indicators and techniques employed to assess SD. These reflect the inherent malleability of the concept itself as well as the different backgrounds and knowledge available for measurement efforts. Combining global, national, and local initiatives, there are literally hundreds of efforts to define appropriate indicators and to measure them in relation with SD. Roughly, half of the existing methods are global in coverage, using country or regional data (the UN Commission on Sustainable Development, Consultative Group on Sustainable Development Indicators, Wellbeing Index, Environmental Sustainability Index, Global

Scenario Group, and the Ecological Footprint). Of the remaining efforts, three were country studies (in the United States, the Genuine Progress Indicator and the Interagency Working Group on SD Indicators, and in Costa Rica, the System of Indicators for Sustainable Development); the other half is done at regional or local level with a variety of approaches and where stakeholders are identified with corporations, investors, regulatory agencies, and civil society groups representing not homogeneous views of SD.

Two broad comments can be made in order to analyze the SD measurement issue: the first deals with a large fragmentation and no general consensus on what indicators and approaches must be adopted and under which circumstances. Sustainable development is a difficult issue to measure and there is no agreed method to assess its impact. Regarding the assembling of large numbers of indicators, many actors, and in particular the NGOs, tend to aggregate them to reflect their distinctive vision of sustainability. The result is a mosaic of methodologies, techniques and tools that lead to very different results and interpretations.

A second observation is that current indicators and methods are not explicit about the time period in which SD should be considered (short or long term). Despite the emphasis in the standard definition on intergenerational equity, there seems to be in most indicators a focus on the immediate or very short term benefits. Three exceptions, however, are worth noting: The UN Commission on SD uses some human development indicators defined in terms of a single generation (15–25 years), the Global Scenario Group quantifies its scenarios through 2050 (approximately two generations), and the Ecological Footprint argues that in the long run an environmental footprint larger than one Earth cannot be sustained. Overall, these diverse indicator efforts reflect the ambiguous time horizon of the standard definition—“now and in the future.” But generally speaking, the majority of existing indicators and methods assess short term impacts. Now, given the broad definition of the concept of SD and the peculiarities of CC measurement, how can both be linked under a common framework of indicators? And can they be measured

on the same conceptual basis? To overcome the difficult answer, the IPCC and other international institutions such as the OECD, the World Bank, and the research community have begun in the last few years to propose different approaches and indicators to solve the problem. The main problem is that many of SD approaches and indicators integrate, though not necessarily focus on, aspects of climate change. One approach to indicator development focused on monetary measures and involves adjustment to the GDP. These include, for example, calculation of genuine savings (Hamilton and et al., 1997; Pearce, 2000), Sustainable National Income (Hueting, 1993), and efforts to develop a measure of sustainability. In an attempt to aggregate and express resource consumption and human impact in the context of a finite earth, a number of indices based on non-monetary, physical measures were created. These indices may be based on the concepts of environmental space or ecospace, and ecological footprint (Wackernagel and Rees, 1996; Venetoulis et al., 2004).

At the United Nations, the Division for Sustainable Development led the work on developing a set of methodology sheets for sustainability indicators that integrate several relevant for climate change from the mitigation and adaptation point of view (UNSD, 2006). Also, the UNECE/Eurostat/OECD Working Group on Statistics for Sustainable Development is developing a conceptual framework for measuring SD and recommendations for indicator sets.

But a lot remains to be done in order to overcome the problem and it seems clear that keeping a broader perspective is essential, as CC, including its drivers, impacts and related responses, transcend many sectors and issue categories like the SD concept. Indicators are needed in order to identify and analyze systemic risks and opportunities both in adaptation and mitigation. Currently, in the mitigation context, quantifying emissions and their underlying driving forces is an essential component of management and accountability mechanisms. GHG emissions accounting is a major field and is guided by

increasingly detailed methodology standards and protocols in both the public and private sector (WBCSD, 2004). For example, the energy sector offer an important space for developing integrated indicators, given that they may focus on absolute or efficiency measures (Herzog and Baumert, 2006). Absolute measures help track aggregate emissions that can thus quantify the direct pressure of human activities on the climate system. The Global Reporting Initiative (GRI) is also a multi-stakeholder process whose mission is to develop and disseminate globally applicable Sustainability Reporting Guidelines. These Guidelines are for voluntary use by organizations for reporting on the economic, environmental, and social dimensions of their activities, products, and services.

In conclusion, tools for measuring progress towards SD have been put in place in the past 20 years within several institutions, state and organizations and continuous refinement and uptake of the indicators is occurring in many sectors of the society, including business and NGOs. The same can be said for climate change indicators and tools for measuring it, together with social indicators coming from the human induced activity which is altering climate variability (global warming). The relevant point herein, which transcends the aim of the present dissertation, deals with the need to integrate indicators and assessment models under a common framework for both SD and CC, which will help to understand and further clear the nexus between the two concepts and their related common impacts.

2.6 Assessing mitigation actions: recent developments

Current dissertation will place more emphasis on the mitigation aspect instead of adaptation, since it is dealing with the role of the flexible mechanisms included in the Kyoto Protocol which are meant to support CC mitigation efforts worldwide. In fact, the projections of future climate change impacts and related effects have created a general strong concern about the need for increased efforts focused on CC mitigation measurements. Before looking at the topic it will be herein briefly described the meaning of mitigation and adaptation within CC.

Mitigation refers to policies and options aimed at reducing GHG or at enhancing the so-called “sinks” (such as oceans and forests) which can absorb carbon or carbon dioxide from the atmosphere in short terms. Adaptation instead refers to long term responses that can help to diminish the negative impacts of climate change or to exploit its potential benefits. As put by the IPCC words, *mitigation reduces the rate and magnitude of climate change and its associated impacts, whereas adaptation reduces the consequences of those impacts by increasing the ability of humans or ecosystems to cope with the changes.*³⁰ Mitigation and adaptation also differ in terms of timescales and geographical location. Although the costs of emission reductions are often specific to the location where the reduction scheme is brought into action, the benefits are long term and worldwide, since emission reductions contribute to decreasing overall atmospheric concentrations of greenhouse gases. In overall terms there is a very broad consensus in the scientific community– as reflected in the above mentioned literature by the IPCC, the Stern Review and the International Energy Agency (IEA, 2006a) – that GHG emissions must be dramatically reduced to limit the severity of climate change impacts on developing and developed countries alike. GHG arise from almost all economic activities and aspects of society,

³⁰ IPCC: Climate change 2007: Mitigation. Contribution of working group III.

indicating that the range of practices and technologies potentially available for achieving GHG reductions is broad and diverse.

By volume, the largest contribution to GHG is accounted for by power generation (electricity and heat production and transformation), followed by industry and fuel combustion. Land-use change, through deforestation and forest degradation, is estimated to account for more emissions globally than the entire transport sector, and emissions arising from agriculture are roughly the same as emissions from transportation. The literature on this topic consequently focuses on the following seven major sectors for assessing mitigation impacts: buildings, transport, industry, energy supply, agriculture, forestry, and waste³¹. Targets to curb GHG at global level are however established in international negotiations which are determined by scientific knowledge, impacts of concentration in the atmosphere and of course by a political agreement among major emitters and developing countries. Costs of achieving stabilization targets to GHG emissions correspond to different scenarios of CO₂ level concentrations.(IPCC 2002)

The two stabilization targets that have been most widely discussed by scientists and policy-makers fall within the concentration ranges of 445-490 parts per million (ppm) and 535-590 ppm CO₂-eq. The first target has been backed primarily by the European Union, which advocates limiting global warming to a 2° C increase in temperature, in order to avoid dangerous anthropogenic interference with the climate system. The second target, more specifically of 550 ppm CO₂- equivalent (CO₂-eq), which would correspond to a temperature increase of around 3° C, has been more extensively studied in science, including by the IPCC.

Key options for climate change mitigation can be found in the using energy more efficiently to reduce the emissions from fossil fuel use, switching to zero- or low-carbon energy technologies; reducing deforestation; and introducing better farming practices and waste treatment. There seems to be

³¹ IPCC, Summary for policymakers.

general agreement on these options and their importance in the literature on the topic (IPCC, 2007e, IEA, 2006c, 2008, and Pacala and Socolow, 2004). In addition, many studies around the world have demonstrated that there is significant potential for low-cost mitigation opportunities such as the increased use of renewable energy sources, energy efficiency improvement, reduced deforestation and land degradation, and improved land and forestry management (Smith et al., 2007). A variety of options in the form of technologies and practices are available for reducing GHG and several studies have been carried on to show that even ambitious emissions cut can be achieved through the adoption of existing technologies, practices and political will. For purposes of the CDM, emission reductions are the difference between a counterfactual baseline emission level and the actual project emissions. The counterfactual baseline scenario is defined at the time of project validation. The calculation of the respective baseline emissions is based on a baseline 'methodology' - either an existing (already approved methodology by the CDM Executive Board – EB -), or a new methodology developed specifically for the project (also requiring the approval of the CDM-EB).

A recent and important development in terms of linking specific mitigation measures with local development initiatives, is the so called Nationally appropriate Mitigation Actions (NAMAs) which encourage developing countries to integrate into national development plans (or at least a national mitigation strategy) country's mitigation potential opportunities.³² Paragraph 1 (b) (ii) of the Bali Action Plan calls for "*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.*" This suggests that either or both NAMAs and technology, financing and capacity building (referred to here as "mitigation support") should occur in a manner that is

³² For a complete understanding of NAMA see the document "NAMAs and the Carbon Market"; Nationally Appropriate mitigation Actions of developing countries". Olsen, Fenhann, Hinostroza. UNEP RISOE Perspectives series 2009.

measurable, reportable and verifiable (MRV).³³ NAMAs though, include actions targeting GHG mitigation directly (climate-specific) as well as actions that would occur regardless of climate change reasons (climate-relevant) but that directly affect GHG emissions (e.g. energy efficiency policy).

However, the Bali Action Plan does not specify the relationship between NAMAs in developing countries and support for such actions. In particular, it leaves open the question of whether the two should be linked or whether progress in one area is dependent on progress in the other area (e.g. actions are dependent on financing or financing is dependent on actions). It also remains unclear whether the MRV requirements apply to the link between NAMAs in developing countries and mitigation support, to one or both of the separate elements or to all three dimensions of the linking notion.³⁴

In the international climate negotiations preceding COP15 (Copenhagen in December), 2009, NAMAs were also suggested and used as the solution of many open issues related to mitigation efforts. NAMAs actually are still very general, making it difficult to work on concrete implementation issues. However in many discussions and submissions, NAMAs have been categorized as follows: unilateral NAMAs which provide mitigation actions undertaken by developing countries on their own; Supported NAMAs, that include mitigation actions in developing countries, supported by direct climate finance from Annex I countries (in the following called 'directly supported NAMAs'); and Credited NAMAs, which are mitigation actions in developing countries, which generate credits to be sold on the carbon market (e.g. sectoral crediting). Although no significant steps were made during COP 15 negotiations in 2009, there is a consensus that NAMAs should be enabled and supported through finance, technology and capacity building from developed country Parties in a measurable, reportable and verifiable manner.

³³ In defining a framework for MRV of action and/or support, many issues still remain to be addressed. Still to be defined for the post-2012 regime are the scope of what needs to be measured (e.g. GHG outcomes, intermediate outcomes, or inputs), how it should be measured, when MRV is required, and who should be responsible for doing it. Work on MRV of mitigation actions is addressed in a separate paper (Ellis and Moarif, 2009).

³⁴ J. Aeree, J. Corfee-Morlot. OECD/IEA 2009. Linking mitigation actions in developing countries with mitigation support: a conceptual framework.

It remains unclear as to how this approach will actually be realized. However an important decision that was reached in the last COP and concerning NAMAs deals with the recognition that reducing emissions from deforestation and degradation in developing countries (REDD) will be an important element of the emerging international climate change regime. Global deforestation is estimated to be the source of 20% of global greenhouse gas emissions per year. At the same time, however, some argue that forestry has the highest potential of any sector to provide low-cost greenhouse gas reduction solutions between now and 2030.³⁵

Important questions regarding NAMA however remain unsolved: Is NAMA helping to deliver greenhouse gas (GHG) reductions in the medium-term to long-term, in addition to what might already be achieved unilaterally or through the carbon market? Or, are the NAMAs consistent with and mutually supportive of domestic sustainable development priorities? And how is the MRV system going to be managed in developing countries?

Currently, several different types of GHG mitigation actions and commitments have been proposed for the post-2012 period. Some of these, such as national-level GHG emission limits, are already being used, with countries therefore already gaining experience with implementing, monitoring, reporting (and potentially reviewing or verifying the effects of) such actions/commitments. (ELLIS 2008)

The extent of this experience varies both by type of action/commitment, as well as by country and sector. In general, Annex I countries have significant experience with monitoring and reporting national emission levels (reflecting their reporting commitments under the UNFCCC and Kyoto Protocol). However, official reporting on other GHG-mitigation actions occurs every few years in Annex I countries and only irregularly in non-Annex I countries. Thus, as outlined in a previous analysis (Ellis and Larsen 2008), significant new

³⁵ Developing and developed countries see REDD as a positive way to contribute to global mitigation efforts. However, REDD is also a highly technical and rapidly evolving subject and many developing countries require support to develop options and negotiate effective modalities and processes that could be included within an agreement under the UN Framework Convention on Climate Change (UNFCCC).

guidance would be needed if post-2012 MRV provisions were to focus on GHG mitigation actions rather than GHG emission levels.³⁶ The process for carrying out MRV of mitigation actions would vary with the type of action undertaken (e.g. measuring the effectiveness of energy efficiency standards and incentives to address REDD will require methods that have little in common). Thus, countries could agree to measurement and reporting guidelines, rules and/or best practices, while understanding that requirements could differ for different types of action, different groups of countries and/or whether actions are binding or non-binding and/or whether actions are supported. Agreement will also be needed on verification, including what the verification process should be and who should undertake it. However, there is no consistent, internationally-agreed guidance on how this should be done. Such guidance will be needed in order to implement some GHG mitigation actions under current international discussion.

Within the overall framework of mitigation actions and measurements above described, where can the CDM and its SD contribution be placed? Although it will be explored further in the dissertation, it is worth mentioning that since its inception in 2005 (and even before), several methodologies to explore CDM Sustainable development impacts in host countries have been carried out. However, any effort to assess the SD impacts of CDM projects requires that the host country defines and selects specific aspects of SD in order to make any relevant assessment. In this sense that there are a number of tools that can be used to assess SD impacts of CDM projects. Some of them come from economics and they include cost-effectiveness analysis, cost-benefit analysis, multi-criteria analysis. Some others apply qualitative methodologies based on multidisciplinary background combined with statistical tools. These involve different levels of analytical complexity and each can be carried out in

³⁶ Ibid.

a simple or in a more complex way.³⁷ Current dissertation will employ a mix of qualitative and quantitative tools to assess such impact.

³⁷ Markandya 2002. CDM sustainable development impacts. UNEP

CHAPTER III

THE CLEAN DEVELOPMENT MECHANISM: ISSUES AND PERSPECTIVES

The third chapter of the thesis deals with the analysis of the Clean Development Mechanism (CDM), its operational aspects and governance. Ten years after the adoption of the Kyoto Protocol and five years from its entry into force (2005), the CDM has become an immense global market, having more than 5.000 projects registered and a value of several billion Euros. In this regard, the CDM has been a great success in developing a new market for GHG emission reduction projects and providing tools for mitigation actions worldwide. However, the CDM has been heavily criticised for many other reasons, not only for the difficulties for its implementation but also for not delivering on its environmental and SD objectives among other issues. In the first section of the chapter, an overview of CDM status and project activities at world level is provided. Up to May 2010, the CDM has been growing in many developing countries, but it was concentrated in few geographical areas, such as Asia and Latin America. China dominates the market both in number of CDM and volume of CERs (40%) followed by India (14%), Brazil (8%), Mexico (6%) and South Korea (5%). Thus, 82% of expected CDM emission reductions by 2012 are concentrated in just 5 countries. In future negotiations, the problem of regional distribution must be addressed in order to provide a more balanced project distribution and benefits for developing countries.

The second part of the chapter copes with the core issue of CDM delivering SD, a quite controversial at the moment. Projects contribution to SD have already been analyzed worldwide and a description of the CDM project situation will be provided: evidence suggests that CDM has broadly delivered on the first of its objectives which is to encourage low cost emission reduction in host countries, but it has fallen short of its potential to contribute to SD in

host countries. Shall the CDM continue as it is with few adjustments or should it be reformed and how?

3.1 The CDM: institutional framework and operational aspects

Art. 12 of the Kyoto Protocol (KP) introduces the so-called flexible mechanisms of the Protocol itself, including the Clean Development Mechanism (CDM), which allows industrialized countries to implement project activities that reduce emissions in developing countries, in return for certified emission reductions (CERs)³⁸. These tradable CERs have monetary value and can be used by industrialized countries to meet their emission targets under the Kyoto Protocol. The idea is that the implemented project should generate environmental benefits such as GHG reduction in the form of transferrable financial assets. The CDM is therefore considered one of the three mechanisms in the Kyoto Protocol. The Mechanisms allow Annex 1 countries flexibility in meeting their targets and they were established under the above mentioned Marrakesch Accords (2001)³⁹. In addition to reducing emissions domestically, Annex 1 countries may (1) exchange agreed quantities of allowed national emissions with other Annex 1 countries (“emissions trading” in Article 17); (2) acquire credit for reductions achieved by projects in other Annex 1 countries (“joint implementation” in Article 6); or (3) acquire credit for reductions achieved by projects in non-Annex-1 countries, which have no reduction targets (the CDM in Article 12). Although these flexibility mechanisms promise savings as large as 50% in the cost of

³⁸ One CER is equivalent to one tonne of carbon dioxide equivalent, measured in accordance with the Global Warming Potential, a mean for comparing and quantifying the various GHGs in terms of their carbon dioxide equivalent. A GWP was adopted by the IPCC in the second assessment report (1995)

³⁹ See Decision 17/CP.7, 2001.

attaining a specified global abatement goal they also present complex implementation challenges⁴⁰

The main purpose of the CDM as defined in the Art. 12 of the Protocol, is to help the non-Annex I parties contribute to the ultimate objective of the convention, which is “*achieving and sustaining levels of atmospheric GHG concentrations that do not imply dangerous anthropogenic interference in the climate system – and achieve sustainable development through the implementation of project activities*”; and finally help the Annex I parties to comply with their quantified emission limitation and reduction commitments. Annex I party compliance or non-compliance with their targets will be verified after the end of the first commitment period, when they must show that their emissions between 2008-2012 are equal or less than a pre-determined limit.⁴¹ In governance terms, the CDM is characterized by the involvement of private actors for two purposes. First, private actors have a role in the rule-making process of the Kyoto Protocol as they have the possibility to submit proposals for new CDM methodologies. In addition, all stakeholders of CDM projects are granted a review period in which they can publicly comment on CDM project design documents. Second, private actors are the main pillar of CDM implementation. Because the CDM is a market mechanism, private actors such as CDM consultancies, certification companies, and the project owners themselves are the ones actually implementing emission reduction measures. This systematic involvement of private actors in an international governance arrangement is innovative and goes beyond public private partnerships (PPPs). The inclusion of private actors in governance arrangements has raised many expectations of higher effectiveness and efficiency in the achievement of governance results (Börzel & Risse, 2005).

⁴⁰ See, M. Montini. *Il Protocollo di Kyoto ed il Clean Development Mechanism: aspetti giuridici e istituzionali. L'esperienza nei Balcani*, Giuffrè, Milano, 2008 and *Developing CDM projects in the Western Balkans: legal and technical issues compared*. Springer 2009.

⁴¹ Clean Development Mechanism and Least Developed Countries: Changing the Rules for Greater Participation Thanakvaro De Lopez and al. 2004.

However, the CDM has come recently to terms with its future structure (post – Kyoto 2012) and its structural inadequacies are clearly defined: part-time governing bodies, inappropriate division of responsibilities and among other factors, neglect of the due process as well as lack of transparency⁴². Although treated further in the chapter, those concerns constitute the core of reform proposals for the future scenarios of the CDM. Crucial to an understanding of the need to reform the CDM is that these problems do not result from the lack of efforts from any part of those working within the system but they are signs of systemic limitations of the flexible mechanisms and the overall climate change environmental architecture, including the KP and the UNFCCC itself. The Conference of the Parties (COP) of the UNFCCC and the Members of the Protocol (MOP) - which regulate and monitor the implementation of the Protocol - have authority over the CDM and its guidelines and decides on recommendations concerning CDM rules. COP/MOP also decides on the designation of the Designated Operational Entities (DOEs), provisionally certified by the Executive Board (EB); it reviews the annual reports of the EB and the regional and sub-regional distribution of the DOEs and the project activities; and finally assists in obtaining funding for CDM project activities.

The CDM EB, the operational decision making body for the CDM acts under the authority and guidance of the COP/MOP and is responsible for supervising the functioning of the CDM. Among the different functions the EB makes recommendations to the COP/MOP regarding CDM modalities and procedures and/or any amendment or addition to the EB's rules of procedure; approves new methodologies related to baselines, monitoring plans and project boundaries; reviews provisions with regard to the simplified modalities, procedures and definitions of small-scale project activities (CDM-SSC) and, if necessary, makes recommendations to the COP/MOP; is responsible for the accreditation of the DOEs and recommending their designation to the COP/MOP; publishes technical reports, giving the public at least eight weeks

⁴² *State of the CDM 2009*; Reforming the present and preparing the future. IETA. www.ieta.org

to comment on the methodologies and directives therein; develops and maintains the CDM Registry; formally accepts a project validated as a CDM project activity (registration); and instructs the administrator of the CDM Registry to issue CERs resulting from a project activity. The EB can also establish committees, panels or working groups to assist it in performing its functions. Currently, these are as follows:

Methodologies Panel	The Methodologies Panel develops recommendations to the EB on guidelines for existing baseline and monitoring methodologies and makes recommendations on proposals for new baseline and monitoring methodologies.
Accreditation Panel / Accreditation Assessment Team	The Accreditation Panel provides input for EB decisions in accordance with the procedure for accrediting operational entities. In order to do so, it appoints an Accreditation Assessment Team, which makes a previous assessment of the DOEs.
Afforestation and Reforestation Working Group	The complexity of the forestry and land-use issue led to the creation of a specific group, the Afforestation and Reforestation Working Group, to prepare recommendations on proposals for new baseline and monitoring methodologies for afforestation and reforestation (A/R) project activities. ⁴³

Source: personal elaboration based on information available at www.unfccc.int

Other important institutions which make up the CDM institutional framework are the already mentioned DNAs and the DOEs. Concerning DNAs, the Parties involved in a CDM project activity must designate a DNA with the UNFCCC. The DNAs must attest to the voluntary nature of the involvement of

⁴³ The two groups are: the Small-scale Working Group and the Registration and Issuance Team (RIT). The Small-scale Working Group prepares recommendations on proposals for new baseline and monitoring methodologies for small-scale project activities. . The RIT is a group of specialists appointed by the Executive Board to assist it by appraising requests for the registration of project activities and the issuance of CERs.

the project participants and, in the case of the host party, attest that the project activities contribute to that country's sustainable development. Approval of CDM project activities is granted through a letter of approval (LoA) issued by the DNAs.

Instead, the DOE is a certification entity accredited by the CDM EB and designated by the COP/MOP, which ensures that project activities are correctly applying the rules and procedures established by the Kyoto Protocol and the EB. The DOE has two basic functions within the CDM project cycle: a) validation: phase in which the DOE analyzes the Project Design Document (PDD), where the main information concerning the project is given, visits the undertaking, checks the documentation and requests changes and additions, among other measures, in order to ensure that the project activity complies with CDM regulations before requesting its registration by the EB. The DOE also confirms that the monitoring procedures have been correctly applied and that their data accurately reflect an effective reduction in GHG emissions (or net CO₂ removals), resulting in a certification report which is sent to the EB for the issuance of the corresponding CERs.⁴⁴

The CDM is a complex instrument and its technicalities are also difficult to apply in developing countries, where the lack of specialist play an important role in determining the success or rejection of a project. For the purposes of this work however, only few basic concepts will be taken into account for describing some operational difficulties of the CDM. Those include the baseline concept and the additionality concept. Starting from the baseline, its determination for a project activity is one of the critical phases for a project development. The baseline for a CDM is "*the scenario that represents reasonably the anthropogenic emissions by sources of greenhouse gases that would occur in the absence of the proposed project activity*"⁴⁵. It is supposed to cover emissions from all gases, sectors and source categories

⁴⁴ Other functions of the DOEs include maintaining a public list of CDM project activities, send an annual report to the Executive Board and ensure that information on the project activities not considered confidential by the participants is available to the public.

⁴⁵ Paragraph 44, Annex to Decision 3/CMP.1

within the project boundary. It is established by project participants in accordance with provisions for the use of approved and new methodologies, which are the guidance for submitting projects to the EB.

An issue inextricably linked with derivation of the baseline is the determination whether the CDM project is additional: additional emission reductions are defined by comparing two alternative scenarios that could take place in the future and the project activity. According to Article 12, paragraph 5 (3), of the Kyoto Protocol, “a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.”⁴⁶ In economic terms, the determination of whether a project is additional or not comes from calculating the difference between the verified emission of the project and the baseline emission. If the latter is higher, the project is “additional”. In other terms, it means that emission reductions of a project are only to be certified if it can be proved that they come from project activities that would not have occurred in the presence of the CDM. Projects that are ‘non-additional’ should not be certified as offsets in the form of CERs and contradict the very purpose of the UNFCCC.

Since it is a counterfactual or hypothetical issue, it has been one of the most controversial issues of the CDM and many projects have been rejected by the EB for not demonstrating to be additional. Currently it is under revision and many critics have been put forward to the concept.⁴⁷ Therefore, the most difficult projects to prove additionality are those of afforestation and reforestation (A/R) which are also projects that have enjoyed low participation in the carbon market.

⁴⁶ Ibid.

⁴⁷ For a detailed critic of the Additionality concept, see Mueller, working paper Oxford Institute for Energy Studies EV 44 March 2009

Table I: Project Cycle Summary table

Stage	Definition	Responsibility Entity	Activity Document
Preparation of the Project Design Document - PDD	Project participants prepare the PDD for a project activity eligible under the CDM. This should contain details on the project activity's essential technical and organizational aspects, as well as, information on the selected baseline and monitoring methodologies. It is the basis for all the subsequent stages.	Project Participants (PP)	PDD
Validation	Validation is the independent evaluation of a project activity by a Designated Operational Entity.	Designated Operational Entity (DOE)	Validation Report
Approval	Approval is the process whereby the Designated National Authorities of the parties involved confirm voluntary participation and the DNA of the host party attests that the activity in question contributes to its sustainable development.	Designated National Authority (DNA)	Letter of Approval (LoA)
Registration	Registration is the formal acceptance, by the Executive Board, of a project validated as a CDM project activity. Project participants must pay a registration fee in this stage of the cycle.	CDM Executive Board	Registry
Monitoring	The process of monitoring a project activity includes the collection and archiving of all relevant data necessary for determining GHG emission reductions (or net CO ₂ removals) in accordance with the monitoring plan established by the methodology indicated in the registered PDD.	Project Participants (PP)	Monitoring Report

<p>Verification and Certification</p>	<p>Verification refers to a periodic independent audit by a DOE to review calculations of GHG emission reductions or net CO₂ removals resulting from a CDM project activity registered by the Executive Board. This process verifies ex-post emission reductions (or net CO₂ removals) that effectively occurred.</p> <hr/> <p>Certification is the written assurance that a project activity has achieved a determined level of GHG emission reductions (or net CO₂ removals) within a specified time period.</p>	<p>Designated Operational Entity (DOE)</p> <hr/> <p>Designated Operational Entity (DOE)</p>	<p>Verification Report</p> <hr/> <p>Certification Report</p>
<p>Issuance</p>	<p>The stage in which the Executive Board confirms that the GHG emission reductions (or net CO₂ removals) resulting from a project activity are real, measurable and long-term. Once this has been done, the Executive Board may issue the CERs which are subsequently credited to the participants of a project activity in the proportion defined by them. CERs may be used by Annex I Parties to offset part of their emission reduction targets.</p>	<p>CDM Executive Board</p>	<p>CERs</p>

Source: personal elaboration based on the UN guidelines for CDM projects

3.2 The political discourse of CDM in the North and South of the world

If SD and CC discourses - together with their practices - are highly politicized, the CDM as well presents political issues worth mentioning. As described earlier, North-South international negotiations are characterized by strong political positions and although it is difficult to find a common approach to all developing countries it is clear that in the case of market based mechanisms and more generally on climate change, there are definitely common points among the G77 countries' block (the whole group of nations belonging to the developing world) on the issue of CDM and its application. According to Gupta, there are different levels among which environmental issues are treated by developing countries: instrumental, organizational, ideological and based on power politics: most of the arguments against market based mechanisms such as the CDM are placed at the level of power politics and ideologies.⁴⁸

The first major point of concern regarding in particular the G-5 Group (middle income countries such as China, India, Brazil, Mexico and South Africa), raise questions about equity and the CDM. Initially, the focus on finding the cheapest emission reduction opportunities poses questions concerning the justification of the CDM as a mechanism for promoting mitigation efforts. The CDM was meant to be a subsidiary mechanism in achieving the commitments that developed countries had taken up. The underlying logic was that developed countries would be reducing their emissions and that a part of that reduction would come from CDM projects. However, between 1990 and 2010, emissions have grown even more in countries with commitment such as Spain and Portugal in the EU.⁴⁹ The very logic of the CDM is thus undermined because it will be used by countries with commitments as an authorized loophole to show formal compliance with their international

⁴⁸ Joyee Gupta, Post 2012: CDMs Role in the Climate Negotiations http://ecologic-events.eu/cdm-workshop/documents/gupta_briefing.pdf.

⁴⁹ Some of the worst increases are in Spain (61%) and Portugal (57%) and in other regions of the world New Zealand (41% per cent) and Australia (37%). Germany (-15%) and the UK (-6%) are the only countries within the EU which have reduced emissions. See, e.g., 'A Joke on the World', 16/14 *Down to Earth* 32 (December 15, 2007).

obligations.⁵⁰ Secondly, the CDM has been conceived from the point of view of short-term mitigation gains. While Article 12 of the protocol provides a basis for reducing the overall cost of compliance with emission reduction commitments, it does very little to promote that world economy goes towards a low or zero carbon economy. This is due to the fact the CDM, in effect, provides a short cut for developed countries unwilling to implement drastic energy policy changes domestically. The CDM also does not include a framework that would ensure that projects are prioritized in accordance with their impacts on the poor and vulnerable and the environment in developing countries. This is of great concern for developing countries because many CDM projects still promote projects and activities (like dams and small hydro-powers) which are not environmentally friendly or not necessarily abate GHG emissions. Thirdly, the CDM may have perverse side effects in the long term for developing countries. Indeed, the search for the cheapest possible emission reduction opportunities means that developing countries are exhausting these options for the benefit of developed countries' compliance with their own commitments. Such options will not exist anymore once developing countries take on commitments, something that is unavoidable in the long term from a global environmental point of view. This has much to do with the principle of common but differentiated responsibilities. It must be noted that developing countries always remind to developed countries that they have been able to reach their current stage of development without emission restrictions and they cannot be asked to abide to regulatory constraints. Historically then, developing countries are responsible for the carbon accumulated in the atmosphere. Through the CDM, developed countries can to some extent "*buy themselves out*" of their commitments to reduce emissions domestically and they prefer to do it where it is cheaper⁵¹. Moreover these efforts should be supplemental to domestic emission reductions and for some developing countries this would be a virtual

⁵⁰ P. Cullet, *The Global Warming Regime after 2012: Towards a New Focus*. P. 4-5
<http://www.ielrc.org/content/a0802.pdf>

⁵¹ Gupta, *Op.cit.*

compliance rather than a “physical” compliance. Underlying these concerns there is the idea that the focus on the use of market based mechanisms and the CDM in particular, is simply business driven and a distraction from the real objective of the UNFCCC.

A second broad vision, somewhat more radical, is embraced by the G77 and it is linked to ideological and historical issues regarding North-South relations. Some countries refer to the CDM, international emission trading and market based mechanisms, as a new “carbon colonialism”. Western structures and values are being diffuse to developing countries (dependency) through a neoliberal concept focused on achieving cost –effectiveness trough markets and the establishment of property rights, some only temporary, for global public goods such as the atmosphere. Many radical NGOs argue that Western corporate industries and polluters and their political allies is that fossil fuel-based industries would move from western to third world countries as a result of lesser environmental standards (pollution heavens) and the end result would be even greater GHG emissions, along with a transfer of jobs from the first world to the third world. The fossil fuel-powered industries of the West relied heavily on the exploitation of third world colonies, and this exploitation would persist through market based mechanisms. In this sense, the CDM also promises further opportunities for neo-colonial exploitation. The main CDM strategy is afforestation to create carbon “sinks”. This is already being practiced by some corporations in anticipation of an international emissions trading scheme. According to the World Rainforest Movement⁵², large-scale tree plantations are commonly a direct cause of deforestation, usurp needed agricultural lands, replace valuable native ecosystems, deplete water resources, worsen inequity in land ownership, increase practices needed for forest conservation. Indigenous peoples declared during the Copenhagen meeting of COP15 (December 2009) that *“Sinks in the CDM would constitute a world-wide strategy for expropriating lands and territories and violating our fundamental rights that would culminate in a new form of*

⁵² <http://www.wrm.org.uy/>

colonialism".⁵³ Various other CDM projects have been proposed for the benefit of multinational corporations, such as genetic engineering in agriculture or subsidizing Western nuclear vendors to build nuclear power plants in the Third World. Another likely outcome is that bilateral "aid" to Third World countries could be made conditional on that aid earning carbon credits for the Western "donor" nation or corporation.

Another strand of views among supporters of carbon colonialism⁵⁴ and more profound is that emissions trading emerges as the principal component of government climate change policy, the rules for its use will have to conform much closer to the general rules governing trade. Emissions trading represent the latest strategy in an ongoing process that stems from 16th century European land enclosures to the recent World Trade Organization (WTO) negotiations on public health and education, to privatize and liberalize the global commons and resources. By its very nature, an emissions credit entitles its owner to dump a certain amount of greenhouse gases into the atmosphere. Control of such credits effectively leads to control of how the atmosphere, perhaps the last global commons, is used. The Kyoto Protocol negotiations have not only created a property rights regime for the atmosphere. It has also awarded a controlling stake to the world's worst polluters, such as the European Union, by allocating credits based on historical emissions. Although many of these arguments have impact on international debates on CDM, it should be noted that emission trading and flexible mechanisms is but one possible policy instrument to reduce GHG and its use is not mandatory for signatories countries. All the above perspectives are represented during UNFCCC international negotiations (conference of the parties) by different actors and movements with important impacts on negotiations. In critical terms, however we must remember that CDM are

⁵³ <http://www.indigenoussummit.com/servlet/content/declaration.html>

⁵⁴ Heidi Bachram, Climate Fraud and Carbon Colonialism: The New Trade in Greenhouse Gases. In *Capitalism nature socialism*, volume 15 number 4 (december 2004). <http://www.carbontradewatch.org/durban/cns.pdf>

considered in many developing countries as an inefficient tool that is increasing greenhouse gas emissions while transferring billions of dollars from consumers and taxpayers to undeserving project developers and a growing army of carbon brokers and consultants. Many hundreds of millions of the supposed “emission reduction” credits do not help to avoid pollution, because the offsets are being sold by projects : most commonly hydropower dams, but also wind turbines, biomass power plants, changes to industrial processes, capturing methane from coal mines and many other schemes – that never needed income from the CDM to be built. In these cases, the CDM is increasing global emissions because polluters in industrialized countries are meeting their legal requirements to cut emissions by buying fake credits rather than actually cutting their own emissions. In the variety of visions within developing countries, these last concerns dare not endorsed by the Mexican government, who as it will be seen later on, for political and economic reasons, adopted the CDM as a tool for climate change mitigation actions in a larger context of foreign direct investments in the clean technology sector.

3.3 The CDM and its performance: an overview from 2005 to date

The second section of the chapter looks at the CDM performance with current data from UNEP/RISO projects pipeline and the regional distribution of the projects together with the creation of carbon markets and the challenges they pose to the climate governance system. Many critics arose from international experts and observers to the CDM problem of distribution within few geographical areas as well as the mechanism implementation within developing countries. Critics also touched carbon markets, mainly arguing that emissions trading does little to solve pollution problems overall, since it offers a short cut to industrialized countries to reduce emissions cheaply and faster elsewhere, avoiding domestically efforts to curb emissions. In general terms the registration of CDM projects has rapidly increased as the Kyoto Protocol entered force into 2005, peaked in 2008, and has slowed down with the global financial crisis in 2009 and due to uncertainties regarding commitments beyond 2012. At August 2010, in total 5365 CDM projects are now included in the UNFCCC Pipeline excluding the 158 projects given a negative validation by DOEs, the 695 projects where DOEs terminated the validation, the 172 rejected by EB and 49 withdrawn. 2306 of the projects are now registered and a further 141 are in the registration process. 748 CDM projects have got CERs issued.⁵⁵

⁵⁵ UNEP RISOE Pipeline. www.cdmpipeline.org Last Access on August 31th 2010.

Table II: status of CDM projects

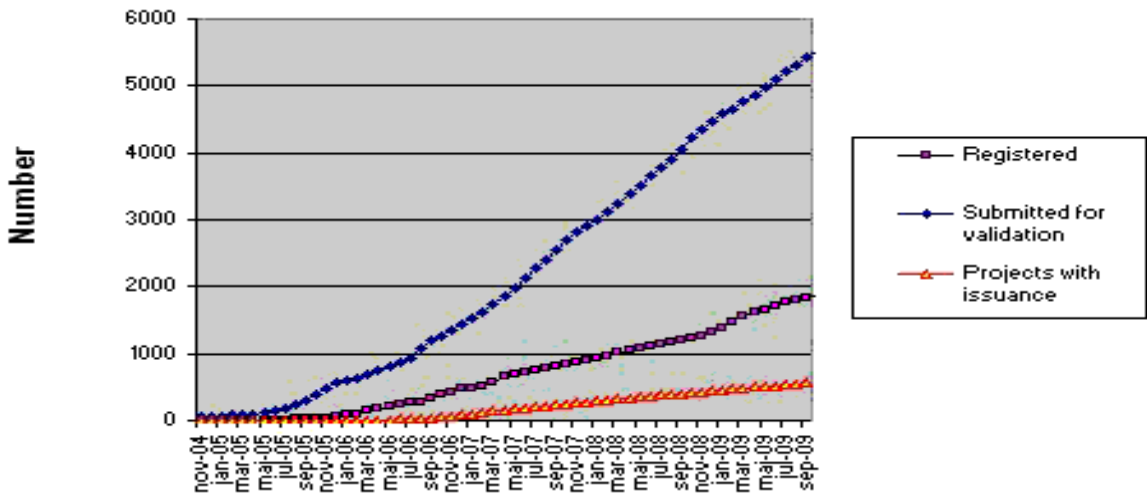
Status of CDM projects	Number
At validation	2918
Request for registration	43
Request for review	60
Correction requested	35
Under review	3
Total in the process of registration	141
Withdrawn	49
Rejected by EB	172
Validation negative by DOE	158
Validation terminated by DOE	695
Registered, no issuance of CERs	1558
Registered. CER issued	748
Total registered	2306
Total number of projects (incl. rejected & withdrawn)	6281

Source: UNEP RISOE Pipeline

In this regard, the CDM has been a big success in developing a new market for GHG emission reduction projects in developing countries, is widely acknowledged as a mechanism that has changed emission trends in some industries and enabled entities in developing countries to participate in the emerging global carbon market. It has also contributed to raising awareness of public and private entities for climate change.⁵⁶

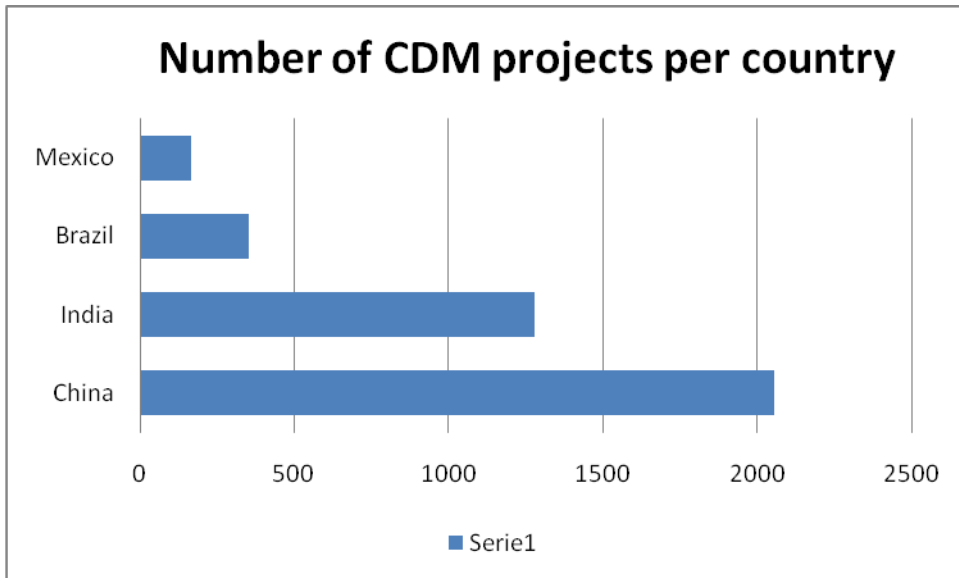
⁵⁶ L. Schneider; "Is the CDM fulfilling its environmental and sustainable development objectives? An evaluation of the CDM and options for improvement". 2007. <http://www.oeko.de/oekodoc/622/2007-162-en.pdf>

Table III: Projects submitted for validation and projects registered projects over time



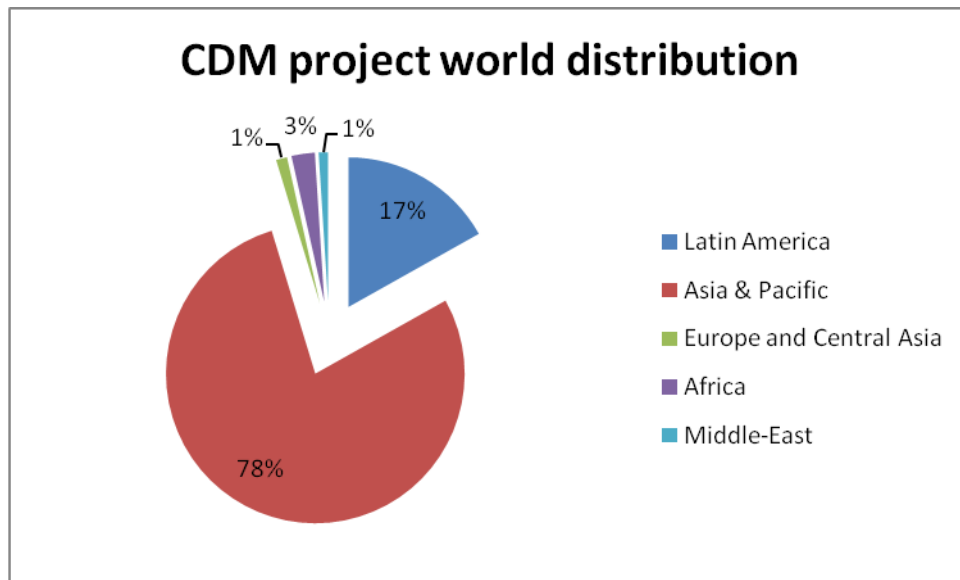
Source: UNEP Risoe Pipeline

Although CDM activities are undertaken in 55 host countries, China dominates the CDM as the main source of CERs (54%), followed by India (14%), Brazil (8%), Mexico and South Korea (6%). Thus, 82% of expected CDM emission reductions by 2012 are concentrated in just five countries. Similarly, China leads by number of projects (34%), followed by India (26%), Brazil (10%), and Mexico (7%). China dominates the market both in number of CDM and volume of CERs.



Source: personal elaboration based on UNEP RISOE pipeline data at May 2010

Five years into the implementation of the early CDM projects, the mechanism is now widely viewed as an imperfect but useful approach to encourage the development of emissions–reduction projects in developing countries.⁵⁷ However, many questions have been raised about the inequitable distribution of projects across the developing world. For example, China is the world’s first largest greenhouse gas emitter followed by the US. Nevertheless, it has received much of the carbon finance and accounted for 73% of transacted CER volume in 2007, due to the relatively low cost of emissions abatement in China (World Bank, 2008). Since its implementation, it became clear that CDM projects are skewed and Africa, in particular the Sub-Saharan region, seemed to have missed the opportunity to take advantage of the CDM. On one side, the regions which benefit most of the projects are the Asia Pacific Region followed by Latin America and the rest of the world. As to May 2010, the Asia Pacific region reached 3745 projects (almost 79% of the total), Latin America registered 821 projects (18%) followed by Africa (116). Asia and Latin America make up almost 95% of the overall CDM projects.



Source: CDM pipeline. UNEP RISO

⁵⁷ Reforming the CDM for sustainable development: lessons learned and policy futures
Emily Boyd and al.

In general terms, over 60% of Non-Annex I Parties do not have CDM projects. At now, 32 No annex I Parties (developing countries) do not have DNAs yet in place and 77% of registered projects are in just 4 countries (China, India, Brazil, Mexico). Uzbekistan is the only CDM country in Central Asia, and Moldova is the only one in South East Europe. Currently 60% of total volume of annual CERs comes from just one country (China). Projects related to afforestation/reforestation have just 6% share in registered projects when Activities in the LULUCF sector can provide a relatively cost-effective way of offsetting emissions, either by increasing the removals of greenhouse gases from the atmosphere (e.g. by planting trees or managing forests), or by reducing emissions (e.g. by curbing deforestation.)

Looking to projects in the pipeline before registration, Asia is set to further dominate the CDM market, increasing its share from 67% to 78% of the reductions. The share of Latin America, in contrast, will diminish from the current 29% to 19%. Countries in Africa and the Middle East look to continue to host a small and declining fraction of projects. Quantities of expected reductions (i.e. CERs) do not correlate strongly with the number of projects in a given country or region. So far, Asia's 67% share of the total number of registered projects provides 77% of expected CERs until 2012.⁵⁸

Looking to data also it is clear that project division is not in line "*with equitable geographic distribution of CDM at regional and subregional levels*" envisaged in the Marrakesh Accords. Explanatory factors for this distribution are to be found in many reasons: institutional capacity for host countries to receive CDM projects, domestic legal frameworks, investments laws (CDM projects are easy to implement where existing regulatory trade frameworks are already in place), infrastructures among others. Participants in CDM projects have to face several difficulties before implementing CDM projects. In addition to political and economic risks associated with investments in emerging markets, participants face new and unfamiliar risks linked to the Kyoto Protocol and its implementation, carbon price volatility (the risk that CERs will

⁵⁸ Own elaboration starting from UNEP-RISOE pipeline

lose their value after the first Kyoto commitment period) and the need to obtain all necessary CDM projects approvals.⁵⁹ Legal regimes in host countries play therefore a key role for developing CDM projects. This is not just because carbon credit investments require secure rights to the underlying project, but also because they entail long term return periods and commitments that hinge upon the viability of an intangible assets. In financial terms, most of the reasons that contributed to the uneven regional distribution of CDM can be summarized in only small incremental revenue (varying by technology); Low credit rating of countries, perceived risks by financial institutions (and lack of exposure on their part); opportunity cost of investments; difficulty in combining Official development assistance funds such as GEF (global Environmental Facility with Carbon Finance); and Few dedicated financial instruments to support clean technologies (the only existing are the World Bank Clean Technology Fund and ABREF in West Africa).⁶⁰

An interesting observation when looking at CDM projects, deals with the question of why are there so many small-scale CDM projects in the pipeline. Normally one would assume that the size of the transaction costs for CDM projects would imply that project developers prefer large-scale CDM projects; however, 44% of all CDM projects are small-scale. There are several reasons for distribution between the large-scale and small-scale. It is understandable that there are many small-scale methane (CH₄) reducing projects. The main explanatory factor is the global warming potential of 21 for CH₄. The CERs therefore make a larger contribution compared to the investment for these kinds of projects than for projects that only reduces CO₂ and the transaction cost barrier for small projects can better be overcome (79% of the Biogas projects and 65% of the Agriculture projects are small-scale. But also many country specific factors and methodology factors (where do approved

⁵⁹ *Implementing CDM projects: a guidebook to host country legal issues*. UNEP RISO.

⁶⁰ OECD Survey on CDM, 2009.

methodologies exist) play a large role. Some project types like energy efficiency (EE) -own generation, N₂O, Coal bed/mine methane, HFCs, geothermal electricity, and tidal power generation are inherently large. All the 13 electricity-producing geothermal projects are large-scale, and the only existing geothermal heating project is small-scale. The only approved small-scale methodology for HFCs from foam manufacturing (AMS-III.N) has not been used yet. The reason that only six small-scale EE-own generation projects exist could be that the approved methodology used, AMS-III.Q, is rather new. Fugitive emissions projects are also large since most of them focus on methane recovery and utilization. For some types, like improvements to the cement manufacturing process and the capture of per fluorocarbons, there are also no small-scale projects. But here the reason is that there exist no small-scale approved methodologies for these project types. For some types, most of the projects are small-scale due to a lack of large-scale approved methodologies. This is the case for EE in households and EE in the service industry. However, the great potential in these types have not yet been tapped. There are only 20 solar projects in the Pipeline, 16 of them small-scale (nine photovoltaic, two solar water heating, and five solar cooking). This may increase due to the recent large increase in oil prices, or by using a programmatic approach to the CDM. For many types, the share of small-scale projects is high: for wind, 32% of the projects are small-scale (furthermore, 121 of the 132 small-scale wind projects are hosted by India). For hydro projects, half of them are small-scale (250 of the 421 small-scale hydro projects are hosted by China). For biomass energy, 59% of all CDM projects are small-scale (300), and most of these are hosted India (~200), Brazil (39) and Malaysia (28). At May 2010, 38% of all small-scale projects are hosted by India (in fact, 61% of all projects hosted by India are small-scale). In Mexico, Malaysia, the Philippines, and Indonesia the share of small-scale projects is larger than the share of large-scale projects. In Mexico, there are a large number of small-scale agriculture and biogas projects; in Malaysia there are a large number (30) of small-scale

composting projects. In the Philippines, most of the CDM projects are small-scale ones, producing biogas from the industrial wastewater from farms. In Indonesia, there are many kinds of small-scale projects. In China large-scale projects are most popular. However, 250 of the 275 small-scale projects in China are hydro projects, and this makes a large contribution to the 1,462 small-scale projects in the CDM Pipeline. In Brazil, 43% of the projects are small-scale and many of these are biogas and biomass energy projects. For some types the issuance success is higher for small-scale: the 21 small-scale wind projects have an issuance success 10% larger than the average for all 51 wind projects. Only one small-scale landfill gas project has had certified emission reductions (CERs) issued, so the statistics behind the 50% for small-scale here is weak. The CER issuance rate to the 11 small-scale EE-industry projects is 5% above the average for all 16 EE-industry projects. The four small-scale fossil-fuel switch projects are 4% above the average for 11 projects. For EE-supply, EE-service and hydro the small-scale performance are on average. For biomass energy, the small-scale performance is just 1% below average, and here the statistics are good with 88 projects (51 small-scale). For two types, the performance is higher for large-scale projects. However, there are only two fugitive emissions projects and it is impossible to compare the small-scale project (CH₄ avoidance from timber waste) with the large-scale project (avoidance of CH₄ flaring at an oil field). For biogas, it is also hard to compare the single large-scale project with the five small-scale projects. It is the large projects (four N₂O, 14 HFC and 18 EE-own generation) with high performance that increase the average issuance success to a level 10% higher than for small-scale.

3.4 Carbon market and CDM

One of the successful elements considered when analyzing the CDM governance system is definitely the creation of a carbon market. Carbon market is a term used to designate greenhouse gas emissions trading systems, be these cap-and-trade systems, imposing a cap on aggregate emissions levels, but allowing trade in allowances between states or covered entities, or baseline-and-credit systems, which define an emissions baseline and reward verified emission reductions beyond that baseline with tradable offset credits. Given the scale of climate change and the ubiquity of its anthropogenic origins, GHG emissions come from many forms of economic behaviour, the cost of emissions abatement becomes more vital compare to those in most other areas of environmental policy. Yet because climate change is linked to aggregate GHG concentrations in the atmosphere, not the physical location of their source, efforts to limit GHG gas outputs may occur wherever they incur the lowest abatement cost. A market mechanism for carbon emissions can help identify the most efficient abatement opportunities through creation of a price signal; yet at the same time, it requires sound governance arrangements to ensure that emissions are actually reduced, and efforts by some participants are not offset by lax behaviour elsewhere (Victor et al., 2004).⁶¹ Currently, carbon markets are better characterised as a parallel existence of an evolving, top-down framework based on an international treaty that facilitates carbon trading between sovereign states, and a parallel, bottom-up layer of regional and national trading systems for eligible private entities.⁶²

As previously mentioned the Kyoto Protocol, through the CDM, allows developed countries under an emission trading scheme to sponsor carbon projects that provide a reduction in GHG in other countries, as a way of

⁶¹ Michael Mehling, *Global Carbon Market Institutions An Assessment of Governance Challenges and Functions in the Carbon Market*. P. 3 *Climate Strategies* 2009.

⁶² *Ibid.* P. 4

generating tradeable carbon credits, which are a key component of national and international attempts to mitigate the growth in concentrations of GHGs. CDM projects produce CERs, which is the technical term for the output of CDM projects and it represents a unit of Greenhouse Gas reductions that has been generated and certified under the provisions of Article 12 of the KP. In contrast Emission Reduction Credits are used for Joint Implementation (JI) under Article 6 of the Protocol. According to Article 12, CERs must be *"certified by operational entities to be designated by the Conference of the Parties (COP) serving as the Meeting of the Parties (MOP)"*.⁶³

In general terms, GHG are capped and then markets are used to allocate the emissions among the group of regulated sources. The idea is to allow market mechanisms to drive industrial and commercial processes in the direction of low emissions or less "carbon intensive" approaches than are used when there is no cost to emitting CO₂ and other GHGs into the atmosphere. GHG mitigation projects will then generate credits which can be used to finance carbon reduction schemes between trading partners around the world. Kyoto though provides for a 'cap and trade' system which imposes national caps on the emissions of annex I countries. On average, this cap requires countries to reduce their emissions by 5.2% below their 1990 baseline over the 2008 to 2012 period.

Although these caps are national-level commitments, in practice, most countries will devolve their emissions targets to individual industrial entities, such as a power plant or paper factory. One example of a 'cap and trade' system is the European Union Emission Trading Scheme (EU-ETS). The ultimate buyers of credits are often individual companies that expect emissions to exceed their quota, their assigned allocation units, AAUs or 'allowances' for short. Typically, they will purchase credits directly from another party with excess allowances, from a broker, from a JI/CDM developer, or on an exchange.⁶⁴

⁶³ CDM glossary.

⁶⁴ <http://www.iisd.ca/journal/ott.html>

National governments, some of whom may not have devolved responsibility for meeting Kyoto obligations to industry, and that have a net deficit of allowances, can buy credits for their own account, mainly from JI/CDM developers. These deals are occasionally done directly through a national fund or agency, as in the case of the Dutch government's ERUPT program, or via collective funds such as the World Bank's Prototype Carbon Fund (PCF). The PCF, for example, represents a consortium of six governments and seventeen major utility and energy companies on whose behalf it purchases credits. Although Kyoto created a framework and a set of rules for a global carbon market, there are in practice several distinct schemes or markets in operation today, with varying degrees of linkages among them. According to recent data published by the World Bank⁶⁵, the overall carbon market continued to grow in 2008, reaching a total value transacted of about US\$126 billion (€86 billion) at the end of the year, double its 2007 value. Approximately US\$92 billion (€63 billion) of this overall value is accounted for by transactions of allowances and derivatives under the EU Emissions Trading Scheme (EU ETS) for compliance, risk management, arbitrage, raising cash and profit-taking purposes. The second largest segment of the carbon market was the secondary market for CERs, which is a financial market with spot, futures and options transactions in excess of US\$26 billion, or €18 billion, representing a five-fold increase in both value and volume over 2007.⁶⁶

⁶⁵ World Bank, *State and trends of the carbon market 2009*.

⁶⁶ Ibid.

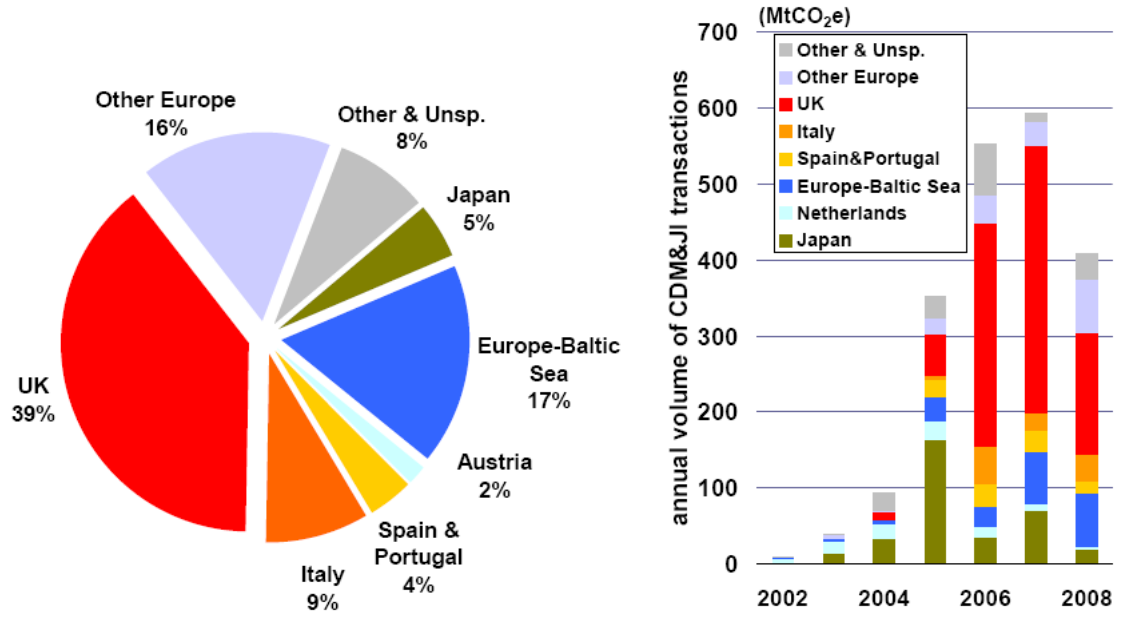
Table IV: Carbon Market at a Glance, Volumes & Values in 2007-08

	2007		2008	
	Volume (MtCO ₂ e)	Value (MUS\$)	Volume (MtCO ₂ e)	Value (MUS\$)
Project-based Transactions				
Primary CDM	552	7,433	389	6,519
JI	41	499	20	294
Voluntary market	43	263	54	397
Sub total	636	8,195	463	7,210
Secondary CDM				
Sub total	240	5,451	1,072	26,277
Allowances Markets				
EU ETS	2,060	49,065	3,093	91,910
New South Wales	25	224	31	183
Chicago Climate Exchange	23	72	69	309
RGGI	na	na	65	246
AAUs	na	na	18	211
Sub total	2,108	49,361	3,276	92,859

Source: World Bank. *State and trend of the Carbon market 2009*.

Since 2006 and to date, European buyers continued to dominate the CDM and JI markets for compliance, with a combined market share of over 80% (similar to 2007). Private sector companies have been the most active buyers, with slightly less than 90% of volumes contracted, including JI purchases.

Table V: Primary CDM&JI Buyers as shares of volumes purchased



Source: World Bank. *State and trend of the Carbon market 2009*.

3.5 A critical balance of the CDM

Ten years have passed since the creation of the CDM: what is the balance of such a mechanism and what are the future perspectives? The CDM balance is controversial: as already said, it has been a great success in creating a global market for GHG emission reduction projects, having a great impact on the thinking of business and policy makers in developing countries and the awareness and understanding about clean technologies, emissions trading and future action on climate change both in the private and public sector. Moreover, the CDM has considerably changed GHG emissions of some gases and some sectors in developing countries. However, major concerns among activists and experts remain strong: poor performance of some DOEs, who are responsible for ensuring that all rules established by the UNFCCC and the CDM EB are followed. Spot checks by CDM EB revealed serious shortcomings, such as incompetency's to perform validation and verification functions" and "compliance with CDM requirements". In some cases, DOEs have failed to check whether very simple requirements of the CDM are met, such as that the project started after 1 January 2000. Another part of the explanation why DOEs do not act as independent auditors is that they are in the same game as the developers. Validators, developers, carbon buyers and brokers are all members of the International Emissions Trading Association (IETA). All have financial interests in a large and growing offsets market, which depends upon a steady stream of new project applications and a lax approvals process. And all lobby the Executive Board, and the governments that are represented on it, to keep the offset flow coming. IETA reportedly had 300 delegates at the 2007 climate negotiations in Bali, forming a powerful, well-resourced lobbying bloc with excellent access to government negotiators. The pressure on the EB, however do not come just from the corporations that make up IETA. Most European governments and Japan are betting on a plentiful supply of cheap CERs that they can use to

meet their Kyoto goals without having to take too many potentially politically difficult actions at home. Governments of the large developing countries are happy with lax CDM requirements because this increases the CDM revenue that can be captured by their companies.

Another point of concern deals with the addition of many projects which is very questionable. If a CDM project would also be implemented without the CDM, but nevertheless registered as a CDM project, the issuance of Certified Emission Reduction Units (CERs) results in an increase in global GHG emissions, since the emission reductions from the project would occur anyhow while the CERs allow entities in industrialized countries to increase their emissions. (Schneider 2008)

Therefore, the demonstration of additionality requires showing that a project would not be implemented without being registered as a CDM project. The additionality of a significant number of projects seems unlikely or questionable. Several other sources support this conclusion. The important issue of the CDM low contribution of the CDM to achieving SD will be explored in the next paragraph.

A great number of critics have also grown with the CDM implications for carbon trading as a control mechanism. Many critics argue that emissions trading does little to solve pollution problems overall, since groups that do not pollute sell their conservation to the highest bidder. Overall reductions would need to come from a sufficient reduction of allowances available in the system. Critics include environmental justice nongovernmental organizations, economists, labor organizations and those concerned about energy supply and excessive taxation.

The mainstream media has published several withering reports of the CDM. The UK Guardian has accused the CDM of being “contaminated by gross incompetence, rulebreaking and possible fraud.” Newsweek declared that the CDM’s “real winners” have been “polluting factory owners who can sell menial cuts for massive profits, and the brokers who pocket fees each time a company buys or sells the right to pollute.” If the mechanism continues

without major reforms, more of these stories of malfeasance and farce will follow, all providing plentiful critics to those who seek to delay climate action. In April 2008 the Wall Street Journal carried a front page article announcing that the CDM was “in turmoil.” The article noted that the UN-appointed board that governs the CDM is rejecting an increasing number of projects for failing to show that they require offset income to go forward. Yet the EB is still rejecting just over one in ten projects that go before it, while independent analysts estimate that up to two-thirds of the CDM’s offsets do not represent real emissions cuts. The official line from the UN is that the CDM is a “great success” and that any problems are only “temporary phenomena.” The UN, many governments, and of course the carbon trading industry are pushing hard to expand the CDM after the first phase of the Kyoto Protocol expires in 2012. The head of the UN’s climate treaty secretariat recently told a carbon industry trade fair that CDM credit sales could reach US\$100 billion under a new climate agreement.⁶⁷

Concerning carbon markets, some see carbon trading as a government takeover of the free market and argue that trading pollution allowances should be avoided because they result in failures in accounting, dubious science and the destructive impacts of projects upon local peoples and environments. Instead, they advocate making reductions at the source of pollution and energy policies that are justice-based and community-driven. Others, such as Carbon Trade Watch⁶⁸ argue that carbon market places disproportionate emphasis on individual lifestyles and carbon footprints, distracting attention from the wider, systemic changes and collective political action that needs to be taken to tackle climate change⁶⁹. Groups like The Corner House, have argued that the market will choose the easiest means to save a given quantity of carbon in the short term, which may be different to the pathway required to obtain sustained and sizable reductions over a longer

⁶⁷ *Bad Deal for the Planet: Why Carbon Offsets Aren't Working . . . and How to Create a Fair Global Climate Accord*. International report by Dams, River and people. 2008

⁶⁸ <http://www.carbontradewatch.org/>

⁶⁹ Tamra Gilbertson and Oscar Reyes; Carbon Trading - How it works and why it fails. Carbon Trade Watch 2009. <http://www.tni.org/carbon-trade-fails>

period, and so a market-led approach is likely to reinforce technological lock-in.⁷⁰ For instance, small cuts may often be achieved cheaply through investment in making a technology more efficient, where larger cuts would require scrapping the technology and using a different one. They also argue that emissions trading are undermining alternative approaches to pollution control and the overall effect is to actually stall significant change to less polluting technologies. In fact, while the CDM has lowered emissions in developing countries, it has often been a stunningly inefficient means of doing so. And when it does result in a project being built that lowers emissions locally, there is no global climate benefit because the CDM is at best a zero-sum game. Each so-called “emission reduction” generates an offset that just allows an industrialized country to keep on polluting. All critics finally point to a unique issue: the CDM system would need to be rethought. Money generated by projects should be transferred from the wealthy countries responsible for most climate pollution to support CDM in poor countries, but without generating permission slips allowing the wealthy to continue polluting.

⁷⁰ Larry Lohmann. Carry on polluting:
<http://www.thecornerhouse.org.uk/item.shtml?x=546606>

3.6 CDM and sustainable development: what contribution?

The CDM has been considered a successful mechanism to build up the institutional framework for a carbon market in developing countries, including monitoring, reporting and verification and provide a carbon signal in these countries. It has also leveraged considerable investment in developing countries. At the same time, there have been a number of concerns such as environmental effects, transaction costs, and uneven distribution of the benefits between countries but also a real or perceived lack of technology transfer and a failure to deliver sustainable development⁷¹. In addition, increasingly questions are raised about the future of the CDM or any other post-2012 flexible mechanism if designed as off-setting mechanism for Annex-1 emission reductions. In this paragraph it will be given particular relevance to the CDM problem of complying with the goal of SD. It will be briefly revised also the relation between CC and SD and based on several international studies an assessment of CDM contribution to SD is provided. To remind, the CDM was set up with two objectives in mind. The first objective was cost effective mitigation. The CDM opened the door for low-cost mitigation in developing countries, thus involving all countries in the global mitigation effort and allowing annex I countries to meet their Kyoto targets more cost-effectively. The second objective is fostering sustainable development in developing countries. But are CDM projects really producing sustainable development benefits in host countries? The Marrakesh Accords emphasize that it is the host country prerogative to define whether a project contributes to SD. Bearing that in mind, recent studies suggest that CDM's contribution to 'local' sustainable development has been limited (Olsen, 2007; Lohmann, 2006). In some large-scale CDM projects with very limited benefits to local people, developers have committed to use a percentage of CER revenues to fund local development projects (Capoor and Ambrosi, 2006; Ellis et al., 2007). On the host-country level, China instituted a 65% CER tax on revenues from HFC decomposition projects, which another study, Sutter

⁷¹ *A Reformed CDM. UNEP-RISOE 2009. Perspective series*

and Parreño (2007) again use PDDs to review the integrity of emissions reductions and the sustainable development contribution of the first 16 registered CDM projects.⁷² To gauge the SD contribution, Sutter and Parreño examined local employment generation, the distribution of carbon revenue (based on the project's ownership structure), and local air-quality effects. They find a stark contrast: 72% of purported GHG reductions are reliable in scientific terms, while less than 1% of projects contribute significantly to SD.⁷³ Similarly, Michaelowa and Michaelowa (2007) conclude that *"projects addressing the poor directly are very rare and that even small renewable energy projects in rural areas tend to benefit rich farmers and the urban population"*. However, a number of projects have indirect benefits for the overall economy, as many projects create employment, indirectly improve the infrastructure or at least provide CER revenues to the economy.⁷⁴ For CDM small-scale projects, Brunt and Knechtel (2005) show that financial investments in small scale CDM projects are often insufficient to cover the high CDM transaction costs.

Experts are beginning to systematise the SD contribution of CDM projects. For example, Sirohi (2007) examines 65 project design documents (PDDs) for CDM in India and attempts to elucidate the effect of each project's stated contribution to SDt. In his final analysis, Sirohi concludes the PDDs *"offer just lip service regarding expected contribution to socioeconomic development of the masses, particularly in rural areas"*.⁷⁵ Olsen and Fenhann (2008) have performed the most comprehensive study so far, sampling 296 PDDs from the May 2006 UNEP-Riso pipeline of 744 CDM projects. Using text analysis software to find indicators of SD they report benefits within employment (68%), economic growth (46%), and air pollution (44%); thus contributions are

⁷² Pew Center on Global climate change. 2007.

⁷³ Sutter C and Parreño J.C. Does the current CDM deliver its sustainable development claims? An analysis of officially registered CDM projects. 2007.

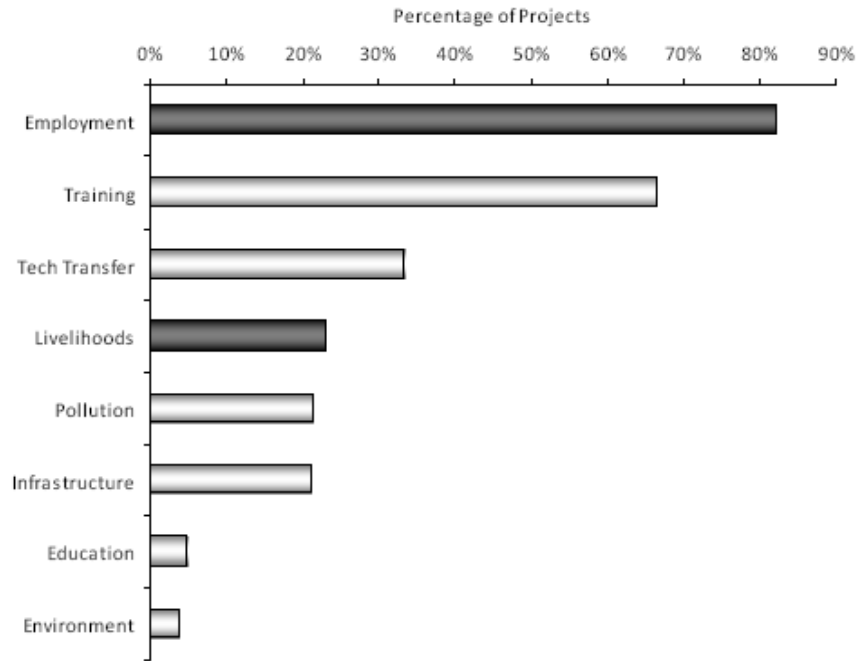
⁷⁴ Michaelowa A, Michaelowa K (2007): Climate or development: is ODA diverted from its original purpose? In: Climatic Change, Vol. 84, pages 5-21

⁷⁵ Sirohi S. *CDM: is it a win-win strategy for rural poverty alleviation in India?* Climatic Change. 2007

predominantly social, followed by economic and then environmental. Other studies, (Boyd and al. 2009) review a random sample of 10 cases that capture specifically (a) diversity of CDM project types that include biomass, waste heat recovery, hydroelectricity, fuel switch, land fill, construction and biogas and (b) regions. The review shows divergences and no causal relationship between project types and SD outcomes. In most cases, outcomes seem constrained to some modest direct employment creation, but little diversification in local economies. The analysis also reveals that it can be misleading to assess projects performance only through project documentation, as local struggles and other development and climate mitigation alternatives may remain invisible. Another attempt to establish the CDM deliver of SD is done by Watson and Fankhauser (2009)⁷⁶. Adopting a broad definition of SD, the project design documents of 409 projects (10% of the October 2008 project pipeline) were searched for keyword indicators of contributions to economic growth, physical, social and natural capital. Economic growth co-benefits, in the form of employment, constitute the main project co-benefit, with 82% of projects claiming to contribute to employment. Under a stricter SD definition, projects contribute principally to social capital, primarily training (67%), with physical and natural capital gains less prominent. Technology transfer is claimed in 33% of projects, followed by livelihood benefits (23%), pollution benefits (21%), infrastructure building (21%), education (5%) and environmental benefits (4%).

⁷⁶ Charlene Watson and S. Frankhauser: *The Clean development mechanism: too flexible to produce sustainable development benefits?* June 2009. Working paper n.3 Centre for climate change Economics and Policy. LSE, p. 8

Table VI: overall projects contributions to SD



Source: Watson and Frankhauser, 2009.

End-of-pipe projects are found to have lower co-benefits than renewable energy or forestry projects in particular. Contrary to common belief, small-scale projects do not appear to provide higher co-benefits than large-scale projects.

Evidence of all these CDM reviews suggest that CDM has broadly delivered on the first objective (to encourage low cost emission reduction in host countries) but CDM has fallen short of its potential to contribute to SD. The uneven distribution of projects across countries and regions together with a very narrow technology transfer and a concentration of projects within few sectors have dominated the CDM experience so far. However it must be mentioned that the difficulty of defining SD during negotiations have resulted in the decision to allocate to host governments the responsibility for setting SD criteria. This has meant for many developing countries, including Mexico, that SD has been overlooked because of the considerable economic value of CDM finance among other factors, such as the technology transfer as well as

the CDM as an instrument for attracting foreign direct investments (FDI).⁷⁷ However, in order to get more reliable information on how CDM are contributing to SD in host countries, it is necessary to count with more in-depth studies at country level, along with largest projects samples and deeper assessment concerning *on the ground* impacts of CDM projects. At the moment, there are only few case studies that provide information concerning major host countries recipient such as China and India (WB 2008). At the same time it is also needed to look at the institutional aspects and local CDM governance framework in order to have a better picture of how SD criteria are applied in CDM projects and how can they be framed into existing patterns of environmental development as well as climate change national actions. Has the CDM to be analyzed within the general development investment frameworks? Or does it have to be approached in a broader view, encompassing social, political and environmental component (ex. SD?). Part II of the dissertation will try to contribute to debate by providing the point of view from the country level perspective of Mexico.

⁷⁷ Emily Boyd, Op. cit.

3.7 The future of the CDM

While the CDM played an important role in the first global agreement to reduce GHG, there is a pressing need to develop new approaches that will welcome all major emitting developing countries to full participation in a global carbon market and strengthen their contributions to averting dangerous climate change. New mechanisms are needed to help developing countries gain experience with the global carbon market and move towards low-carbon economies. (EDF 2008). What is therefore the future envisaged for the CDM in a post 2012 climate regime? In the years since the Kyoto Protocol was established, the CDM has conceptualized, and grown fast together with an acceleration of global awareness of climate change along with serious concerns about global economy and energy supply. The CDM has become established and has engaged stakeholders, and there has been increased scrutiny of its governance structures and performance as a regulatory approval system. Following the Bali Action Plan (2007), the CDM has developed very rapidly and mobilised billions of dollars in public and private investments to reduce emissions in developing countries. However the challenges and weaknesses showed by the CDM have also shaped continuous negotiations on the role of CDM and its future within a post 2012 climate change agreement.

A number of post-2012 approaches have been put forward by many authors. More than 30 approaches are identified in Bodansky's *International Climate Efforts beyond 2012: A Survey of Approaches* (2006) and others by Drexage (ISSD 2007). All of them look at the potential role of the CDM. For practical reasons, in this section it will be analysed the focus of international negotiations and CDM since 2007 and up to date. Increasingly the negotiations have focused around the following main issues:⁷⁸ a) addressing the problem of the already mentioned development dividend (SD and volume of CERs produced by the CDM), b) the institutional reform and the governance of the CDM , c) the need to scale up mitigation by moving from a

⁷⁸ A reformed CDM - UNEP-RISO, 2008

project based level CDM to a sector or programme based level, as suggested by some developing countries such as India and China and finally (d) the problem of financing mitigation efforts such as a fund based mechanism, in which Mexico has a leading role by proposing the creation of a green fund. Key elements being explored during the negotiations include broadening the scope of the CDM to include other activities (land use, land-use change and forestry (LULUCF)⁷⁹, carbon capture and storage (CCS) and nuclear); and expanding the CDM to include sectoral CDM, sectoral crediting of emission reductions below a previously established no-lose target, and/ or crediting on the basis of nationally appropriate mitigation actions (NAMAs).

Concerning the institutional reform of the CDM, it is worth mentioning that current discussions are focused on the role of the Executive Board and its powers, which in other regulatory systems would typically be divided, but in the CDM system are highly concentrated at the EB level. Some points to be mentioned in the analysis of the CDM institutional reform deal with the following⁸⁰: a) the problem of part-time governing bodies: the CDM is a large international regulatory agency handling increasingly complicated political and technical tasks, yet its main policy-making and technical bodies function on a part-time basis. Working part-time severely limits the amount of time that can be spent taking decisions, resetting policy, and responding to CDM stakeholders. It also leads to inconsistent decision making difficulty finishing work expeditiously or thoroughly, and poor focus and low quality of participation from members when in session. b) Inappropriate division of responsibilities. While several examples of inappropriate division of responsibilities exist within the CDM, project by-project decision-making by the EB continues to be the most disruptive. The lack of explicit delegation of

⁷⁹ Until now afforestation and reforestation project activities have enjoyed extremely low participation in the carbon market. The principal reasons are that they are not accepted in the EU-ETS and that they generate only temporary credits. The future of these project activities in the post-2012 regime is unclear, as are the role and financing mechanisms for reducing emissions from deforestation and forest degradation (REDD).

⁸⁰ For a more detailed and accurate description of CDM structural inadequacies, see IETA, State of the CDM 2009.

decision-making authority to any of the technical or administrative bodies means that the EB often engages in discussions and takes decisions on issues which either should be handled as an administrative rather than policy issue or should be handled by Panel experts who have the appropriate technical expertise and familiarity with the specific case in question. c) Lack of transparency.

In the CDM today, however, project participants effectively lack the right to be formally heard by the EB before a project is rejected, and they are not provided a right of recourse or appeal to an independent decision-making body. In addition, the impartiality of the decision-making process is left in doubt by the political nature of EB appointments, the lack of standardized decision-making criteria, and the lack of the use of precedent. d) Inadequate Standardization: despite recent attempts to standardize some CDM processes, significant potential remains to systematize and inject more objective criteria into decision-making throughout the CDM, which would alleviate a wide range of problems facing it today.⁸¹

⁸¹ On standardization see Sther, *in A reformed CDM*. OP. cit.

Table VII: Post 2012 approaches to CDM reform in international negotiations and regime characteristics

Approach	Regime Characteristics
Development Dividend	<ul style="list-style-type: none"> -Wider emission reductions targets, -Monitoring of sustainable development advancement within host countries, -Better regional distribution of projects - Graduation criteria for developing countries
Institutional reform	<ul style="list-style-type: none"> - Top-down standardization and development of methodology tools. - Final registration and issuance upon validation or verification by DOEs unless appealed against. - Appeals to be dealt with by a new independent appeal body, which will take the final decisions based on legal expertise concerning the conformity of cases with existing Executive Board regulations. - The review process to be abolished. - The “new” Executive Board to continue to exercise its regulatory and executive functions, with the exception of decisions on registration and issuance.
Scaling up of the projects	<ul style="list-style-type: none"> -Expanding CDM by introducing sectoral programmes, exploiting afforestation and reforestation, energy and transportation. -Crediting on the basis of NAMA
Fund-based mechanisms	<ul style="list-style-type: none"> -The Climate Investment Funds (CIF); designed to support low-carbon and climate-resilient development through scaled-up financing. It includes the Clean Technology Fund (CTF) and the Strategic Climate Fund (SCF). -Green Fund -Introduce foreign technology requirements in CDM projects

Source: personal elaboration

In the last meeting of COP 15 in Copenhagen- Denmark - while much of the attention in the final few days of the meeting was focused on the emergence of the

Copenhagen Accord, the UN also released a number of technical documents, including an agreed set of changes to the CDM titled *Further guidance relating to the CDM*⁸². Under the agreement, the CDM-EB has been granted permission to streamline registration and issuance procedures for emission reduction projects, and provide new funding to accelerate the development of CDM projects in countries with fewer than 10 CDM approved projects in operation. Following a number of investigations which found that some of the firms tasked with independently verifying that CDM projects deliver real emission cuts had been cutting corners, the proposed reforms also call for an improved system of "continuous performance monitoring" for the third-party certifiers that assess requests for registration and issuance. And in a significant move given the CDM Executive Board's controversial recent decision to reject applications from 10 Chinese wind energy projects, the Copenhagen Summit agreed also that the EB should establish new procedures for stakeholders to appeal against decisions.⁸³ Such decisions indicate that CDM should be improved and continue in its functions although it must be remembered that any improvements to the CDM's project approval processes will be determined by major changes within any binding treaty or new international agreements that will replace the Kyoto Protocol when it expires in 2012 and that Copenhagen failed to deliver. It remains to be seen what will be achieved in COP16 (Cancun 2010) and COP17 (2011). During the COP16 in Cancun (December 2010), some important progresses were made. The so called Cancun Agreements helped to bring back on track international negotiations on climate change. The two documents resulting from the Cancun agreement contain the following provisions. One deals with the future of the Kyoto Protocol. The Kyoto Protocol shall be continued with a second commitment period. It is of particular importance that the relevant working group shall ensure that there will be no gap between first and second commitment period. The second document copes with a foundation for long-term cooperative action in many fields, including compromises on the issues of mitigation, adaptation, a shared vision for 2050, technology transfer, capacity building, and financing.

⁸² Further Guidance Relating to the Clean Development Mechanism. UNFCCC.int

⁸³ <http://www.businessgreen.com/business-green/news/2255410/copenhagen-green-lights-plan>

Concerning mitigation is surely the most important among all issue areas. It has direct consequences for both the environmental effectiveness and the carbon markets. According to the expectations, no country has taken stronger commitments in Cancun in terms of reduction targets. It is, however, of significance that the nonbinding pledges taken under the Copenhagen Accord have now been reflected within an official UNFCCC decision, including measurement, reporting and verification. This is the case for mitigation by industrialized and by developing countries. The targets pledged under the Copenhagen Accord, including the various NAMAs in developing countries, thus form the basis for future demand and supply in the carbon markets. This is especially important in the context of the further development of market mechanisms.⁸⁴ Concerning in particular the flexibility mechanisms, it has been decided that the Kyoto Mechanisms shall be continued under the Kyoto Protocol and a long-term agreement, with further development/new mechanisms being considered. Furthermore, the Conference took decisions on the CDM and Joint Implementation, representing further important steps for reform. However it remains to be seen what will be achieved in COP17 (Johannesburg 2011) to determine the future of the Kyoto Protocol in more details terms and the carbon market evolution. Upon future developments of the CDM at international level will depend also the future of the CDM in Mexico, together with the consolidation of national institutional processes and sustained economic performances.

⁸⁴ *Green market*; Special Report: Cancun Outcome and Implications for the Carbon Market.

PART II

CHAPTER IV

SUSTAINABLE DEVELOPMENT AND CLIMATE CHANGE IN MEXICO

The fourth chapter of the thesis deals with the role of SD and CC policies in Mexico. The proposal of the chapter is twofold: on one side arguing that Mexico's environmental framework and governance is quite a recent topic for the country and although the SD concept is widely accepted, environmental actions are not always driven by SD criteria. Mexico has been implementing environmental policies and creating environmental institutions since the end of 1980s and beginning of 1990s when international conferences on the environment and the Agenda 21 pushed developing countries towards a stronger commitment to environmental issues. Current environmental degradation is posing serious threat to national economic development and growth, based in particular on natural resources exploitation (oil, gas etc.). But when looking at the Mexican environmental policies it must be taken into account the economic and political choice made by the Mexican government that since 1980s adopted a neoliberal vision which strongly determined the current development of the country in many fields, including the environmental one.

On the other side, the chapter copes with the issue of CC in the country; due to the high vulnerability of the country and a strong political interest by the president of the Republic Felipe Calderon elected in 2006, Mexico has become one of the most active countries in the international community and among the Group of 5 (G5) to promote the issue and its impacts within Mexico and in the Latin American region. Mexico's commitment to fight climate change shows an unprecedented interest for an environmental topic by a developing country in terms of actions and strategies adopted. Efforts undertaken by the Mexican government both nationally and internationally in

the climate change arena are remarkable in many ways, as it will be described along the chapter, considering the fact that Mexico is a No Annex I country and it has no obligation under international agreements such as the Kyoto Protocol to reduce GHG emissions. Therefore all climate change strategies and actions, including the CDM, are adopted by the Mexican government on voluntary basis. However and despite those important efforts, Mexico still lags behind with the commitment to promote for example SD in the country and complying with the Millennium Development goals in the environmental field, where the country is not on track. One of the main reasons for not having yet a balanced environmental governance that include a sound SD policy and the implementation of adequate climate change policies deals with the lack of a clear definition of national SD goals and under what circumstances Mexico is sustaining current economic growth at the expenses of the important natural and environmental conditions of the country.

4.1 Mexico, the neoliberal economic choice and the environment

The economic progress achieved by the Mexican during the first half of 1900, came to an abrupt halt in the 1970's. Fueled by increasing oil prices and petrodollars, deficit spending increased at an explosive rate. Furthermore, direct government intervention in the economy accelerated while more restrictive foreign trade and investment policies were adopted. The government's inability to curtail spending, in conjunction with populist creeping economic policies, led to the beginning of the disastrous cycle of "end-of-administration economic debacles": By mid-1981, Mexico was beset by falling oil prices, higher world interest rates, rising inflation, a chronically overvalued peso, and a deteriorating balance of payments that spurred massive capital flight. This disequilibrium, along with the virtual disappearance of Mexico's international reserves--by the end of 1982 they were insufficient to cover three weeks' imports--forced the government to devalue the peso three times during 1982. In August 1982 Mexico's minister of finance informed the US Federal Reserve chairman, the secretary of the treasury, and the International Monetary Fund (IMF) managing director that Mexico would be unable to meet its obligation to service an \$80 billion debt (mainly dollar denominated) and declared the insolvency. It was one the worst economic crisis nationally and internationally. In the following administration by President Miguel de la Madrid (1988 -1994), the country underwent a major structural reform, aimed at reducing government spending and opening the country to foreign markets. In 1986, Mexico became part of the General Agreement on Tariffs and Trade (GATT), later renamed as the World Trade Organization (WTO). During the administration of President Carlos Salinas de Gortari (1988-1994), the Mexican economy went through a process of political, economic and financial liberalization, following the rules

established by the Washington Consensus⁸⁵. The role of the state was reduced, controls on interest rates and cash requirements were lifted and free trade agreements were signed with various countries. A set of strong economic rules pointing to a stable macroeconomic environment, fiscal prudence, low inflation, little country risk, a flexible labor force, a strengthened and solvent banking system, successfully reformed poverty-reduction programs, high earnings from oil, was put in place during those years.

In addition, many state-owned companies were privatized including railroads; airlines, commercial banks and the National Telephone Company, and concessions to build and operate toll roads were granted. The proceeds from the sale of public companies were channeled to public debt reduction that went from 100% of the GDP in 1988 to 20% in 1994⁸⁶. During this period Mexico opened up its economic and political ties with the world. In 1993, Mexico was admitted as a full member of the Asia Pacific Economic Cooperation (APEC), and in the following year became a member of the Organization for the Economic Cooperation and Development (OECD). In January 1994, the North American Free Trade Agreement (NAFTA) with the US and Canada was implemented. Although 1994 was a year full achievements, it was also characterized by deep social and political unrest as well as a deepening poverty conditions among Mexican population (30 million people out of 90 living in poverty), which began to experience a massive

⁸⁵ Since the late 1980's reforms to correct the plight of the developing world economies have generally followed an economic blueprint rooted in neo-liberal thought. The embodiment of these theories was defined in a set of economic principles dubbed the "Washington Consensus". The term, coined by John Williamson (1990), categorized a set of policy prescriptions that should enhance growth and are consistent with conservative economic principles. They are: privatization; trade liberalization; public expenditure priorities; fiscal discipline; tax reform; interest rate liberalization; competitive exchange rate; foreign direct investment; deregulation; and property rights. The ideological basis of the Washington consensus come from the economic school of thought of the Chicago University, which strongly influenced Latin American scholars that for many years occupied key jobs in the public administration, particularly as Secretaries of Treasury and Economics (the so called *Chicago boys*).

⁸⁶ Jose Manuel Suarez-Mier, *"Mexico's Mid-term Elections Foretell Deep Trouble in the Country's Future: 14 lessons from Mexico's history that help to understand better what is in store for that country and for its neighbor to the North"*. Laffer Associates. October, 1997.

migration movements towards North America.⁸⁷ By the end on 1994, the Mexican Peso came under speculative attack. Hit by plunging oil prices and the loss of confidence in emerging markets following the Asia financial crisis in 1995-1996, the volatility of the Mexican Peso increased markedly during 1998. Tighter monetary and fiscal policies were adopted by the central bank to cope with the situation. In spite of this, the economy managed a 4.9% real grow in 1998 and inflation rate reached 18.6%⁸⁸.

After a period of economic stability and reduced inflation through the end of the 1990's and strong growth in 2000, Mexico suffered from the slowdown of the US economy in 2001. The year 2000 was also the first election won by a candidate from an alternative party (Vicente Fox from PAN, National Action Party). Under president Fox (2000-2006) and its successor (President Felipe Calderon also from PAN, 2006-2012) Mexico has been experiencing a low economic growth compare to other middle income countries, with soaring inflation and interest rates, falling oil production and shrinking remittances – money sent home Mexicans working in the US (the second national income after oil). The economy slow down was also part of the largest international economic crisis that hit the world in 2008-2009. Poverty in the country is still growing (40 million people in 2009 census)⁸⁹, and foreign direct investment (FDI) have increased slowly. The global economic crisis is having a significant effect on the Mexican economy. Real GDP growth in Mexico in 2008 was 1.4%, down from 3.3% in 2007. The economy is forecast to contract by 2.6% in 2009 and 2010. The expected decline in the Mexican economy in 2009 may be the sharpest decline since the 1995 currency crisis. The decline in U.S. demand for imports from Mexico resulting from the U.S. economic slowdown will have an impact on the Mexican economy because of its dependence on the United States as an export market. In fact, since

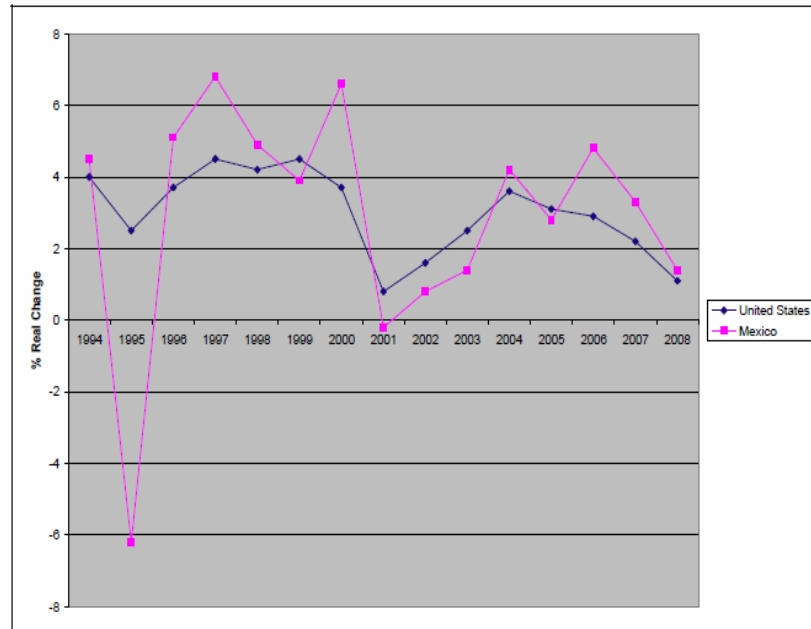
⁸⁷ It was also the time of the Zapatista guerrilla Movement, a military-peasant group against the economic liberalization process and opposed to NAFTA, which was born in the poor Mexican southern state of Chiapas and led by the iconic figure of *Sub-Comandante Marcos*

⁸⁸ The government inflation target for the year was 12%.

⁸⁹ Mexican National Institute of Statistics (INEGI), 2009 annual report.

president Salinas de Gortari's radical change of economic policy, the Mexican economic became closely linked to the US economy and trade with North America region is currently the major economic source of Mexican growth, together with oil revenues and remittances. Any prompt recovery is necessarily linked to the recovery of the US economy. The Mexican political choice to embrace the neoliberal view and strengthening the North American integration is still bearing strong social costs and it is not yet clear what the economic and political benefits for such a choice have been.

Table I: Mexico and US economic performance (1994-2008)



Source: Economist Intelligence Unit.

The political economic decisions embraced by the Mexican government since 1980s have had clear impacts on environmental policies. Some of the most significant changes in environmental management as well as in the adoption of over the past 25 years have been those associated with the above mentioned neoliberal policies. Neoliberalism is in fact generally associated with free trade and reduced government and with a belief in market- rather than state-led solutions to social and environmental problems. In terms of the environment, neoliberalism has been linked to the privatization and co

modification of state-owned enterprises, or common property resources such as forests, water, and biodiversity; payments for environmental services; deregulation and cuts in public expenditure for environmental management; and transfer of environmental management to local or nongovernmental institutions. Mexico therefore, as part of the NAFTA, The North American Free Trade Agreement (NAFTA) between Canada, the United States, provides an important case of trade liberalization and the relation with the environment. The environmental effects of neoliberalism are direct and indirect, as well as, negative and positive. Although environment was not part of the original neoliberal view of US economists such as Friedman, it is inextricably linked to neoliberal policies because many economic sectors are directly dependent on the natural environment (e.g., for water or waste disposal) and because reduced state intervention may mean less environmental regulation. Nature and the environment also complement the neoliberal market agenda in that they provide new opportunities for commodification and privatization and thus for capital accumulation.

With a more specific analysis on the case of NAFTA, environmental concerns have begun to rise since its inception in the middle of '90. Among the three nations involved in NAFTA, the environmental effects on Mexico are perhaps the most alarming. For a number of reasons, Mexico entered into NAFTA with a variety of environmental disabilities. These were further complicated by the treaty, as large multinational corporations moved in, focusing almost exclusively on profit over environmental well being. Being a relatively impoverished nation, Mexico's infrastructure had always lagged behind substantially in comparison to Canada and the United States. Thus, the nature of such already established industries coupled with newly introduced foreign firms, makes it increasingly difficult for Mexico to reach the agreed-upon environmental standards. One of the main reasons why it is so difficult for Mexico to invest a sufficient amount of funds into these environmental projects is the tremendously high national debt that Mexico is currently running. This debt is due to international bail-outs by the World Bank, the

IMF, and private U.S. banks, whose standards for loans often require cutting social and environmental spending in order to balance the budget and pay back the borrowed sum. In concrete terms, the border region between the U.S. and Mexico has been hit particularly, due to intense industrialization associated with free trade zones and maquiladora industries. The border between Mexico and the United States has poor drinking water standards, inadequate sewage treatment, mass squatter settlements with deplorable living conditions, exploding population rates, and rapid industrial expansion by industries whose air and water emissions are insufficiently monitored. Until very recently, Mexico has spent virtually nothing on environmental law enforcement, and thus powerful multinational corporations were able to get away with almost anything.

Now, with the increasing industrialization as a result of NAFTA, the Mexican government struggles to even assess the environmental impact these corporations are having. Every day for example, untracked, unmonitored hazardous wastes from *maquiladora companies*⁹⁰ are dumped onto vast stretches of desert near the border cities. Likewise, there is rising concern regarding vast marine pollution and endangered marine resources caused by petroleum spills and wastes from oil operations off the coast of Mexico. Due to the expansion of multinational corporations into Mexico from the U.S., there is a substantial increase in the transportation of goods across the border. Mass waves of trucks idling in traffic at international bridges and border crossings have led to substantial photochemical smog problems in Tijuana - San Diego and Ciudad Juarez - El Paso. Finally, as a result of the immense poverty, such border cities as Ciudad Juarez and Nuevo Laredo lack sewage treatment plants. Thus millions of gallons of raw sewage are poured daily into the Rio Grande, the main source of drinking water. In addition to having

⁹⁰ Maquiladora industries are assembly plants in Mexico (near the United States border) and owned by large transnational corporations (mainly US, European and Japanese); goods produced are shipped into Mexico and the finished product is exported across the border to the US market.

profound effects on the health of the nearby residents, industries are having increasing difficulties finding fresh water for their processing needs.

But the border region is not the only place of environmental devastation associated with the effects of NAFTA. The agricultural sectors also face severe environmental problems. Large corporations often feel the need to use harsh pesticides on their products to ensure the success of their crops. However, these pesticides also contain life-threatening poisons that have a profoundly debilitating effect on both the land and the workers. These toxins eventually seep down into the water supply, poisoning surrounding habitats and polluting drinking water. Furthermore, these pesticides are known to cause serious health problems and birth defects in humans, and very likely will have similar effects on animal species whose food and water supplies will be similarly contaminated. Although it is hard to establish a direct link between NAFTA's effects and the environmental problems, environmental degradation in Mexico during the past 20 years has clearly been also the effect of the choice of environmental policies mostly driven by economic interests.

4.2 The evolution of Mexican environmental politics

Bearing in mind the previous Mexican political and economic background both national and internationally and strongly led by the economic growth concern, the environmental issue has become a matter of national importance for the country only during the end of 1980s and beginning of 1990s when the international debate on environmental issues was gathering momentum around the relationship between exploitation / conservation of natural resources and aspects of economic growth. Considering its economics and extensive oil and natural gas resources and being caught among the dilemma of many developing countries which need a rapid and sustainable economic growth while they keep exerting strong pressures on natural resources and the environment, Mexico has been taking a stand position on the environment since the Rio Conference in 1992. From Rio

onward, Mexico has adopted an ambitious approach to environmental governance, increasingly mainstreaming SD as a guiding principle of sectoral policy-making processes and as a shared responsibility of different sectors and institutions.⁹¹ With 1.3% of the world land area, Mexico hosts about 12% of known terrestrial biota and is one of the world's 12 mega-diverse countries. The 1983-1988 National Development Plan, includes for the first time the subject of ecology as an explicit factor in the social and economic development of the country and it presents strategies for appropriate use of natural resources in the country. An important milestone of this period is the reform of Article 25 of the Mexican Constitution, to indicate that economic activities that rely on natural resource exploitation should take care of their conservation. In the same year, it begins also to regionalize the country's environmental policy with the signing of the Bilateral Agreement with the U.S. on the Protection and Improvement of the environment in the border area. In 1987, a constitutional obligation to preserve the environment and restore ecological balance is passed in the Low Chamber, empowering the Congress to enact laws that establish the obligations of federal, state and local governments to respect and preserve the environment. With such legal changes, a new phase is opened in Mexico and it paves the way to a fundamental national stage in the development of policies towards the environment, defining roles and public responsibilities. In 1988 the General Law of Ecological Equilibrium and Environmental Protection is published, which is so far the instrument governing the operation of environmental policy, including climate change. In 1992 the government creates the National Ecology Institute (INE) and the Federal Environmental Protection Agency (PROFEPA), with clear roles: the first one has a mandate to generate information and studies, environmental standards and policies, while PROFEPA would be responsible for monitoring and controlling compliance with the rules and laws. In the same year, Mexico participated in international negotiations under the UNFCCC. The adoption in 1992 and

⁹¹ OECD Report; *Mexico Environmental performance*. 2004

ratification of the UNFCCC in 1993, marks the formal commitment to Mexico to start working on the climate change issue.

The following presidential period (1994-2000), under President Ernesto Zedillo, is characterized by two important phases within the environmental context: the first deals with the consolidation of earlier policies and the institutionalization of national environmental programs and the second one, concern a mayor Mexican engagement to international environmental agreements, in particularly with the Rio Summit on SD, the Agenda 21 and the UNFCCC and NAFTA. Mexico then begins running an unprecedented effort on environmental diplomacy as part of its national and international environmental agenda. In particular, with the entry into force of NAFTA in 1994 and the signing of the side environmental protocol, Mexico was forced to take a stronger environmental stance within North America. The U.S. pressure on the environment in the specific case of air pollution and soil on the northern border impacts and guides the country's strategic environmental policies in many ways into the future.⁹² In the same year (1994), the Ministry of Environment and Natural Resources and Fishing (SEMARNAT) was established, which formalized the establishment of a government ministry that deals with all aspects of environmental guidelines. In 1994 Mexico also joined the Organization for Economic Cooperation and Development (OECD): although the entry of Mexico into the club of world richest countries boosted the international image and prestige of the country, it practically resulted in an immediate separation from the Group of 77 putting the country in a situation of relative isolation from major international environmental agreements and negotiations. In fact by not joining the G77 position of developed countries with whom Mexico traditionally had been identified, turned out to be a choice that until now has not been clear in its consequences. It is worth mentioning that Mexico entry into the OECD had initially suffered a setback concerning climate change international governance system: between the various

⁹² Ibid.

aspects and terms negotiated for the integration into the OECD, it was agreed that Mexico would be included into the Non - Annex I list of countries to the UNFCCC. Until the signing of the Kyoto Protocol in 1997, the definition of the Mexican environmental policy is characterized by an internal debate among government secretaries and officials (SEMARNAT, Secretary of Energy - SAGARPA) and INE in terms of the commitments that Mexico should take under the emerging global climate change regime. During the six years of President Fox (2000-2006), the environmental agenda lost vigor and interest due to several factors: first the fact that the U.S. did not ratify the Kyoto Protocol represented a major blow to the aspirations that Mexico could take better advantage of the flexible instruments of the Kyoto Protocol PK and environmental carbon markets within North America. Secondly, the terrorist attacks of September 11th at the Twin Towers in New York, conditioned the new international security agenda, including the environmental one and the bilateral one for which Mexico had no immediate response. US-Mexico 3,500 miles border militarization and security operations in the six major border trade check-points, significantly impacted the development of the strongest environmental bilateral program ever put in place between the two countries (US Mexico border program 2020) as a part of the NAFTA commitments to the environmental bilateral agenda, and its financial budget was dramatically reduced. Thirdly, the foreign policy agenda of President Fox predominantly focused on the issue of human rights, and all diplomatic and economic efforts in foreign policy were directed to this field. The only two environmental actions worth to remember on this presidential term, regard the actions taken on climate change: in 2004, the federal government created the Mexican Committee for Projects to Reduce Emissions and Capture of Greenhouse Gases (COMEGEI) and in April 2005, it created the Interministerial Commission on Climate Change, within which the COMEGEI remains as one of its working groups. This committee has among its most important functions the formulation of national climate action strategies and policies. The current presidential term of Felipe Calderón (2006-2012), former secretary of Energy

under the Fox administration, shows an unprecedented interest and engagement with the climate change issue and sustainable development, making it an issue of priority for the country at regional level and internationally. The intention is to project to Mexico as a country highly vulnerable to the effects of climate change and as a possible international leader in promoting mitigation and adaptation agendas regionally, among the G5 and internationally.

4.3 Sustainable development in Mexico

A crucial question to be addressed before looking specifically to the the issue of environmental government policies in Mexico, is what kind of SD is promoting therefore the government, under which definition and practice. At the beginning of the thesis, a brief description of what is meant by adopting SD policies in Mexico was provided. Having described what is Mexico is trying to sustain and under what conditions, it is worth recalling the official version of SD at the discourse level, and analyze what the Mexican government is undertaking in terms of environmental governance.

At the official discourse level, Mexico has been implementing an SD agenda following the adoption of Agenda 21 and the various Conventions resulting from the UNCED-1992, by improving the institutional environmental framework and addressing major environmental issues within the country. From a governmental stand point, SEMARNAT is responsible for conducting all sustainable development policies and programs. The national strategy developed by the federal government through SEMARNAT also includes specific measures to promote new ways of participation to encourage people, either individually or collectively, to become involved in the preparation and execution of the environmental policy and to pay attention to the use of resources in the environment. Policies have also been designed to prioritize matters relating to women and indigenous races, social groups that are fundamentally important for protecting the environment and preserving biodiversity, as these groups have often been excluded from the preparation and execution of public policies. SD criteria are described within the six stages of the overall national environment policy.⁹³ The most relevant are:

- a) Environmental policy should be managed under a wide-spectrum approach which includes not only ecological considerations but

⁹³ Helio International: *Mexico and sustainable development*. In <http://www.helio-international.org/reports/pdfs/Mexico-EN.pdf>

comprehensive focus in which the existing relationship between water, air, soil, forestry resources and the biological diverse elements will be taken into account.

- b) SD actions should be included within the attributions and functions of the different agencies which are responsible of conducting economic, social and energy policies.
- c) Implementation of efficient management instruments and restructuring of the federal environmental sector considers the involvement of all federal, state and municipal authorities, to jointly implement coordinated actions to ensure that environmental management is effective and efficient.
- d) Accurate assessment of natural resources, where the national policy will encourage users of natural resources and environmental services to recognize their economic and social value and this will result in them being used rationally.⁹⁴

Beyond the above-referred main goals and objectives of the Energy Sector Program 2006-2012, it also establishes strategies that relate to the environment and SD: to maintain and to strengthen a clean-fuel development policy, which mostly relates to the use of natural gas and improved gasoline; to foster the fulfillment of all related environmental laws and regulations by the public energy companies, which means that the state-owned energy companies are not beyond these laws and regulations; to promote sustainable energy projects, which reflects more an intention than a law-mandated commitment; and, to contribute in the mitigation of GHG emissions. However, the SD policy in Mexico cannot be understood without framing the government environmental efforts into the strategy set out by the MDGs. In

⁹⁴ Ibid. p.4

line with the rest of the Latin American Region, Mexico finds itself struggling also with the international commitment of complying with the MDGs and in particular with the goal n.7 which promotes sustainable development. At few years away from the expiring date of MDGs (2015), Mexico is not on track in many areas.⁹⁵ Deforestation, soil degradation, deterioration of natural ecosystems and the problems stemming from the waste being discharged into the atmosphere, soil and water are still to be properly tackled down in the country. But most of the official information does give only a partial account of the most pressing issues around the SD national policies and priorities to be addressed in the country. Given Mexico's environmental objectives, the deforestation rate is still extremely high (among the highest in the world). Despite progress in managing protected areas, these areas account for fewer than 10% of the territory and some types of ecosystems are under-represented; human, material and financial resources are still insufficient, leaving a sizeable number of protected areas without management plans. For example, in the period 1993 to 2006, forest area and forests declined by just over 1.5 million hectares, with all negative implications on biodiversity and environmental services associated with it. During this period also, the integrity of forests and woodlands was reduced. Protected Natural Areas (PNA) increased significantly rising from 2.9 percent of the national surface 1990 to 9.6 percent in 2005, due mainly to a strong policy associated to the consolidation of existing programs and new strict regulations on the area.⁹⁶ Although the 154 Natural Protected areas have shown to be an effective way to promote conservation, biodiversity is necessary to complement this strategy with other forms of nature protection. Payment programs for environmental services reward landowners to maintain the environmental services like water harvesting, protection biodiversity and carbon sequestration are a good example of programmes that could be implemented but are currently not applied.

⁹⁵ Millennium Development goals; Advances in Environmentally sustainable development in Latin America and the Caribbean, CEPAL 2010.

⁹⁶ *Los Objetivos de Desarrollo del Milenio en México: Informe de Avance 2006*. ECLAC/UN

In the area of drinking water and sewerage, it is satisfactory but still insufficient progress have been made. Drinkable potable water, including that available through piped water inside the housing, increased from 75.4% in 1990 to 87.1% in the year 2005. From 2000 to 2005, 7.6 million inhabitants received a better delivery service of water. The coverage of sewerage and drainage increased substantially in the last five years, from 72.8% in 2000 to 83.4% in 2007. These advances, however, do not mean an effective sustainable water management. Many areas of the country still suffer problems overexploitation of aquifers due to intense extraction of this resource for agricultural needs, urban and industrial, and most of the rivers and lakes in the country have pollution problems as result of discharges of urban and industrial waste.

Concerning CO₂emissions, there are also few progresses. Emissions from fossil-fuel burning and cement production have increased in absolute terms from 1990 to 2006 (around 30%). Data reflects Mexico's development choices as well as rapid population growth. Together with other environmental pressures, such as road traffic, industrial and agricultural production, and energy production and consumption, Mexico has not yet been able to achieve strong *decoupling* of environmental pressure from economic growth as has been done in some other OECD countries. In the field of social concerns, Mexico has made significant progress in reducing the health impacts of pollution. In particular, a drop in child mortality rates (e.g. from acute gastro-intestinal and respiratory diseases) is related to water disinfection and air quality improvements. An active policy towards income and employment generation through environmental/natural resources management is also implemented at federal level.⁹⁷

During the fieldwork for the Phd thesis and in particular through interviews with local stakeholders and the revision of major SD literature in Mexico, it is fairly clear that the national sustainable development path in the country has

⁹⁷ Ibid. P.45

been evolving and modifying along the years and the reality of SD in Mexico is very different from the discourse analysis above presented. Though no formal definition of SD can be found in official documents, except for the mention to “human sustainable development” as a pillar for the national development strategy (National development Plan 2006-2012 -NDP), there is no clear use of the term. The NDP incorporates the tenets of the Human Development Report (1994), United Nations Program for Development, according to which *“the purpose of development is to create an atmosphere where everyone can increase their capacity and opportunity to be extended for present and future generations”*. However, the SD concept within the NDP is not stuck to any international conventional definition but it is a sum of different assumptions.

According to a personal interpretation of data, information and fieldwork, the ability of Mexico to practice SD is affected by many factors, some of which are defined with the combination of the following points:

(a) domestic policy actions, including steps taken toward the safeguarding of current economic policies open to free market economies (privatizations, deregulation, foreign investments) without depleting current and powerful natural resources (such as oil, gas, biodiversity);

(b) Financing policies from bilateral and multilateral lending institutions in the environmental sector;

(c) Private sector investments and clean technology development.

d) Enforceable environmental policies led by environmental services concepts and practices,

e) Public participation in decision making.

f) Verifiable and measurable standards to monitor progresses on some core environmental priorities for the country (air, water, soil).

The interaction of these factors forms the basis for an SD national definition, practice and conceptualization of the term in Mexico. What lies beneath this definition is a matter of high importance for the current Phd dissertation. As previously seen, the neoliberal economic path chosen by the country since 1980s, paved the way for a clear definition of growth and development in Mexico. Neoliberal policies shaped the current economic and political system and the environment is not an exception to that trend. Mexico in fact, has sought to establish a regulatory legal framework, to coordinate environmental issues and sustainable use of natural capital stock, provided that the degree of capacity of these standards and their applicability to make them effective mechanisms for preserving the environment and natural resources based on a economic rationale.⁹⁸ In this sense the concept of SD was implemented in Mexico as a result of international agreements many of which are related to the liberalizing policies that prevailed throughout the world since the early 80's. In particular it is important to recognize that together with many other developing countries, Mexico has been adopting the so called “environmental consensus”, a euphemism used to recall the effects of the *Washington consensus* in environmental terms. It means that the predominant environmental policy in the country follows the advice of institutions like the OECD, of which Mexico is member since the middle of the 90s, and international donors like the World Bank, USEPA among others, that have provided support through environmental development assistance based principally on market solutions.

When comparing for example the official discourse with solid economic data, it is clear that the economic growth in the country was (and still is) based on the unsustainability of the use of public property stock natural capital. Average investment rate on environmental issues was only about 5% since 1990s of the GDP⁹⁹ and is certainly not enough to compensate the depletion

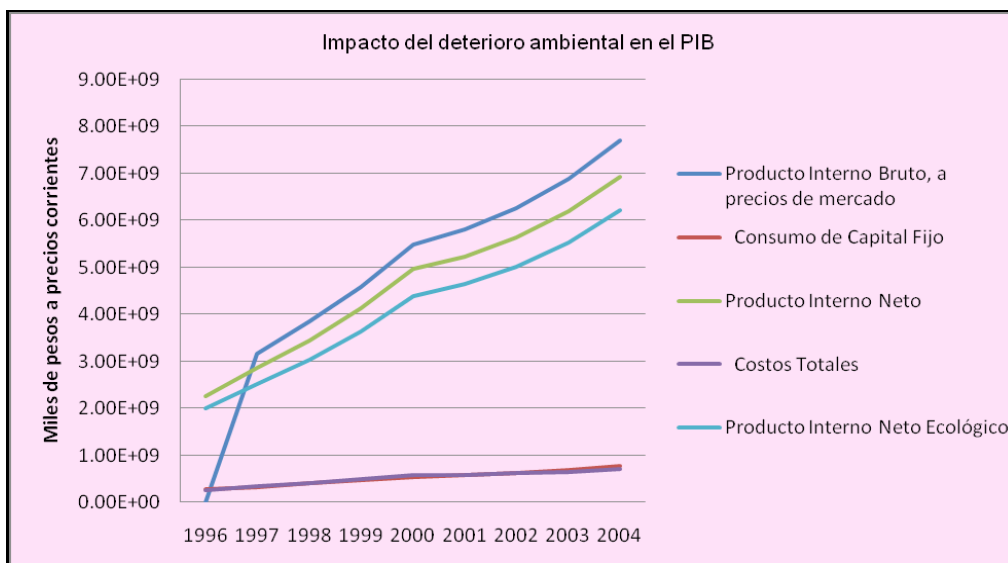
⁹⁸ Jessica Escobar, El desarrollo sustentable en México (1980-2007). Revista Digital Universitaria 10 de marzo 2007 • Volumen 9 Número 3.

⁹⁹ Ibid.

of resources. Thus, it appears that SD remains an elusive discourse in a nation that has as a proportion of GDP to 10% of environmental degradation and that only spends about 5% of the value of their consumption of natural resources.

The current development model therefore has failed to solve the major environmental problems in the country and on the contrary it has increased, reflecting a growing impoverishment of society and an excessive enrichment of a few. Furthermore, this model of "development" has consistently contributed to the deterioration of natural capital stock and consequently the deterioration of the quality of life of the population. A big mistake seems to be the fact that the excessive use of natural resources under the criteria of immediate profitability caused the destruction of potential resources whose value is not reflected in the market. This problem is particularly acute, given that environmental degradation resulting from human action in Mexico is both the conditioning element of social development. Therefore, economic growth has not taken into account the preservation of the environment, which by contrast, has been increasingly degraded, probably due also to short-term vision of meeting the economic needs.

Table II: GDP and the environmental impact in Mexico



Source: J. Escobar, 2008

As a consequence of this policies, Mexican priorities on environmental issues and therefore on SD practices focus on the following areas: water and forest management, which have become issues of national security; integrated management of natural resources; environmental management and environmental planning at the watershed level; decentralization of environmental management and decision-making; increased public participation and the right of access to environmental information; ensuring that users of natural resources pay for the environmental cost of resource use; and strengthening of environmental legislation, inspection and compliance rates.¹⁰⁰ As a matter of fact these priorities coincide with the so called “WEHAB” (Water, Energy, Health, Air, Biodiversity) principles established by the Johannesburg conference on SD in 2002 and where most of the international fundings by the international cooperation are available. The World Bank only lended to Mexico more than 500 billion US\$ in the last eight years for environmental projects, mainly directed to the implementation of the WEHAB agenda.

In fact, though Mexico has recognized the severe environmental degradation confronting it, the problem of funding national actions on the environment, has been among the major hindrances for implementing national public policies. Insufficient Federal spending on environmental protection, limited application of the user and polluter pays principles, limited revenue-raising ability of states and municipalities and low reliance on external financing all explain Mexico’s difficulties. Devolution of environmental policy implementation also has not been accompanied by adequate capacity building at state and municipal levels. This implementation gap reflects, in particular, the complex and sometimes unclear distribution of environmental competency across levels of government and limited local authority to raise revenues from taxes or charges. In terms of environmental enforcement there are still some basic issues unsolved: the necessary increases in staff and

¹⁰⁰ OECD Report; Policies to address climate change: the OECD experience and relevance for Mexico. 2007.

budget of the Federal Attorney for Environmental Protection (PROFEPA) have not been attended during the past years.¹⁰¹ This is also why the country has been constantly recurring to international financial support for implementing national environmental policies.

However, it must be said that when President Calderon came to power in 2006, the SD concept in Mexico was slowly incorporated into a larger policy framework that shifted the attention towards the issue of climate change, which has become the core of the current national environmental strategy. Several traditional areas of national SD environmental concern such as water, energy and other issues have been recently linked to mitigation and adaptation policies within the national strategic plan for climate change (NAMAs). It remains to be seen how the new Mexican environmental policy agenda will be able to tackle both dimensions (climate change and sustainable development) or if they both will merge in practice into a unique concept and strategy, as it seems to be the case.

¹⁰¹ Ibid.

4.4 Climate change in Mexico

Mexico is one of the developing countries most committed to the fight against climate change. As the only member of the Organization for Economic Development and Cooperation (OECD) that did not take on targets under the Kyoto Protocol, together with South Korea, not being included in Annex I to the KP, Mexico has been very active in taking the forefront of negotiations regarding developing-country initiatives for the international climate regime. In this section, an understanding of the dynamics of climate politics in Mexico will be provided in order to frame the Clean development mechanism context within the country. Furthermore, the analysis of the Mexican case study can be a useful exercise to create knowledge of climate politics in non-Annex 1 countries and understanding their future role in international negotiations.

Overall national strategies and actions taken towards climate change for a country that has no obligations to reduce GHG under the Kyoto Protocol are quite impressive. Mexico presented to the UNFCCC four national communications (1997, 2001, 2006, 2009), it released a study on the economics of climate change, like the Stern report, (2009), developed a National Special Programme on Climate Change 2009-2012 (NSPCC) which provides unilateral commitments for the reduction of emissions in the short term and it will be soon replicated in every one of the 31 States of the federal republic. Mexico counts also with a *Greenhouse Gas Emissions Inventory*, many national studies on climate change energy and others initiatives that will be described in this section. In administrative terms, Mexico has set up in 2005 an Inter-ministerial Commission on Climate Change which has been coordinating the activities of the Federal Public Administration in charge of formulating and implementing national policies for prevention and mitigation of GHG emissions, and for adaptation to climate change impacts. As the majority of developing countries, Mexico recognized that climate change is a serious environmental issue, and that Mexico is a highly vulnerable country that can suffer severe impacts from climate change.

Latin America's second largest economy is the world's thirteenth largest greenhouse emitter. Its annual emissions of carbon dioxide equivalent reach 525.8million tonnes per year, according to the World Resources Institute (WRI; 2006). One of the biggest sources of Mexico's GHG is the use of fossil fuels, such as oil and coal, to generate power. Traffic-related pollution and illegal deforestation are also cited as major contributors to climate change.¹⁰² Common to other developing countries within Latin America (Brazil, Argentina and Chile), the initial agenda for action on climate change was set in Mexico by climate scientists in the national university and by bureaucrats in the national environmental ministry after the Rio Summit in 1992. Their early control of the issue had the path-dependent effect of establishing Mexico as a supporter of international action on CC. The creation of an "Ad-Hoc Group" to coordinate inter-ministerial dialogue on climate change in 1995, determined the entry of the climate change into the national political arena. This group prepared the Mexican policy position, in advance of the Conferences of the Parties. Together with the evolving of the Kyoto negotiations in December of 1997, the international climate negotiations process gained much higher public and political salience in the international arena, and, consequently, it began to be recognized as a much more important issue within Mexico. In the same year, following the problems experienced since 1997 was created a single instance of the Interministerial Committee on Climate Change as a space for dialogue between various national agencies whose purpose was to generate a common position and promote a national dialogue on the subject (as instance interlocutor of the Legislature).¹⁰³ In 1997, Mexico published its first national communication under the UNFCCC and hosted the twelfth plenary session of the Intergovernmental Panel of Climate Change (IPCC).

¹⁰² Martínez, Julia y Fernández Bremauntz, Adrián (comp.). *Cambio climático: una visión desde México*, Secretaria de Medio Ambiente y Recursos Naturales- Instituto Nacional de Ecología, México, 2004.

¹⁰³ SEMARNAT, México en el régimen internacional de cambio climático 2007. In www.semarnat.gob.mx/queessearnat/politica_ambiental/cambioclimatico/Pages/cambioclimatico.aspx

The effect of the shift from scientific to political issue was a widening in the field of actors and agencies that perceived themselves as having a stake in the climate policy process. In 1997 climate change became an issue of concern to the ministries of agriculture and rural development, commerce and industrial development, communications and transport, energy, and social development. Among these ministries, the Ministry of Energy (Secretaría de Energía – SENER -) in particular began to play a much more active role in climate discussions. For the sake of recount, it is worth mentioning that the First National Communication of Mexico to the UNFCCC in 1997 included the first *Mexico Greenhouse Gas Emissions Inventory 1990*, and the results of the first studies on the country's vulnerability to climate change. In 2001, the *Second National Communication* was released, including an updating of the Emissions Inventory for the 1994-1998 period, and scenarios for future emissions. Both were carried out with funding from the Mexican Government. SENER's played a fundamental role in engaging climate policy at national level and during the COP 3 negotiations in Kyoto in December 1997, SENER representative was included in the Mexican delegation to the United Nations (UN) climate change negotiations. The following years, sees a great generation of documents addressing the link between energy and climate change within SENER and at national level. Being Mexico one of the major world oil and gas producers, many of the studies and reports were devoted to energy and climate change issues. Eventually, the vision of many bureaucrats in SENER, which adopted the critical position of many other international oil producers towards the climate change issue, created a steady opposition to climate regulation at national level. Another key event in analyzing Mexican position towards climate change policy, was Mexico's decision to ratify the Kyoto Protocol, (April 29, 2000) by the Mexican Senate. One of the cornerstones of Mexico's interest in the Kyoto Protocol was the access to the Kyoto flexible mechanisms, specifically the CDM. Before the U.S. pull-out, the size of the CDM at that time was estimated at US\$2-4 billion, translating to a price of US\$10-20 per ton of carbon, with the United

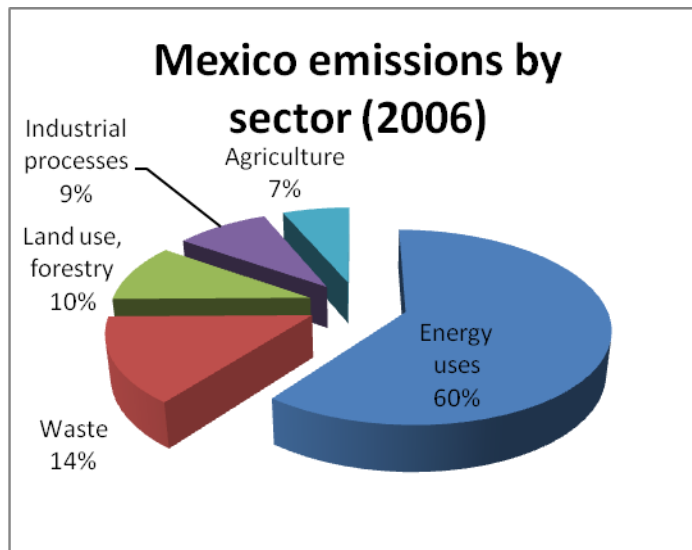
States being the main purchaser of emissions. Being Mexico one of the major trading partners of the US in the world, the US withdrew from the negotiations was a major blow. With the pull-out of the United States, the expected size of the CDM became dramatically reduced and prospects for a U.S.-Mexico emissions trading partnership vanished.

If the US withdrawal represented a setback, the European Union (EU) ratification of Kyoto enhanced CDM possibilities in Mexico. With EU ratification of the Kyoto Protocol in 2002, the CDM once again became a viable mechanism to attract foreign investment into Mexico's energy and environmental sectors. Climate discussions within Mexico's federal government ministries in 2002 focused on the creation of a national climate change office, or more specifically, a national CDM project approval authority. In January 2004, Mexico established a National Climate Change Office under SEMARNAT. In November 2006, the Third National Communication was released and it presented an update of the Inventory to 2002, and recalculated the figures since 1990. To that end it counted with funding from the Global Environment Facility (GEF) through the United Nations Development Programme (UNDP), the U.S. Environmental Protection Agency (USEPA) and the Mexican government.¹⁰⁴ The updating of the National Greenhouse Gas Emissions Inventory (INEGEI) for 2006 was carried out with the Intergovernmental Panel on Climate Change (IPCC) methodologies and its Good Practice Guidelines in estimating emissions for the 1990 to 2006 period, for six greenhouse gases listed in Annex A of the Kyoto Protocol. In 2006, emissions in units of carbon dioxide in equivalents (CO₂eq) for Mexico were 711,650 Gg.¹⁰⁵ It is worth mentioning that since 2003, Mexico stopped producing aluminium, so PFCs emissions are zero since 2004.

¹⁰⁴ Ibid.

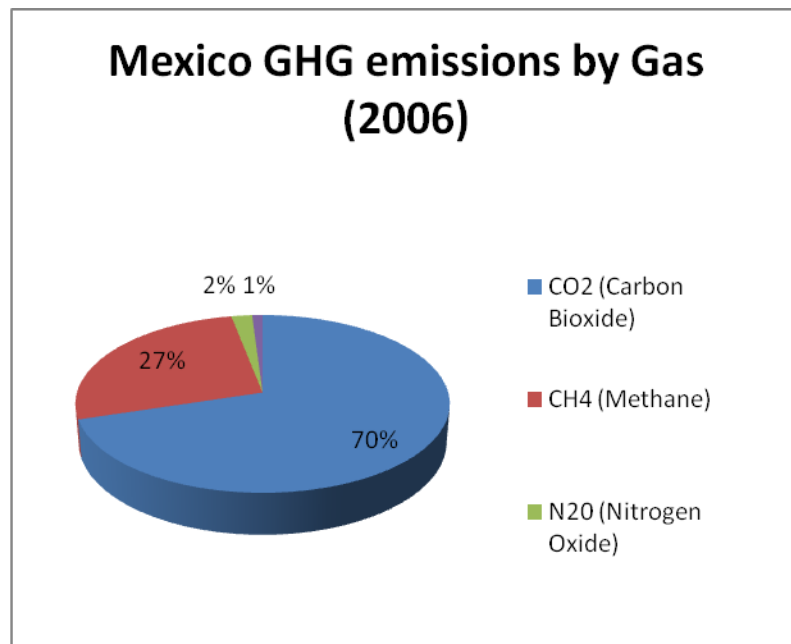
¹⁰⁵ In turn, the energy uses category is subdivided as comes next: energy industry: 35% (49,137 Gg); followed by transportation: 34% (144,691 Gg); manufacturing and construction industry: 13% (56,832 Gg); fugitive emissions: 11% (47,395 Gg); and other sectors (residential, commercial and agricultural): 7% (32,042 Gg).

Table I: Mexico GHG emissions by sector (2006)



Source: personal elaboration with data from the 4th Mexican National communication to the UNFCCC

Table II: Mexico GHG emissions by gas type (2006)



Source: personal elaboration with data from the 4th Mexican National communication to the UNFCCC

The inventory results of GHG for the years 1990-2006 show that Mexico increased its emissions of approximately 40% during that period, an average annual growth of 2.4%. In May 2007, the newly elected President Felipe Calderon, a former Energy Minister under the previous Fox's administration (2000-2006), announced a new national strategy on climate change. The strategy defines various possibilities to reduce global warming gases produced by transport, industry, agriculture and the generation of power, among others. Central to the new policy are moves to improve energy efficiency, particularly in the transportation and power-generation industries. Given Mexico's large reserves of fossil fuels, many of its power plants are fuelled by oil. Moves to increase the capacity of gas-powered plants are envisaged. Among the plan's additional objectives are specific commitments to phase out all buses and trucks more than a decade old and to increase goods transportation by rail by 10% before 2012.¹⁰⁶

Both worldwide and nationwide, 2007 was a very important year. Firstly, in the international sphere, the *Fourth Assessment Report of the Intergovernmental Panel on Climate Change* and the *Stern Review on the Economics of Climate Change* were published. In second place and at a domestic level, the National Development Plan 2007-2012 was the first to address courses of action for climate change mitigation and adaptation in Mexico. The programs within the Energy, Communications and Transport, and Social Development sectors also included a description of actions related to climate change. Correspondingly, the *Programa Sectorial de Medio Ambiente y Recursos Naturales* (Environment and Natural Resources Sector Program) 2007-2012 led to the subsequent development of the National Strategy of Climate Change. These efforts culminated this year with the publication of the Special Program on Climate Change 2009-2012 (NSPCC), which provides unilateral commitments for the reduction of emissions in the short term. The special program was open to civil society for public

¹⁰⁶ Climate change Corp, <http://www.climatechangecorp.com/content.asp?ContentID=4897>

consultation before being approved. In 2009, The Fourth National Communication of Mexico to the UNFCCC was published and it reports the progress in climate change made by the country, in particular on adaptation and mitigation issues.¹⁰⁷ In 2009, the results of important research assessing the potential mitigation in the medium and long terms were also released, and the study of the Economics of Climate Change for Mexico was concluded. As a culmination of its international and national efforts, Mexico has been chosen to host COP 16 (Parties to the UNFCCC) and CMP (Parties to the Kyoto Protocol) 6th meeting at the end of 2010.

Table III: Mexico and Climate Policies (key events)

Key Events/Phases in the Evolution of Mexican Governmental Climate Politics 1995-2009	
Phase 1: 1995-1996 Scientists dominate policy process	1995 —Carlos Gay at UNAM establishes an “Ad-Hoc Group” to coordinate interministerial dialogue on climate change May 1995 —Second U.S. Country Studies Workshop September 1995 —INE publishes Preliminary National Inventory of Greenhouse Gases January 1996 —Third U.S. Country Studies Workshop
Phase 2: 1997 Jump in political prominence of climate issue	April 1997 —“Ad-Hoc Group” is reorganized into a formal Inter-Ministerial Committee for Climate Change September 1997 —SENER begins to engage in climate policy debates September 1997 —Mexico publishes First National Communication under UNFCCC September 1997 —Mexico hosts 12th plenary session of IPCC. December 1997 —Kyoto Protocol negotiated
Phase 3: 1998-2000 Upsurge in momentum with ratification of Kyoto Protocol	1998 —SEMARNAT supports ratification of Kyoto Protocol 1999 —SENER opposes ratification of Kyoto Protocol on climate change December 1999 —Pemex announces proactive climate policy April 29, 2000 —Mexican Senate votes to ratify Kyoto Protocol
Phase 4: 2000-2001 Decline in interest in climate change under new president	August 2000 —Vicente Fox elected to presidency December 2000 —President Fox assumes office March 2001 —U.S. President George W. Bush withdraws United States from Kyoto Protocol November 2001 : Second National communication to the UNFCCC
Phase 5: 2002	Spring 2002 —Fox appoints Victor Lichtinger as

¹⁰⁷México; cuarta comunicación nacional ante la Convención Marco de las Naciones Unidas sobre el Cambio Climático. SEMARNAT/INE.

<p>Upsurge in interest with European ratification of Kyoto Protocol</p>	<p>Secretary of the Environment May 2002—EU ratifies Kyoto Protocol October 2002—discussion re creating a Mexican CDM office</p>
<p>Phase 6: 2003-2005 Domestic action bogged down due to inter-ministry competition</p>	<p>March 2003—Bilateral Working Group on Climate Change between United States and Mexico January 2004—Mexico establishes national Climate Change Office September 2004: third national communication to the UNFCCC December 2005—Mexico participates in the Gleneagles summit of G8+G5 and states new international commitment to climate change</p>
<p>Phase 7: 2006-2009 International projection</p>	<p>July 2006: Mexican President Felipe Calderon elected December 2007 – During Bali negotiations Mexico emerges as developing countries leader in climate change policy. January 2008: 100 CDM projects registered in the UNFCCC pipeline (second largest recipient in Latin America and 4th in the world) October 2008 – Mexico announces a Strategic National Plan for climate change (PECC). July 2009: L'Aquila G8 + G5 summit. Mexico is proposed as a G5 leader on climate change. November 2009 – Mexico presents the fourth National communication to the UNFCCC The Galindo report is also published on the economics of climate change in Mexico. November 2010: Mexico hosts COP 16 in Cancun.</p>

Source: personal elaboration

4.5 Mitigation actions in Mexico

As previously seen, climate mitigation is any action taken to permanently eliminate or reduce the long-term risk and hazards of climate change to human life by curbing GHG. Mexico adopted its Special Climate Change Program in 2009 including a set of nationally appropriate mitigation and adaptation actions to be undertaken in all relevant sectors to face climate change. The full implementation of the Program will achieve a reduction in total annual emissions of 51 million tons of CO₂e by 2012, with respect to the business as usual scenario. Mexico aims at reducing its GHG emissions up to 30% with respect to the business as usual scenario by 2020, provided the provision of adequate financial and technological support from developed countries as part of a global agreement. The country has been very active in promoting initiative in many areas, as well as fostering a juridical framework for SD in different topics. Just to mention, though it will not be part of the dissertation adaptation is meant as the reduction of risks posed by climate change on people's lifestyles, natural resources, environmental services, and productive and economic activities, through vulnerability reduction.¹⁰⁸

Table IV : Relevant actions carried out by the Mexican Government on mitigation and adaptation strategies

MITIGATION	ADAPTATION
Compliance to the Special program on Climate change (SPCC) at the end of the current administration will result in a reduction of 50 million tones of CO ₂ eq in 2012.	Advise federal entities and municipalities to take into consideration adaptation concepts in their planning strategies and land zoning
Actions in sectors such as energy generation and use, agriculture, forestry and other land uses, and waste. In a long-term vision, SPCC establishes, as an aspirational goal, to reduce 50% of ghg emissions by 2050, as compared to 2000 levels, and a flexible convergence towards a global per capita emissions average of 2.8 tons of CO ₂ eq. in 2050	Promote the incorporation of references of climate change for disaster prevention and risk reduction measures derivative of the existing Atlas of Risks and or Hazards.

¹⁰⁸ Mexican Second National communication to the UNFCCC. *Introduction*.

Projects under the CDM	Upgrade Urban Development Programs, so they take risks and population vulnerability into account, and issue recommendations in order to be well-prepared for droughts, floods, extreme climatic events, and sea level rise, in a context of climate change
Renewable energies	Formulate strategies for fire prevention and control, and consider climate change for reforestation strategies.
Energy efficiency projects	Governance and financial protection are tools of risk transfer and insurance, which are increasingly important for disaster prevention and management, including those of meteorological and climate origin. Such is the case of insurance and funds to secure housing, agricultural production, and businesses.

Source: personal elaboration based on information provided in the SPCC

Mitigation actions in Mexico as a strategy for curbing emissions are set out in the following areas:

a) In the energy sector. It is important to highlight that during the 1990-2006 period, the Country's GDP grew at an average annual rate of 3%, while GHG emissions grew 2% and national population 1.5% per year. With the implementation of various energy saving programs in industrial, commercial and public services, a saving of 15.7 million barrels of oil equivalent was obtained during the 2006-2008 period, preventing the emission of 8.6 million tons of CO₂eq. For example with the Daylight Savings Programme, emissions decreased by 4.5 million tons of CO₂ for the period 2006-2008. Concerning renewable energies, the Special Program for the Use of Renewable Energies was published in 2009; as a part of the new Law for the Use of Renewable Energies and the Energy Transition Funding.¹⁰⁹

b) In the residential sector efforts have been oriented towards incorporating efficient technologies in matters of energy. The Program for Sustainable Housing was published in 2007; it proposes, among other actions, to adapt current regulations on housing towards environmental protection, and to

¹⁰⁹ National Special Program on climate change.

create tax incentive schemes for housing developers and users. The Sustainable Housing Cross-cutting Program is also an important initiative, which seeks to change the perception and construction practices for housing in Mexico. According to the goals set by the Mexican Government, between 2007 and 2012, six million housing credits will be granted, of which approximately 20% should be used for sustainable housing.¹¹⁰

c) Concerning farming and livestock mitigation actions and reforestation, which are of particular importance for the CDM projects, during the 2007-2009 period, a budget of more than 1.3 billion dollars was allocated to the Program for Reforestation by the federal government and through the World Bank funding; The National Forestry Commission aims to mitigate GHG emissions, increase forest carbon sinks potential, stabilize the forest-agriculture border, and reduce the incidence of forest fires. Complementarily, the National Commission of Natural Protected Areas (CONAP), began developing its Climate Change and Protected Areas Strategy, launching its Fire Management Program in Protected Areas of Mexico, and has identified some pilot sites in protected areas in order to participate in the carbon market in the future.

d) the issue of biofuels has also become increasingly important in Mexico. This can be confirmed with the publication of the Law for the Promotion and Development of Bioenergy, in February 2008, and its Regulations in June 2009. The Ministry of Energy and the Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food are developing bioenergy programs that include environmental criteria and guidelines to be developed to ensure that biofuels produced and used in Mexico are sustainable.

Finally, it is worth mentioning that the Mexican Government financed several studies in the area of emissions GHG scenario for 2020, 2050 and to 2070. In 2009, The National Institute of Ecology financed and coordinated the *“Study on the Impact of Renewable Energy Sources of GHG Emissions in Mexico in the Medium and Long Terms”*, and the study *GHG Emissions Scenarios in*

¹¹⁰ Ibid.

the Medium and Long Terms, 2020, 2050 and 2070”, prepared by the Mexican Institute of Oil. Other relevant studies on mitigation published in the last two years are: a) Study on the Economics of Climate Change in Mexico, coordinated by the Ministry of the Environment and the Ministry of Finance, with financial support from the UK Government and the Inter-American Development Bank and which will be analyzed in this section; b) Low-Carbon Growth. A potential Path for Mexico, conducted by the Mario Molina Center and the McKinsey consulting firm¹¹¹; c) Low Carbon Development for Mexico (MEDEC), developed with funding and technical assistance of the World Bank.¹¹² According to Mr. Enrique Lendo, of the Mexican Ministry for the Environment,¹¹³ *“for a more efficient management of mitigation options in the country, it is necessary to continue a more in depth evaluation of the mitigation potential of various technology options, for key emitting sectors. Furthermore, it becomes necessary to develop emissions mitigation frameworks to measure, report and verify them in strategic sectors, particularly the definition of Nationally Appropriate Mitigation Actions (NAMA’s). The need for better estimates on the potential economic and financial costs of climate change impacts in key productive sectors has also become evident. Likewise, it is important to analyze the social, economic and environmental impacts derived from the fulfillment of Mexico’s international responsibilities on climate change, both present and future”*.¹¹⁴

Among the mitigation initiatives promoted by the Mexican Government, it is definitely worth mentioning the unique only country-study insofar completed at international level on the economics of climate change. In 2008-2009, the Finance and the Ministry for the Environment and Natural Resources commended the Faculty of Economics of the National Autonomous University

¹¹¹ http://www.esmap.org/filez/pubs/63200985854_529200911857_FINAL_LCCS-bro_lowres.pdf

¹¹² <http://siteresources.worldbank.org/INTMEXICO/Resources/MEDECExecutiveSummaryEng.pdf>

¹¹³ Director of the Unit of international environmental affairs at the Mexican Ministry for the Environment SEMARNAT, personal in-depth interview held in October 2009, Mexico City.

¹¹⁴ Ibid.

of Mexico with undertaking a work titled “*The economics of climate change in Mexico*”, coordinated by the economist Luis Miguel Galindo, which attempts to make an estimation of the possible economic costs that anthropogenic climate change will generate in Mexico, especially for those sectors of the population which, due to their poverty, are especially vulnerable.

Based on the previous work of Lord Stern and his well-known “*Stern Report*”, which looked at the impacts of climate change at a global level (2006), the Mexican study looks at a local level, where the impacts will be realized and both adaptation and mitigation responses will take place. The main finding of the Stern Review is that the costs of taking action to reduce the impacts of climate change are less than the costs of inaction.¹¹⁵ By reflecting the Stern report, the Mexican study shows that without action the Mexican economy will suffer significant economic costs as a consequence of climate change. Despite partial short term gains in some activities and regions there are net costs overall and that these costs will increase during this century, in particular in the agricultural and water sectors. Furthermore, there will be important losses outside the economic sectors and market prices that people value such as biodiversity. Moreover the key conclusion is that it is a better for the Mexican economy to actively participate in an effective international agreement than just face the economic costs of adaptation. Policymakers are increasingly clear that not only is climate change, if left unmanaged, a severe, or insuperable challenge to their growth and poverty reduction goals, but also that action will lead to a wide range of business opportunities for growth and development. In the transition to a low-carbon growth path the markets for low-carbon, high-efficiency goods and services will expand, creating opportunities for farsighted governments and businesses to benefit from. The study both makes a major contribution to the understanding of climate change in Mexico, and strengthens the global case for strong action.¹¹⁶

¹¹⁵ Nicholas Stern: *The economics of climate change*. Cambridge University Press, 2006.

¹¹⁶ L.M. Galindo: *The Economics of climate change in Mexico*; Synopsis. SEMARNAT, Presidency of the Republic 2009.

In general terms, main conclusions of “*The economics of climate change in Mexico*” study say that the economic consequences of climate change for Mexico are regionally heterogeneous, and indeed some temporary gains may accrue to some regions as a consequence of climate change. Nevertheless, the estimates for Mexico as a whole show that the negative economic consequences in the long term outweigh any gains in the short term. Major impacts of climate change in Mexico are identified in the following areas: water and agriculture, land use, biodiversity loss, extreme natural events such as hurricanes and tropical storms, coastal areas sea level rise, deforestation. In general, it is found that the economic costs of climatic impacts by 2100 are at least three times greater than the costs of mitigating emissions by 50%¹¹⁷. For example, in one of the scenarios considered it was found that with an annual discount rate of 4% climatic impacts reach, on average, 6.21% of current GDP while the costs of mitigating emissions by 50% represent 0.70% and 2.21% of GDP, at 10 and 30 US dollars per ton of carbon respectively.¹¹⁸

Total costs of climate change to the Mexican economy in 2050 and 2100.

sector	2050											
	0.5% rate of discount				2% rate of discount				4% rate of discount			
	B1	A1B	A2	Scenario average	B1	A1B	A2	Scenario average	B1	A1B	A2	Scenario average
Agriculture	2.11%	2.82%	2.40%	2.45%	1.37%	2.44%	1.56%	1.79%	0.80%	1.07%	0.90%	0.92%
Water	7.59%	7.59%	7.59%	7.59%	4.02%	4.02%	4.02%	4.02%	2.20%	2.20%	2.20%	2.20%
Land use	0.17%	0.37%	0.57%	0.37%	0.08%	0.18%	0.28%	0.18%	0.03%	0.07%	0.11%	0.07%
Biodiversity	0.02%	0.05%	0.02%	0.03%	0.01%	0.03%	0.01%	0.02%	0.01%	0.02%	0.00%	0.01%
Foreign tourism	0.01%	0.01%	0.01%	0.01%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total	9.90%	10.84%	10.60%	10.45%	5.49%	6.68%	5.87%	6.01%	3.04%	3.36%	3.21%	3.20%
Livestock	1.10%	1.44%	1.24%	1.26%	0.71%	0.94%	0.80%	0.82%	0.41%	0.55%	0.46%	0.47%
Indirect biodiversity	0.23	0.42%	0.16%	0.27%	0.13%	0.16%	0.06%	0.12%	0.08%	0.01%	0.01%	0.03%
Total (Livestock and Indirect biodiversity included)	11.22%	12.7	12.01%	11.98%	6.34%	7.78%	6.73%	6.95%	3.53%	3.92%	3.68%	3.71%

¹¹⁷ The estimation of these costs includes a set of assumptions such as discount rates, and that cost reduction processes due to technological innovation or some form of optimization strategy will not develop.

¹¹⁸ Ibid. p. 9.

Source: Galindo, *The economics of climate change*. P. 65

Taken together, the results demonstrate that the costs of inaction are higher than the costs of participating in an equitable international agreement that recognizes the common but differentiated responsibilities of countries, and that immediate and decisive action is indispensable to reduce the worst impacts of climate change. In this sense, from an economics perspective it is much more efficient to act than to leave the problem for future generations.

The construction therefore of a strategy of mitigation and adaptation to climate change in Mexico needs to utilize an array of policy options with long term vision. Such a governance vision is set to include some of the following points: recognizing the importance of building a relative pricing structure consistent with the aim of sustainable development is indispensable, to control excessive consumption, improving resource management and for supporting technological innovation and diffusion.¹¹⁹ In addition, the importance of changing habits and patterns of production, distribution and consumption should also be recognized, as should decisive support for innovation and diffusion of new technologies which reduce carbon intensity, the elimination of institutional barriers and the building of a new environmental culture. Secondly, and over the next few years, the Mexican economy, similar to the rest of the world's economies, will have to move onto a trajectory of low carbon-intensity growth, at the same time as implementing adaptation processes to minimize the impacts of climate change. The monetary and financial resources needed for so doing are significant and currently scarce and represent a challenge. This is again where Mexico is taking the lead, together with other countries, to promote at international level a financial mechanism that beyond the flexible ones under the Kyoto Protocol, could help to look for extra funding to fight climate change. Thus, Mexico should, in the short term, seek to use those international resources now available through various funds and organizations, at the same time as

¹¹⁹ Ibid.

contributing to the development of multilateral institutions which will permit the consolidation of the necessary sources of financial support.¹²⁰

4.6 The assessment of Sustainable development and climate change impacts in Mexico

As mentioned earlier, attempts to integrate environmental concerns into public policy in Mexico and therefore the need to measure the impact of such policies date back to the 1980s, when the first regulatory and institutional schemes were put in place. However, it was not until the mid-1990s that the Mexican government started implementing the *Agenda 21* commitments adopted at the 1992 Earth Summit. By accepting the «Action Program for Sustainable Development » or *Agenda 21* , Mexico committed to adopt national and global measures in matters of sustainability and actions aimed at generating indicators which could be used to measure and evaluate the policies and strategies for sustainable development. In April 1995, the Commission for Sustainable Development (CDS) of the United Nations approved the Task Force for Sustainable development Indicators 1995-2000, to be instrumented in three, non-exclusive phases, that can be summarized as: a) information exchange, development of method sheets and training at the national and regional level (1995-1996); b) continue training and test the functionality of the method sheets among those countries which, voluntarily, wish to develop sustainable development indicators (1996-1997); and c) evaluation of the indicators in terms of their interrelation and evolution over time, and modifying them if necessary (1998-2000).¹²¹ The work done by the UN, INEGI (Mexican institute for Statistics) and SEMARNAT, helped to create an important framework for building strong indicators to assess the progress of sustainable development policies in the country.

The consolidation of such a framework led the basis for the inclusion in 1995-2000 to the National Development Plan (Plan Nacional de Desarrollo (NDP) ,

¹²⁰ Ibid. p.11

¹²¹ National Institute for Ecology: *Sustainable development Indicators in Mexico, 2002.*

for the first time in Mexican history, of the principle of sustainable development. Six years later and up to now, the NDP has confirmed that this principle stands formally in the public policy making. The NDP, which involves a wide-ranging consultation process, sets the guidelines for public policy making in Mexico. It includes goals and strategies for economic and social development, as well as governance. Federal Ministries and agencies base their strategies on this programme. Sustainable development cuts across all policy areas in the NDP.¹²²

Due to its significance to Mexico's institutional SD, the NDP, as well as its corresponding environmental sectoral programme, set a limited benchmark for a sustainability impact assessment in the country. Given the broad definition of SD adopted by the country as well as its practice, some national ministries and government bodies have set their own different SD goals and indicators. More recently, the Ministries of Energy (SENER) and Tourism (SECTUR) in collaboration with SEMARNAT completed comprehensive strategies to foster sustainable patterns of production in their respective sectors and the Mexican Congress passed the Law of Sustainable Rural Development. In addition, the Mexican Ministry of Finance and Public Credit (SHCP) established a unit for the development of environmental economic instruments, including taxes and charges, as well as for the analysis of the impact of subsidies on different economic and social variables including the environment. Many of the indicators and methodology are often accompanied by the support of international organizations and agencies such as the World Bank, IEA (International Energy Agency) among others.

If SD methodologies and indicators are somehow established and used, the same cannot yet be said for climate change impact in Mexico. In fact, it can be argued that evaluation methodologies and indicators for assessing climate change impacts are developing and fragmented. Some sectors, like the energy one, presents long and well established methodologies to assess

¹²² E. Lendo. *Policy document*.

climate change impacts¹²³. But in general terms, the above mentioned PECC, the National Special Program for Climate change - which serves as a national guideline for promoting mitigation and adaptation strategies and provides visions and goals for particular sectors - does not offer any specific procedures for achieving these goals neither indicators to evaluate their impact. The PECC addresses the importance of collaborating and harnessing existing institutional capacity through streamlining and integration but again it does not provide specifically guidelines for evaluating or monitoring progress. However, it must be said that PECC, presents national emissions data from 2006 and the mitigation part of the Plan contains 41 mitigation objectives and 95 related targets. Targets are framed in terms of both quantitative and qualitative metrics. Most have a 2012 deadline; some are framed in terms of GHG reductions. An annex identifies responsible agencies and strategies. It also establishes long-term vision, including national GHG reduction target of 50% below 2000 levels by 2050 and it covers mainly the sectors of energy generation; energy use; agriculture, forests, waste and other land uses. As described in this chapter, likewise many Latin American countries and others worldwide, Mexico has been promoting several institutional initiative and efforts on the SD side as well as on the climate change one. In particular, concerning the latter, it seems that national efforts have been recently focusing much stronger on the climate change issue, if compared with more than two decades of national efforts in the SD sector. Progresses at institutional and operational level have been more visible within the climate change arena, including the international leadership among the G5, the group of most advanced emerging economies (China, India, Brazil, Mexico and South Africa). This is probably due to the fact that climate change is a more tangible issue compare to SD and its effects are immediately felt in several national sectors.¹²⁴

¹²³ José Antonio Medina-Ross, Juan C. Mata-Sandoval and Roberto López-Pérez. 2005. Indicators for sustainable energy development in Mexico Natural Resources Forum 29 (2005) 308-321

¹²⁴ Interview with Mr. Eduardo Tovar, Bancomext CDM legal authority.

But in general terms the lack of an integrated framework for assessing SD and CC impacts in its different dimensions is required. The two concepts are still conceived separately and climate change only recently has begun to be seen as a sustainable development issue and available indicators of SD provide a natural framework for developing multidimensional climate change indicators as well as offering new integrated methodologies to evaluate mechanisms such as the CDM, which helps to recognize important linkages between SD and CC.

CHAPTER V

CDM PROJECTS CONTRIBUTION TO SUSTAINABLE DEVELOPMENT IN MEXICO: AN ASSESSMENT

This chapter explores the role of CDM in Mexico and its contribution to SD, starting from an overview of the institutional and legal settings (CDM governance) and providing an empirical assessment of Mexican CDM projects impacts based on the Project Document Design (PDD) review, together with other analytical tools further described. The chapter includes conclusions drawn by the empirical analysis. It is argued that considering the flexibility of SD criteria established by the Mexican government through the DNA (National Designated Authority), projects have an impact on SD in some key dimensions such as the environment, the economic and to lesser extent, in the social one. Mexico has chosen to use the CDM as a tool to attract foreign investments, treating carbon credits as just another export product, and only putting marginal emphasis on securing the CDM's contribution to SD. The so called '*race to the bottom*'¹²⁵ in terms of SD requirements becomes a clear choice that states the emphasis on economic development in Mexico's national development strategy. In this sense, SD criteria are voluntary set in a broad manner by the DNA authority. This means that CDM projects reflect mainly an environmental market based strategy to face the challenges posed by Climate change, but are not posing enough emphasis on the need to achieve better SD performances at country level. In broader terms, the CDM is fulfilling the criteria established by the DNA, which are personally considered too flexible to deliver concrete and effective benefits on national SD.

¹²⁵ The "race to the bottom" is usually referred to a set of policies and instruments, often employed by national institutions in developing countries that are not sufficiently beneficial for the compliance of good SD policies at national level. It implies the use of very broad and open standards, with no monitoring or assessment of progress made, together with lack of transparency among other factors.

The chapter also explores, under some indicators used for the case study and contrary to some evidence found in other studies of mainstream literature, the CDM potential benefits in Mexico, which are found in different levels. Technology transfer, which is claimed to be a major benefit of CDM projects, is instead happening at low level. The project sample is about 65% of Mexican registered projects under the UNEP Risoe pipeline and the majority of them are small scale projects. Contrary to common belief, small scale projects seem to provide relevant SD benefits in the environmental sector and thus contributing more than large scale projects. The methodology used to assess the impact is largely detailed along the chapter itself. Several conclusions are finally drawn in relation with findings and some considerations of CDM benefits in Mexico are also discussed.

5.1 Mexico and national settings for the CDM implementation

Mexico, as developing country and non Annex-1 country under the Kyoto Protocol, can benefit from Clean Development Project activities resulting in certified emission reductions (CERs), which can be used by Annex I Parties to contribute to compliance with the Kyoto Protocol itself. While its primary goal is to save abatement costs, the Clean Development Mechanism is considered by many developing countries as a key means to promote technology transfer and to improve national policies in mitigation activities, as well as to promote sustainable development policies. According to the Mexican National Strategy for Climate Change 2007, Mexico:

Favors the development of a global market for carbon credits and, in general, the intensive use of market mechanisms to foster mitigation activities in a sustained manner and to reduce, globally, the costs of compliance.

Recognizes the pioneering role that the CDM has performed and, in order to scale-up its benefits, proposes that project processing flow be increased, additionality criteria be reviewed, transaction costs minimized, real facilities be provided for small scale projects, and that the thematic and geo-political distribution of projects attain a better balance, among other factors.

The CDM should maintain its current environmental integrity, but should also attempt more ambitious, complementary schemes which transcend isolated projects to involve entire programmes or productive sectors, thereby expanding the scale of international cooperation.¹²⁶

Although Mexico is considered a high middle income country (according to the World Bank definition), it has to deal with the dilemma of many developing countries who need to fight poverty and improve living standards under the frame of the Millennium Development Goals. At the same time, Mexico has to cope with sustainable growth and reducing vulnerability from climate change impact in its natural and socio-economic systems. Given its nature of middle

¹²⁶ Mexico National Plan for Climate Change, 2009.

income countries, México decided to take an important step among developing countries in fighting climate change since 2006.

Concerning CDM and during the negotiations period of the Kyoto Protocol, national debate about the flexible mechanisms (art. 12) in Mexico as a no Annex-I country was dominated by two points of view: the first dealt with the discussion of entering voluntary carbon markets (given that the US pulled out from the Kyoto Protocol) and establish a personal commitment to abate emissions at its own pace (mainly supported by the powerful Ministry of Energy) and the second one, was to keep on with CDM project during the commitment period and beyond. The final decision was taken by the Government in 2005, when it was decided to participate and strengthen CDM as an important part of its national strategy for climate change although it was always kept in mind that CDM should be further improved and supported internationally by other funds. The financial aspect is still one of the major concerns during international negotiations for the Mexican Government, which is also known for the proposal of the already mentioned Green Fund. In financial terms in fact, the Mexican government is also very keen on proposing for the next meetings of the UNFCCC (United Nations Framework Convention for Climate Change) a different operational scheme such as the inclusion of different international funds for climate change, compensation for emission reductions above the established limits and cap & trade systems.¹²⁷

In institutional terms, the Inter-Ministerial Commission for Climate Change (ICCC, CICC - Comisión Intersecretarial de Cambio Climático in Spanish) acts as the Designated National Authority (DNA) in Mexico and was set up in 2004. The Commission, which is made up of different federal ministries (Economy, Energy, Foreign Affairs, Fisheries & Agriculture, Social development, Transport & Communications), convenes twice a year. The Minister of Finance and Public Credit participates in the Commission's meetings on a permanent basis. The lead agency in the ICCC is the Ministry

¹²⁷ PECC. *Plan Estratégico de Cambio Climático, 2009.*

of Environment and Natural Resources and the central coordinator is the Director General for Climate Change Projects. The ICCC was established for the purpose of coordinating, within their respective spheres of competence, the actions of the agencies and entities of the Mexican Federal Government related to the design and implementation of national policies for preventing and mitigating greenhouse gas emissions, adapting to the effects of climate change and, in general, promoting the development of climate change action programs and strategies geared to the fulfillment of the commitments made by Mexico within the United Nations Framework Convention on Climate Change and other instruments deriving from it, in particular the Kyoto Protocol.¹²⁸

The ICCC is answerable to a Consultative Council for Climate Change grouping representatives of various social sectors, prominent private individuals as well as academics and researchers, each appointed for a four-year term. The Council prepares expert studies for ICCC and frames proposals for strategies and plans of action. The Mexican DNA has gained a reputation for efficient and reliable operations, as also attested by the large number of national project approvals issued. Working meetings with ICCC take place every month.

After submission of the requisite documents, a decision can be expected within 30 days. By its own reports, the Commission does not adopt a very stringent approach to project appraisal. Of prime importance is that the project contributes to a sustainable reduction in greenhouse gas emissions and fits in with the National Strategy for Climate Change.¹²⁹ SD concerns, as it will be shown afterwards, are established by an internal document that is used as reference whenever a projected is submitted to the DNA. The

¹²⁸ Towards a National Climate Change Strategy, ICCC, executive summary. http://www.semarnat.gob.mx/queessearnat/politica_ambiental/cambioclimatico/Documents/enac/sintesis/070110%20TNCCS.ExSumm_eng.pdf

¹²⁹ GTZ, CDM Market Brief, July 2009. Available at http://www.gtai.de/DE/Content/___SharedDocs/Anlagen/PDF/CDM/cdm-markt-mexiko-english,templateId=raw,property=publicationFile.pdf/cdm-markt-mexiko-english?show=true

document includes references to the three pillars of SD and it places emphasis in environmental, economic and social aspects.¹³⁰

Concerning the national legal framework, the Mexican Senate ratified the Kyoto Protocol on 29 April 2000. There is no special legislation on CDM projects. ICCC has, however, adopted the above mentioned National Strategy for Climate Change in 2007, which is binding for the ministries involved. It is also intended to contribute to attaining the overriding environmental goals of the National Development Plan 2007-2012. The requirements for project approval by ICCC were officially adopted in 2005. At present, no other special legislation is in preparation. No tax incentives or supplementary or exemption provisions under fiscal law are envisaged for CDM projects. It must be said that original efforts by ICCC to gain exemption of emission certificate revenue from income tax failed due to opposition from the Ministry of Finance who is not in favor of applying carbon taxes in the country.

On the carbon market side and in order to advance CDM in the country, the state-run Mexican Bank for Foreign Trade - Bancomext, the national development bank - Nafin, the non-governmental organization - Centro Mario Molina as well as the Ministry of Environment and Natural Resources - SEMARNAT founded the already mentioned fiduciary Mexican Carbon Fund, FOMECAR (Fondo Mexicano de Carbono) in November 2006. This is to provide technical and financial support for national enterprises and public institutions to implement CDM projects. The idea behind this is to position the country better on the world market for carbon credits and increase its attractiveness for foreign CDM investors. Bancomext also offers advice on selling CERs.¹³¹ In the specific case of project developers and projects buyers, as well as with DOEs, there is little communication, coordination and information. With reference to emission reductions purchase, there is little specific information on emission reduction purchase agreements (ERPAs)

¹³⁰ Information from DNAs authority interview

¹³¹ Elaboration based on an interview with Teresa Crespo Chapa, Mexican Carbon Fund administrative manager.

from Mexico. The Danish Carbon Fund is known to be acquiring 1 million CERs from landfill gas use in Monterrey. The Spanish Carbon Fund in turn has concluded ERPAs for the La Venta II wind-park belonging to the national power supplier CFE in the federal state of Oaxaca and for a transport project in Mexico City (Metrobus). There also other numerous private buyers of carbon credits currently engaged including the Deutsche Bank and the KfW Carbon Fund, but they cannot be tracked easily.

Before proceeding with the assessment it is worth reminding the Mexican national conditions regarding CDM development potentialities. Mexico is open to foreign direct investment (FDI) in most economic sectors and has consistently been one of the largest recipients of FDI among emerging markets. In recent years, Mexico has become increasingly aware of its loss of competitiveness relative to other emerging economies, notably China and India. In the energy sector, where most of the CDM potentialities can be explored, the country lives a strong contradiction. Although Mexico is considered a neoliberal state, potential CDM projects investments concentrate more on state-monopoly industries, such as electricity, oil, gas and chemicals and this is quite a contradiction. The Mexican constitution in fact reserves ownership of petroleum and other hydrocarbon reserves for the Mexican state. Oil and gas exploration and production efforts are under the sole purview of Pemex, Mexico's petroleum parastatal. The constitution also provides that most electricity service may only be supplied by two state-owned companies, the Federal Electricity Commission (CFE) and Central Power and Light (LYFC). There has been some opening to private capital. Private electric co-generation and self-supply are now allowed. Private investors may build independent power projects but all of their output must be sold to CFE in wholesale transactions. Private construction of generation for export is allowed with limits. In 1995, amendments to the Petroleum Law opened transportation, storage, marketing and distribution of natural gas imports and issued open access regulations for Pemex's natural gas transportation network. Finance Public Works Contracts (COPFs), formerly

Multiple Service Contracts (MSCs) designed to comply with the country's constitution, mark Mexico's most ambitious effort to attract private companies to stimulate natural gas production by developing non-associated natural gas fields. Under a COPF contract, private companies will be responsible for 100% of the financing of a contract and will be paid for the work performed and services rendered. However, the natural gas produced in a specific field remains the property of Pemex. Some Mexican politicians still oppose COPFs as a violation of the Mexican constitution's ban on concessions. Some contracts have failed to attract any bids, demonstrating the limited success of COPFs. All these conditions are important to be remembered because they offer a clear idea of how CDM projects in the energy strategic sector can be carried on in Mexico.

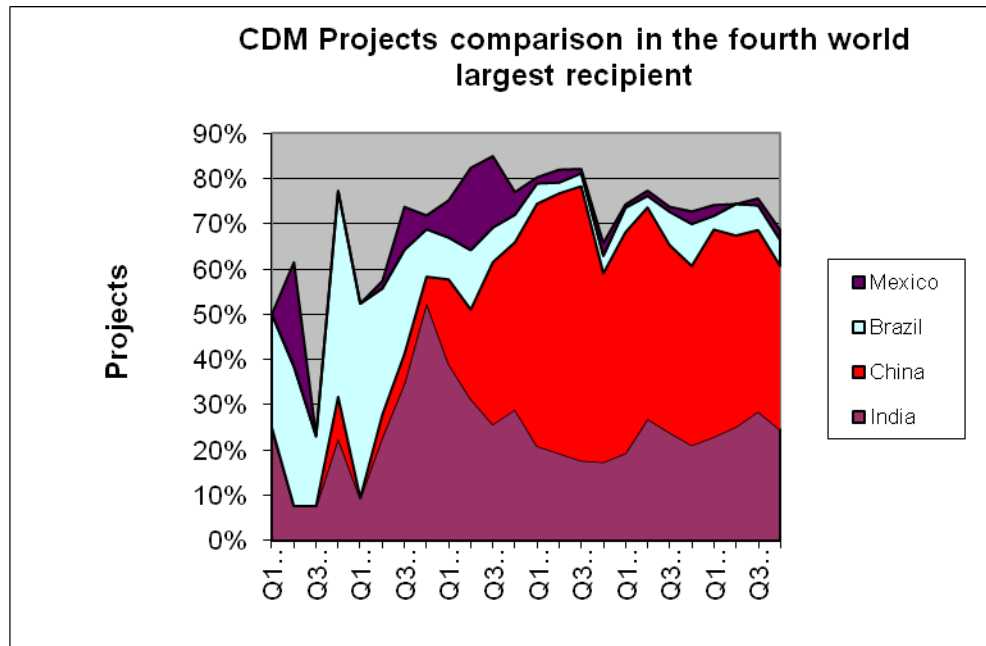
For example, energy consumption is growing faster than in more developed countries, and there is a shortage of conventional energy resources for power generation. The majority of the energy production in Mexico is used for industrial production (38%) or transportation (27%), and losses for electricity generation and distribution account for a significant portion of consumption (22%). Within the electricity sector renewable energies sources will play a significant role and show a clear potential for the development of CDM projects, particularly in solar and wind sectors. At the moment only 10 projects in Mexico are registered for the wind sector, none in the solar. Potentialities on the country can be found in geothermal and sea-tide energy. Another important sector for CDM projects is the chemical one, an energy intensive area: steam cracking to produce ethylene, benzene, and propylene etc, feedstock choice: gas and increasingly coal due to high oil prices. Refrigeration, heating, etc. are also found to be crucial areas for projects. Mexican chemical industry has been in fact switching from coal to gas powered facilities as an efficient way of reducing CO₂ emissions. This fuel switch almost halves the emissions of carbon dioxide due to the lower carbon content of gas. The chemical industry is also pursuing reductions of nitrous oxide emissions (N₂O), which are even more harmful than carbon

dioxide when released into the atmosphere. For instance, the industry uses a catalyst which selectively destroys nitrous oxide when it is formed, cutting the amount of emissions in the combustion process by more than 90 percent. Housing and transportation are two examples where chemistry has helped considerably to reduce energy consumption and thereby the impact on climate. Another potential sector in the country is the cement one: the most energy consuming and CO₂-intensive part of the cement production process is the clinker calcination and Mexico has the third world largest cement producer (CEMEX) which is undertaking steps for launching CDM projects. To resume, potential sectors for CDM investments in Mexico are: oil industry, electricity, cement, chemicals, landfills (solid waste management), renewable energies, transportation.

5.2 CDM Project situation

The generation of CDM projects has been relatively low in Mexico compared to China, India and Brazil, but it is still the fourth world largest recipient country for CDM projects.

Table I: CDM comparison among China, India, Brazil and Mexico



Source: UNEP RISO Pipeline (consulted in May 2010)

According to several stakeholders interviewed during the fieldwork in Mexico¹³², the CDM has yet to reach significant percentages in relation to national opportunities. This situation is consistent with the national intent to use oil and gas reserves to boost economic growth without necessarily follow an environmental policy and investment climate that inhibits or reduces the competitiveness of products and services. Considering also Mexico's mitigation potential as a producer and exporter of oil and electricity, the country has an estimated mitigation potential of about 100 million tons of CO₂ equivalent per year in the energy sector under an intermediate stage of

¹³² Interviews with DNA, Mario Molina Centre, Bancomext, EcoSecurities CDM project developer.

penetration of energy-efficient technologies and low carbon intensity that has not been clearly exploited with relation to the CDM potential.¹³³ It is also worth to remember that oil and electricity, which provide the major revenues for the country, are state owned. Mexico is in fact one of the biggest world oil producers and PEMEX – *petroleos mexicanos* - is the national oil company together with the Comisión Federal de Electricidad, CFE, the state energy company. According to the Mario Molina centre,¹³⁴ this is one of the major hindrances for developing further CDM projects along with a partial energy state reform in the country. *“For the country economic dynamics and potentiality, CDM projects are under exploited, especially in areas where primary energy is produced, such as the oil sector and power, as well as in areas where more energy is consumed as it is, remarkably, the cement sector, industry, transportation or household use”*.¹³⁵

Concerning the description of CDM projects, Mexico is the second largest recipient for projects in Latin America after Brazil. At the moment, the Mexican Ministry for the Environment (SEMARNAT) registered before the CDM Executive Board, 189 projects, 120 fully registered and 86 with Letter of Approval.¹³⁶ 85% of the projects belong to the *“Methane gas extraction and use in mass livestock farming”* sector and are small scale projects. Only 9% of the projects are related to renewable energies and 6% to Energy Distribution. GHG reduced are mainly methane, which account for 10% of the national inventory of GHG. All projects account for the moment to 6.273.537 TCo2e per year, compared to the potential of 100 million estimated by the Government. Countries investing in CDM projects and receiving credits are mainly member states of the European Union (70%), followed by Switzerland

¹³³ Mario Molina Centre for Strategic Studies on Energy and Environment estimation.

¹³⁴ Interview with Dr. Rodolfo Lacy, Mario Molina Centre Head of programmes.

¹³⁵ Ibid. A detailed analysis of potential CDM sectors can be found in a report carried out by the Mario Molina Center for Strategic Studies on Energy and Environment, under the grant received by the World Bank under the name: Carbon Finance Assist Grant for Capacity Building to Support Carbon Finance Transactions of 2006.

¹³⁶ At march 2010 Unep Risoe Pipeline

and Japan. 85 out of 120 registered projects are small scale projects.¹³⁷ Numbers and figures may be relatively important, given the fact that Mexico is reducing emission on voluntary basis.

Table II: CDM projects registered and estimated annual emissions reductions

Project category	Number of projects fully registered	Estimated annual emission reductions (1,000 t CO ₂ e)
Decomposition of HFC23	1	2,155
Biogas Methane combustion	65	2,345
Electricity Generation from biogas/methane gas	28	2,650
Landfill gas extraction and use	10	2,348
Power/Heat cogeneration from natural gas and biogas	1	4
Windpower	10	4,301
Hydropower	4	1,200
Energy efficiency	1	261
TOTAL	120	14.573.000
		ISSUED: 6.134.000

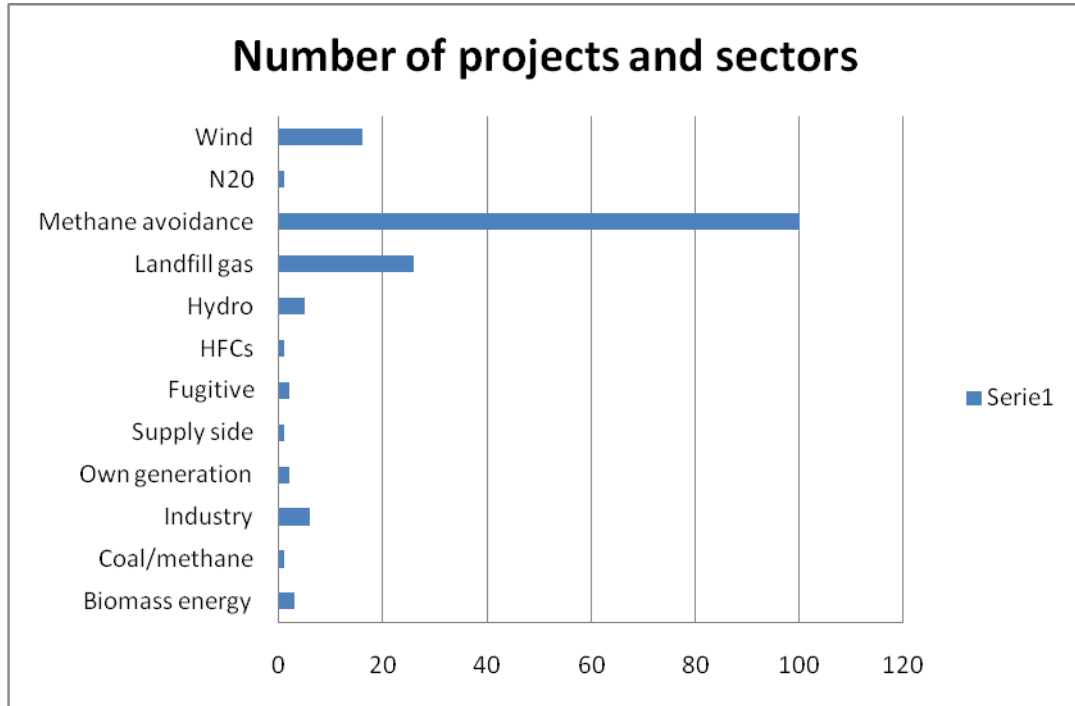
Source: SEMARNAT and INE

The annual emission reductions are calculated by the Mexican National Institute for Ecology (INE) for SEMARNAT and are based on several methodologies that take into account many areas of energy use that have the greatest impact on carbon dioxide emissions: they combine emissions from industrial and energy consumption, electricity, transportation and waste. Figures are taken from the latest national inventory of GHG emissions.¹³⁸

¹³⁷ Results are based on UNEP RISOE CDM pipeline

¹³⁸ Available at: <http://www2.ine.gob.mx/publicaciones/libros/520/cap2.pdf> . Calculation methodologies are available at: <http://www.epa.gov/ttn/chief/conference/ei18/session2/wolf.pdf>.

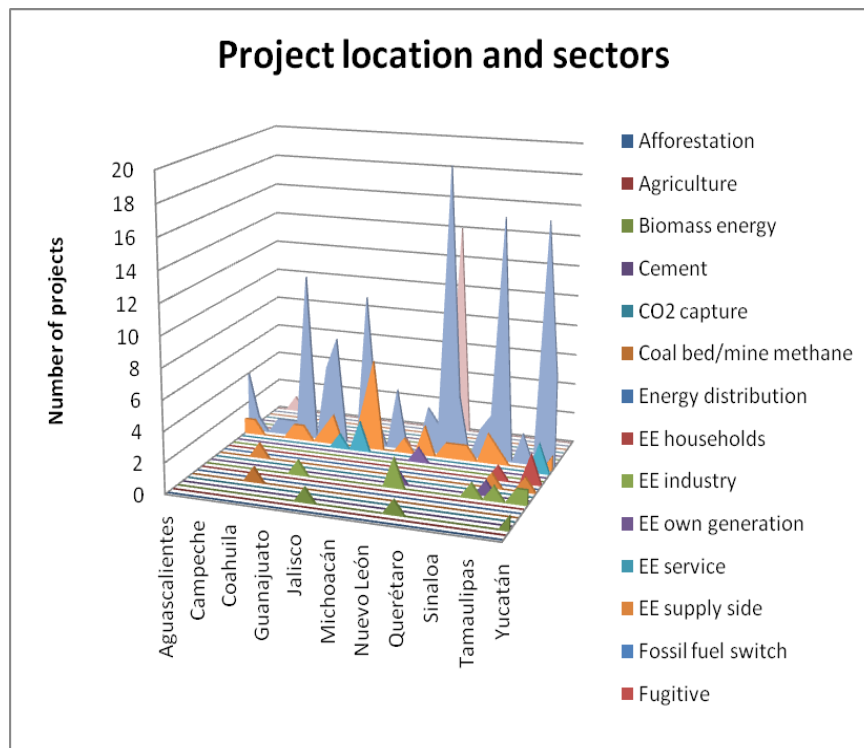
Table III: Mexican CDM projects and distribution per sector



Source: personal elaboration based on the CDM pipeline. The figure shows on the vertical axis (y) CDM projects per sector (wind, energy, biomass, etc.) while the horizontal axis (x) shows the number of projects per sector.

Concerning the CDM project location, the majority can be found in the centre-north part of the country, in particular in the State of Nuevo Leon, Tamaulipas, Coahuila – which are closed to the US border and among the most industrialized of the country. 90% of CDM methane avoidance projects are distributed among the mentioned States.

Figure II: CDM project location in Mexico



Source: personal elaboration based on UNEP Risoe Pipeline. The Y axis shows the number of projects available in each of the Mexican States, which are listed in the X axis. Variable X is the Mexican State and variable Y the number of project and the sector which it belongs to.

Since 2007, the number of projects approved by the Mexican DNA has only risen by twelve (from 100 to 112 in three years). One reason for this is that the few investors engaged in methane gas extraction on livestock farms, who had initiated very many projects in previous years, have recently been reticent to expand their portfolio. In order to understand the general slowdown and evaluate the CDM potential in Mexico, a national meeting was organized as a part of the Phd fieldwork and research agenda among several Mexican stakeholders in Mexico City in August 2009, in order to identify CDM challenges both at international and at local level in order to speed up CDM projects.¹³⁹ During the forum some of the major obstacles were identified to

¹³⁹ "A balance of the CDM in Mexico: opportunities and challenges". August 28th 2009, Mexico City. Organized by Bancomext and Instituto de Investigaciones Dr. José Maria Luis Mora, Mexican National Council for Research and Technology.

explain the relative growth of Mexican projects since 2007. Concerns include complex modalities for project approval, lack of a development dividend in projects delivering high certified emissions reduction (CER), uncertainty over post-2012 carbon credits, and uneven geographic distribution within the country itself. Other issues were found in the strengthening of human and institutional capacities and improving the operational setting for CDM implementation as well as the need for training issue of project developers in CDM specific methodologies such as elaborating baselines, monitoring protocols etc. The building of local validation and verification capacity, and the need to facilitate the development of effective and streamlined local and international CDM institutions and finally ensuring a reasonable CER price for local project owner through awareness building and market access were also identified as key problems for the CDM development.

In particular with reference to projects developers, it was claimed that many projects would have difficulties to find international CDM investments and the reasons for that are transaction costs, given that most of the projects will not be able to bear the additional transaction costs which rise when a commercial international investment takes place. Then the cost for conventional due diligence process and for additional CDM requirements such as validation, monitoring and certification would be unbearable high. Secondly, many projects bear specific risks especially for projects with rural off-takers that would conceive projects too expensive to be realized. Legal issues were also of great concern among participants and in particular the lack of a national law concerning carbon investments and climate change. Concerning the issue of SD, except from an interview with the NGO *"Tu Transformas"*, none of the interviewed key persons, mentioned the issue of SD as a relevant topic.

Table IV: Mexican CDM registration process



Source: personal elaboration from Unep Risoe CDM pipeline.

Therefore and broadly speaking, the CDM has been slow to develop in many promising fields in Mexico. Extensive prospects for CDM projects are still seen in the electricity, oil and gas sector, in solid waste management (reduction of landfill gas emissions) and in energy-intensive industrial segments (e.g. in cement production or in the steel industry). There is also multiple scope in renewable energies, which has begun to be more targeted, but CDM activities are likely to step up in future along with the development of the green economy trend.

Concerning the programmatic approach (Programme of Activities - PoA), where many small projects of the same field are bundled together, it can be said that it may represent a new area of opportunity. So far, the only PoA project in Mexico (although programmatic CDM is not well developed worldwide) deals with the replacing of conventional light bulbs with more energy-efficient illuminants, which was considered quite successful at international level and may pave the way for future similar projects in the field.

But in general terms is not yet clear how the development of Programmatic CDM will impact the country. Programmatic CDM allows an unlimited and continuous addition of project activities (CPA) replicating the first one after approving the umbrella project (PoA). With the Programmatic CDM, there is the idea that it may help to scale up projects although other problems, starting from the right adoption of methodologies, may create obstacles to the adoption of this PoA modality itself.

5.3 CDM Contribution to Sustainable Development in Mexico: an assessment

In this part of thesis an empirical assessment will be carried on with the aim of proving the relation between CDM projects in Mexico and its potential contribution to SD. Before explaining the methodology used for the assessment it is worth reminding some important issues concerning the use of SD criteria in Mexico and the Mexican Designated National Authority way of proceeding when projects are submitted.

The CDM was established as a mechanism by which GHG emission reductions could be achieved in a cost-effective way in exchange for investment in sustainable energy technologies in developing countries. While host countries retain responsibility for assessing the sustainable benefits derived from CDM projects and countries have identified such evaluative criteria, the Marrakech Accords provide very little direction when ensuring that benefits are achieved. In accordance with the procedures for the CDM agreed at Marrakech in 2001 participants in CDM projects will have to provide *“written approval of the voluntary participation from the designated national authority of each party involved, including confirmation by the host party that the project activity assists it in achieving sustainable development”* (Section 40(a), Decision 17/CP.7).

Host countries take then different approaches to setting SD criteria for projects and it relies on their choice how to establish and define a basic set of principles for sustainability in the CDM projects. In general, a project can contribute to three types of sustainability: ecological, economic and social sustainability: each dimension can have some specific sub-sectors or indicators to be followed. It is important therefore that host countries are explicit in describing their sustainable development criteria and how those criteria meet international standards as well as they are transparently applied during the CDM project approval process in each host country. In the case of the environmental criteria, if during the project approval process, either the

project developer(s) or the host country believes that negative environmental or social impacts from the project activity will be significant, then an environmental impact assessment (EIA) must be carried out.¹⁴⁰ The assessment should include impacts from both within and outside the project boundary area and follow the host country's procedures. The results of the environmental assessment must be attached to the final PDD. The host country's sustainable development criteria can serve as a basis for the EIA. Another important issue concerns stakeholder participation. Local stakeholders have opportunities to provide comment on the proposed CDM project activity and the project developer must consult with stakeholders to gain input and support for their project. A summary of this consultation process, as well as the comments received and how the comments were taken into consideration must be included in the final PDD.¹⁴¹

In the case of Mexico, the DNA has set out explicit SD criteria that cover economic, environmental and social development issues. As previously seen there is no formal definition of SD in Mexico and the National Development Plan 2007-2012 only briefly mention the concept without providing any further definition. Therefore, DNA authority SD criteria consist of a description of general principles to be followed in the economic, environmental and social sphere. While these are more general they anyway set out a set of minimum standards that must be met by the project.¹⁴² Mexico's criteria illustrate a balance on the different SD dimensions and no particular importance is placed on any relevant sector, including technology transfer or employment generation. They are quite flexible and there are no particular criteria for further demonstrating project additionality, in order to maximize the support for the newest clean technologies that can provide true SD.

¹⁴⁰ The clean development mechanism: an international perspective and implications for the Latin American Region.
http://pubs.pembina.org/reports/Review_of_Current_Status_of_CDM_and_LAC_Implications_para_web.pdf

¹⁴¹ *A reformed CDM: including new Mechanisms for Sustainable Development*. UNEP RISOE Perspectives series 2008.

¹⁴² Personal Interview held with the Coordinator of the Mexican DNA Authority on February 2010, Mexico City.

The DNA will consider each project application against the three core criteria and will make an assessment of whether *on balance* the project supports SD in the country. In some instances, projects may have different impacts on one or more dimensions of SD and little benefits in some other dimensions. In such cases the DNA, in fulfillment of its regulatory role can assess the overall contribution of the project to SD. The DNA criteria include: fulfillment of national environmental regulations; contribution to improve the economic and competitive situation of Mexico (e.g. through investment, wealth generation, employment and/or technology transfer); and contribution to maintain or improve the quality of life of communities (e.g. by providing well paid permanent jobs, promoting equality, improving community health, creating or improving local infrastructure, and promoting capacity building).

TABLE V: Mexican DNA criteria used to analyze CDM Project contribution to SD

<p>Environmental Contribution</p>	<p>Projects PDD should highlight environmental benefits, such as the preservation or enhancement of biodiversity or reducing other polluting emissions. Other aspects to be considered where appropriate, are those related to treatment, use and waste generation, its contribution to the quality and quantity of water used or saved, and the project's impacts on the quality and conservation of soils. If current regulations do not require that the project is submitted to environmental impact assessment (Article 4 paragraph IV of these procedures) projects should ensure that there are no major negative environmental impacts.</p>
<p>Economic contribution</p>	<p>Projects submitted should improve or at least maintain the economic and competitive situation in the country. This includes the project's profitability, direct investment generated as a trigger for other investments or economic growth, especially at the local level, its effect on imports / exports of the country and the development or technology transfer that the project would entail.</p>
<p>Social benefits</p>	<p>Projects need to improve or maintain influence in the quality of life of the town where it is realized, creating permanent, <u>well paid jobs</u> with gender equality, improving health conditions for the participants and contribute to regional and community development. Projects should also promote integration with other socio-economic activities and providing <u>access to energy or infrastructure</u>, and building administrative capacity, economic and / or technological in the region and the country.</p>

Source: personal translation to English from the original Spanish document provided by the DNA office. SEMARNAT February 2010.

Criteria are very flexible but all points to the fact that what is more important is to improve the national economic situation under current Mexican economic trends and circumstances without compromising national development.

According to the DNA there is no threshold for any of these criteria nor any kind of indicators or measures are used to comply with the criteria established. The DNA takes into account the contribution made by the project description and related to SD benefits plus some additional information whenever required. If no contribution to SD is envisaged, some clarification can be asked to the project developers. When project is approved by the DNA, a Letter of Approval is stated and says that the project contributes to SD. It is important to mention that during this stage many projects can simply deliver potential benefits and there is no possibility to monitor the contribution to SD before registration. The control that the DNA can have after the issuance of the LoA is very limited. Another difficult part consists in assessing to what extent a type of project can deliver short term or long term benefits to SD.¹⁴³

If we match the national SD definition previously analyzed (chapter 4) with DNA national criteria for CDM projects, we can see clearly some differences. DNA' SD definition in fact encompasses the three broader definitions of SD at international level, looking at the three pillars of economic, environmental and social dimensions. However strong emphasis is given to the economic pillar; this probably due to the fact that the Mexican government is concerned that CDM projects are bringing FDI (foreign direct investments, particularly in the energy sector) and it does give the impression that the country is really concerned with the SD compliance. Criteria for complying with the economic pillar of SD include the capability of *“project's profitability, direct investment generated as a trigger for other investments or economic growth, especially at the local level, its effect on imports / exports of the country and the development or technology transfer that the project would entail”*. This clearly shows that there some divergences and no causal relationship between DNA SD criteria and national SD strategy and this is why also SD benefit can be expected not to be broadly reached. In most cases, outcomes seem constrained to some narrow definition of SD with little and unbalanced results

¹⁴³ Personal interview with the Coordinator of the DNA authority.

within the three general pillars of SD. Secondly, it seems sufficient that with some unspecified environmental benefits, employment generation together with a more efficient energy use, some national SD practices can be satisfied. In fact, if we look at the SD-DNA criteria on SD and in particular on the social dimension, it is mentioned that *“Projects need to improve or maintain influence in the quality of life of the town where it is realized, creating permanent, well paid jobs with gender equality (...) Projects should also promote integration with other socio-economic activities and providing access to energy or infrastructure, and building administrative capacity in the region and the country”*. Concerning the environmental criteria, it is consider a sufficient condition the *“preservation or enhancement of biodiversity and reducing polluting emissions”*.

The analysis provided in this dissertation, however, also reveals that it can be misleading to assess projects performance only through project documentation, as many factors, such as other development and climate mitigation alternatives, may remain invisible. So how can we expect that CDM can deliver SD in Mexico, when SD criteria do not necesarrily respond to national SD practices ? This is a crucial issue that deserves to be also proven by an empirical analysis.

5.4 Methodology description and assessment criteria

Moving to the empirical analysis and the methodology used to assess CDM impact on Mexican SD, work is based on the UNEP RISO database (pipeline) and further inputs are drawn by the works of Watson, Frankhauser among others¹⁴⁴. Moreover a correlation coefficient analysis as a statistical tool is also run to provide a relation between projects and SD in Mexico.

The following analysis to assess CDM impact on SD is carried out based on a methodology that looks at the text analysis of the Project Design Documents submitted for validation at the UNFCCC and it considers the claims of co-benefits made by CDM projects themselves in the PDD.¹⁴⁵ The PDD is the most widely-available and comprehensive source of project-by-project information and it is available in the UNFCCC website. Reviewed by the Designated Operating Entity (DOE; a body accredited by the UNFCCC) before submission to the EB, the PDD presents information on all aspects of the proposed activity following a standardized format including a general description of the project activity, environmental impacts and stakeholders comments.

It is important to remind that project documents do not reveal how projects are implemented and what is happening on the ground, but they simply inform about the mindset of project developers and the importance they assign to Sustainable Development while making the project. It is also important to see if projects are taking into considerations the sustainable development criteria established by the DNA for project submission.¹⁴⁶ As the nature of the methodology is qualitative, findings describe *how* CDM projects at aggregate level can contribute to SD and from the point view of

¹⁴⁴ This methodology was first used by Fehmann and Olsen in 2008 (Energy Policy 2008). C. Watson and S. Frankhauser have also used a methodology based on the previous authors but with different analytical tools. See: The Clean Development Mechanism: too flexible to produce Sustainable Development benefits? *Working paper 3, June 2009. Grantham Research Institute for Climate Change and the Environment, London School of Economics and Political Science.*

¹⁴⁵ Project PDD available from: <http://cdm.unfccc.int/Projects/Validation/index.html>

¹⁴⁶ Ibid.

projects developers. But there is no basis to conclude how much the CDM really contributes to SD on the ground. This second option, although much reliable, could not be used for one main reason: the lack of information at project ground level due to the denial for interviews and investigation posed by projects developers and project managers in Mexico.

To assess economic growth and SD some understandable and practical indicators are used. A part from the three general dimensions which identify the concept of SD (Economical, environmental and social) a fourth dimension (the Physical one) is introduced. Within the four dimensions, some key words are chosen. Most of them are based on the work developed by Frankhauser and other authors, which identify for the whole PDD UNFCCC database some words common to all documents and useful to match SD criteria as such.

Through this choice of indicators emerges a particular definition of SD that may not necessarily align with the Mexican DNA document that establishes SD criteria for project submission. This is because it is necessary to encompass as many aspects of the numerous SD approaches as possible and secondly to avoid tautological results. In fact if we were to use DNA SD established criteria, it would be certainly easier to prove that CDM projects in Mexico satisfy national demand for SD.

Furthermore, PDD are not finally searched for a claim of 'sustainable development' *per se*. These keyword indicators are found in table VI. Indicators do not include the benefits that expected to occur in all projects, for example, GHG reductions, equipment, and CER revenues. When taxonomy is identified, 75 PDD out of 120 registered projects (65% of the overall sample) are then searched for both primary and secondary keywords associated with indicators and word count results are summarized in the table VII. Words found are scored "yes" or "no" to weight¹⁴⁷ their importance within the sentence or paragraph where they reside. This binary scoring which result from the weighing helps to refine the search and give a better context to the

¹⁴⁷ Weighting is a technique used in this kind of methodology to attribute certain values or importance to a variable, being it qualitative or quantitative.

words searched: for example only those words in the PDD which are found to have a positive contributions – meaning that in the sentence there are mechanisms described that indicate a clear delivery of some SD criteria- will be taken into account. Mere words that just state SD benefits will occur without being precise are not taken into account. This method is clearly subjective because it requires personal judgments on the nature of co-benefits associated to the words found.

For example, if we take an extract from the PDD of the “Oaxaca III Wind Energy Project”¹⁴⁸, the word “environmental” is taken into consideration:

*“After examining all documentation and analyzing the potential effects that could derive from the implementation of the Project, the Project is considered viable from an environmental point of view”. The **Environmental** Impact Manifest and the **Environmental** resolution consider the different possible impacts in the different stages of the project: erosion; Soil contamination; Vegetation loss; Modification of habitats, Possible effect on flora or fauna habitats, as the environmental resolution details, where an environmental impact is possible, it shall be minimized, mitigated or prevented via the measures and conditions proposed in the environmental resolution. In this paragraph the word “environmental” is repeated 6 times, but only two (those in bold) are held in account or “weighted” as a “YES” because they are those who are strongly related with the potential environmental benefits of the project that are listed immediately after (contribution to the erosion; Soil contamination; Vegetation loss; Modification of habitats, etc). The other 4 words have a relative meaning for the purposes of the counting, have less significance for the analysis of the PDD file and therefore are scored as a “NO”.*

The results represent the type of co-benefits that CDM projects can bring rather than the size or scale of such benefits. The method of word counting

¹⁴⁸ Available at: <http://cdm.unfccc.int/Projects/Validation/DB/B64SQQ09DS3QPF49OYTTJOUUC8QE0AK/view.html>)

and search through the PDD means that only the potential benefits are observed by this methodology and there is no certainty if projects are going to deliver or not their benefits, because projects may face several difficulties in their implementation phase after registration and during the entire commitment period of the CMD itself (until 2012). Finally, with this methodology only some general comments about sectors level contributions to SD objectives and some differences in their possible impact can be done. Again, it is worth to remember that this “controversial” methodology is widely used and accepted among the international scholar community dealing with CDM studies and its different results were recently mentioned by the 2010 World Bank World development report on “*Development and climate change*” to explain the CDM lack of SD delivery in host countries.¹⁴⁹

Table VI: Keywords indicators

<i>Sustainable development criteria</i>	Primary Keywords searched	Secondary Keywords searched
Economic Dimension	Employment Livelihood	Job, Labour, income
Physical Dimensions	Infrastructure Technology Transfer	- -
Social	Training Education	- -
Environmental	Pollution Environment	Ecosystem Biodiversity

Contrary to the environmental and economic dimension, where it was necessary to search for secondary words in order to come up with much stronger data, for the physical dimension no secondary words were searched

¹⁴⁹ WB 2010 World Development report “*Development and climate change*”. P. 266
<http://siteresources.worldbank.org/INTWDR2010/Resources/5287678-1226014527953/Chapter-6.pdf>

because the words “Infrastructure” and “Technology Transfer” were found many times in the PDD files and were considered enough for satisfying the purposes of the word count itself. In fact, secondary words are searched only when results from primary search are not significant to the purpose.

Table VII: general matrix of word count

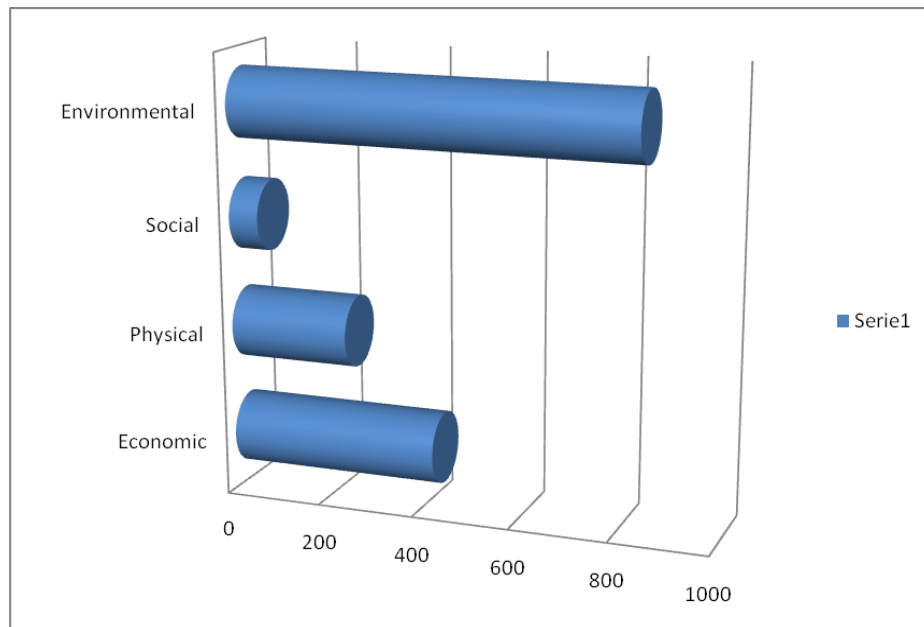
SD Dimensions		Economical		Physical		Social		Environmental	
CDM Projects Type	Number of projects	Employment	Livelihoods	Infrastructure	Tech. Transfer	Education	Training	Pollution	Environment
Wind	16	3	9	9	2	3	27	5	199
N20	1	0	1	2	4	0	0	1	1
Methane avoidance	100	127	124	36	38	0	4	4	394
Landfill gas	26	16	43	33	11	2	10	8	58
Hydro	5	3	9	9	2	0	1	0	29
Energy Efficiency	10	28	52	45	26	2	6	8	104
HFC	2	0	1	0	2	0	1	0	13
Fugitive	1	0	0	1	0	0	0	0	0
Biomass energy	3	5	8	9	11	6	2	2	15

Colors show the different SD dimensions (economical, physical, social ad environmental) and highlight the number of words found for each indicator (employment, infrastructure, education, etc.)

5.6 Key findings

At the overall level, results of word count analysis show that potential SD benefits of CDM are predominantly seen in the environmental sector (53% of the projects sampled), followed by the economic benefits (27%), physical (16%) and social (4%). Again, it must be taken in consideration that results only show the alleged benefits per sector and not the real impact *per se* on SD. However and for the methodology chosen, findings are somewhat surprising compare to some mainstreaming studies where CDM are claimed to have little impact for example on the potential nebenefits in the environmental side of SD. In particular for the Mexican case, it is worth mentioning that the environmental benefits are large due to the fact that the majority of projects belong to the methane avoidance sector which is considered *per se* to have high potential sustainable impacts on the environment. This is because methane is a gas with an high potential index of warming and therefore it is of great importance that CDM-PDD projects include references to the abatement of such gas emissions and all environemental benefits derived from its control.

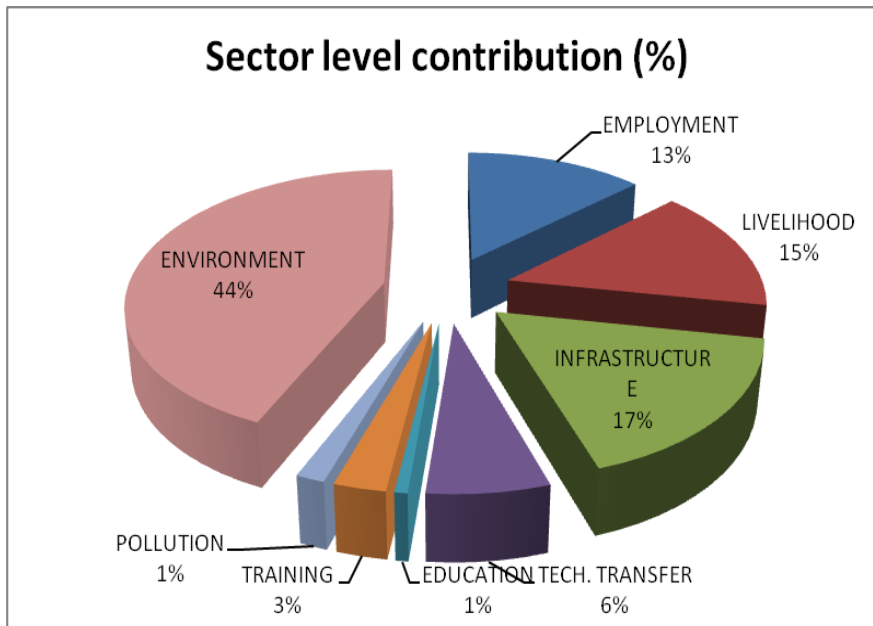
Table VIII: Potential SD benefits per dimension



Source: personal elaboration

While looking at the level contribution per secondary words searched within each of the dimensions explored, the most significant contribution in terms of possible benefits seems to come from the environmental word (44%), followed by infrastructure (17%), livelihood (15%) and employment (13%). Social indicators (education and training) score very little. Technology transfer, which is supposed to be one the major benefits delivered by CDM is having a relative importance (6%) in the PDD project description.

Table IX: pie graph on overall level contribution to SD



Source: personal elaboration

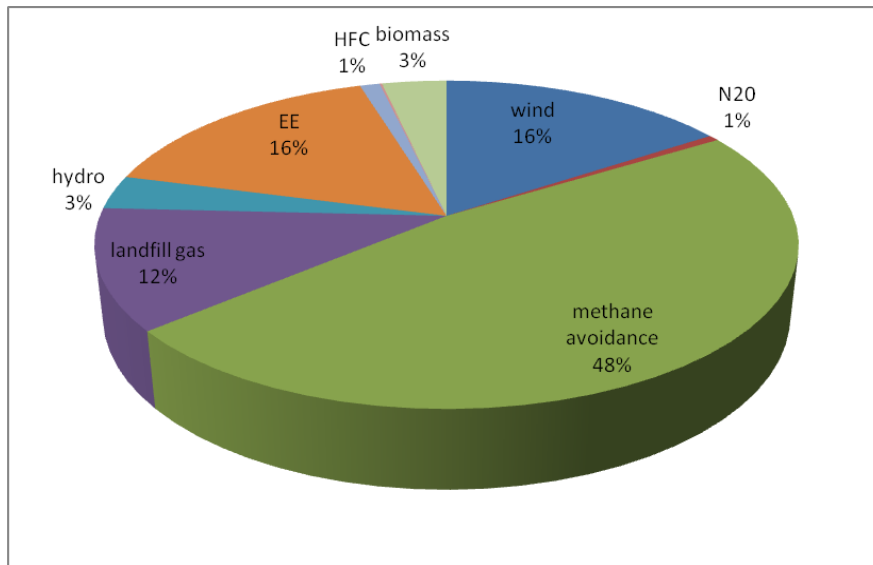
The full complement of SD is found in the CH₄ reduction (methane avoidance projects), energy efficiency, renewable energies, and the landfill gas project activities sectors as shown in table XI. This is again due to the fact that the majority of CDM projects in Mexico are related to landfills. In general terms, the contribution of the methane avoidance projects is clear in terms of local environmental sustainability and improvement in labor conditions, especially for projects developed in industrialized areas such as the North of the

country. Landfill gas projects also seem to have positive impact on the environmental side and they are also a good source of revenues for local municipalities given that solid waste is among the major problems for local communities. They can also generate local employment and provide the creation of skilled labour in the topic.

Just to take an example, the environmental sustainability benefits provided by a landfill project such as the one in Aguascalientes (the first worldwide CDM project to be registered in 2006 on the landfill sector) is considered at national level to have generated a number of important environmental benefits. In addition to reducing GHG emissions, the destruction of LFG also improved the local environment by reducing noxious air pollution that had previously been responsible for considerable nuisance, odors, and health risks to the local community. The Aguascalientes project also provides a model for managing LFG, a key element in improving landfill management practices throughout Mexico. The project thus acts to demonstrate the benefits of clean technology, encouraging less dependency on grid-supplied electricity, and representing a significant technology transfer. Overall, sustainable management of the landfills at Aguascalientes can accelerate waste stabilization such that the full decomposition of landfill waste will be largely complete within 30-50 years.

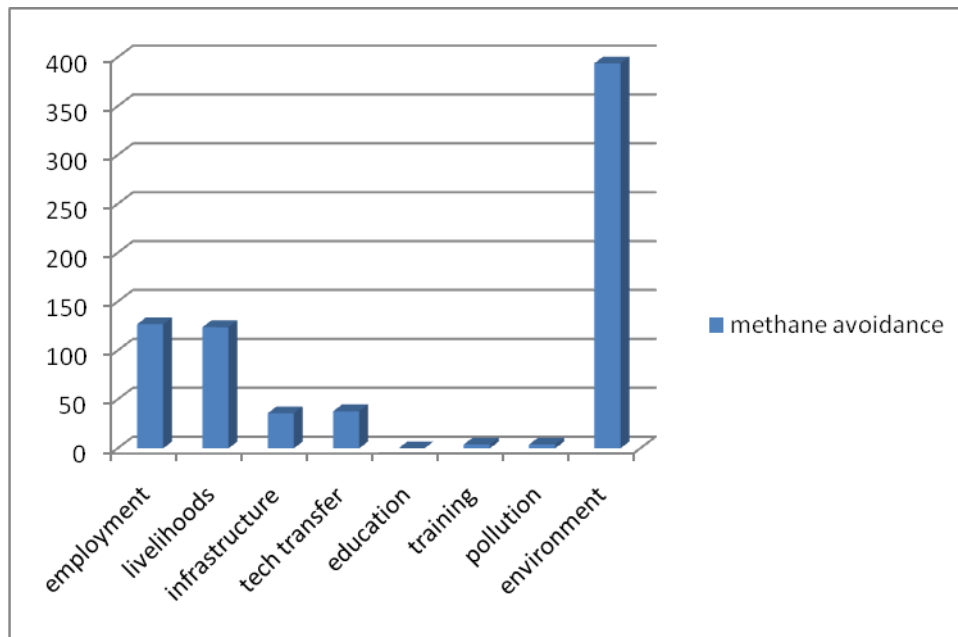
However, problems may come from stakeholders who can have dispute over the rights to explore land sites and other legal concerns related to the set up of new landfills. This is why programmatic CDM is also explored in landfills in Mexico in order to overcome such circumstances.

Table X: full complement of SD benefits



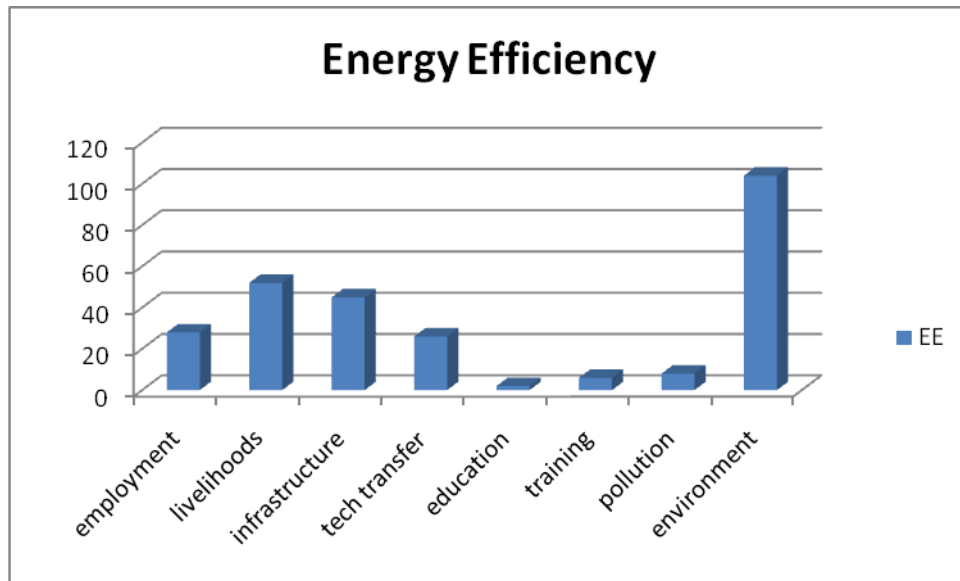
Source: personal elaboration

Table XI: CDM methane avoidance impact per sector



Source: personal elaboration

Table XII: CDM Energy efficiency impact per sector

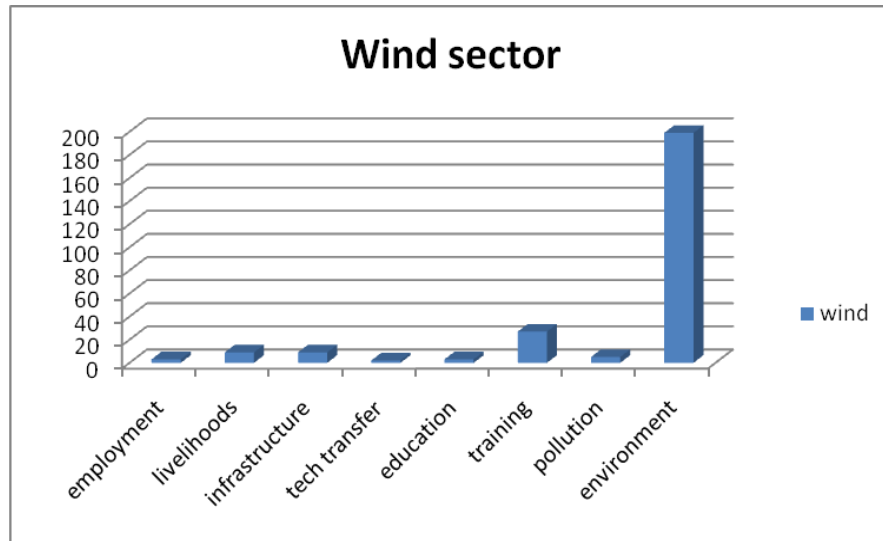


Source: personal elaboration

Energy efficiency projects are also showing to have possible benefits on the environmental side as well as in livelihood and infrastructure. However, in the energy efficiency sector, most of the projects have to be checked for real benefits delivery on the ground, given that accurate measurements occur with different methodologies than those applied here.

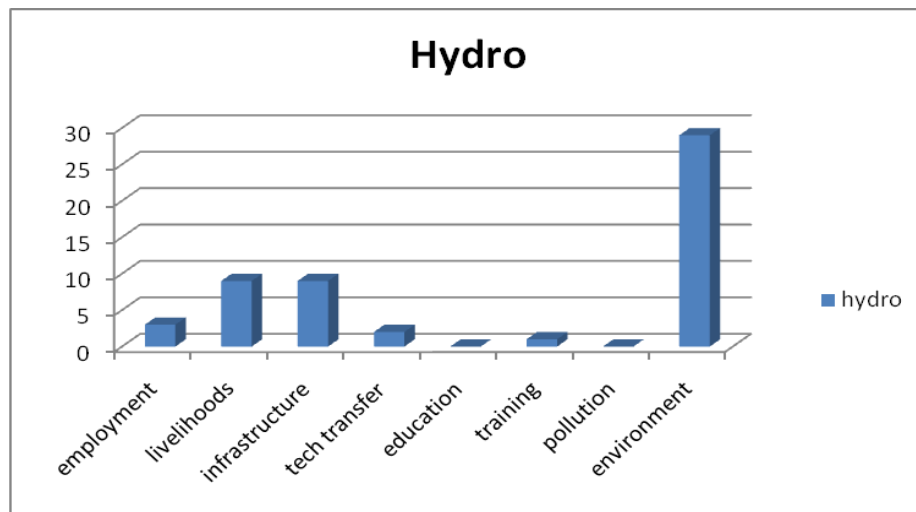
Concerning renewable projects, it can be also observed the delivery of substantial benefits in environmental and economic terms (for example the electrification of rural areas, very low contamination level) but not in social ones. Several projects in fact, especially those on wind energy in the South west of Mexico (Oaxaca State) had to face local indigenous resistance given land expropriation and the lack of employment generation. Projects implementation require high skill labor which is not available in the area.

Table XIII: Renewable energy impact (wind power) on sectoral level



Source: personal elaboration

For the hydro power projects, emission reductions from this type of project and environmental benefits for local biodiversity are real and measurable and contribute in the long term to reducing emissions because of the life time of a small hydropower project is 50 to 70 years. According to the findings, infrastructure is also definitely playing an important role in contributing to SD. Many of the projects help to create facilities, premises and industries that can have positive impacts on the area where projects are carried on.



Source: personal elaboration

Livelihoods contribution appears also to be significant (15%): this is probably due to large number of projects generated around the livestock farm issue (methane avoidance). The multiple contributions of livestock in natural resource based livelihood strategies is in fact well documented worldwide. Further, development and sustainable use of waste/common land through sizeable investment, promotion of ecologically sustainable livestock farming through incentive mechanisms, diverting intensive production system to appropriate areas, control of negative environmental impacts of livestock production have been tested and improved in many Latin American countries. A final remark can be done on the employment variable. All projects surveyed, although the PDD files make general mentions of job creations, do not reflect a particular focus on the labour aspect (13%), maybe because small scale projects have not such a direct influence in creating permanent and stable jobs. This is in line with Mexican national policies on employment which prefer taking advantage of opportunities offered by large foreign direct investments in strategic industrial sectors which employ thousands of people, rather than in small size projects.

Finally, it can be mentioned that PDD files do not refer to the concept of poverty alleviation in line with the requirements made by the MDGs which Mexico is bound to comply by 2015. This means that in general terms the SD criteria established by the DNA do not take into consideration some of the indicators required by the UN to the compliance of the MDGs. This a major concern since the Mexican government placed strong emphasis on the compliance of the MDGs as a national strategy for reducing poverty and improving conditions in its community and the CDM should be part of the integral process of reducing poverty adopted by the country. The decision of CDM Executive Board at its 21st Meeting in 2008 to create a *global CDM Bazaar* for the defined purpose of bringing Industries, CDM Project Activities, Funding Agencies, and Investors to earn carbon credits and streamlining emissions' trading in sustainable manner under Kyoto Mechanism, was

considered part of the process to contribute for the compliance of Goal n.7 which aims to improve SD. However both DNA authorities worldwide and the SD criteria established, did fail to envisage the role of the CDM as leverage for the compliance of specific goals related to the MDGs. When asked the question to the DNA authority in Mexico¹⁵⁰ of whether CDM may help to reach MDG 7, the answer pointed to the fact the CDM are market mechanisms that already contribute to improve SD and therefore they also comply with MDG 7. However, the DNA stressed that there might be the need for establishing better links among CDM and MDG 7.¹⁵¹

Despite the official answer however it seems personally that no link is provided between the CDM-SD criteria at national level and the overall efforts to achieve MDGs in Mexico. The two aims are pursued through different means and strategies at institutional and federal level (SEMARNAT is responsible for the CDM in the context of a larger fight against climate change, while the Ministry of Development SEDESOL, looks upon the issue of the MDGs together with the support of the United Nations Development Program). Indicators for measuring both CDM and MDG are also unbalanced: the CDM in Mexico does not have any concrete indicators for its measuring, while MDG have long and established indicators developed at national level and yearly monitored. Future recommendations point to the fact that both concepts may be integrated under common indicators and frameworks.

¹⁵⁰ Interview previously cited with Mexican DNA authority, held in Mexico City, February 2010.

¹⁵¹ Ibid.

5.6 Statistical analysis of the CDM and its contribution to SD in Mexico

In order to prove that a positive relation between the number of CDM project types (wind, energy, methane reduction etc - variable X) and SD potential benefits such as transfer technology, employment, livelihood (variable Y) – exists, a correlation coefficient statistical exercise is carried on. The formula used to calculate the Pearson’s coefficient “r” is the following:

$$r_{xy} = \frac{\Sigma XY - \frac{(\Sigma X)(\Sigma Y)}{n}}{\sqrt{(SS_x)(SS_y)}} \quad \text{OR} \quad r_{xy} = \frac{\Sigma XY - \frac{(\Sigma X)(\Sigma Y)}{n}}{\sqrt{\left[\left(\Sigma X^2 - \frac{(\Sigma X)^2}{n_x} \right) \left(\Sigma Y^2 - \frac{(\Sigma Y)^2}{n_y} \right) \right]}}$$

The table shows the results of the correlation, run through the Microsoft Excel program:

N. of projects per sector	SD sectors	“r” results
All (wind, energy, hydro, etc)	Technology Transfer	0.80640685
All (wind, energy, hydro, etc)	Infrastructure	0.57379453
All (wind, energy, hydro, etc)	Environment	0.9181743
All (wind, energy, hydro, etc)	Employment	0.9712122
All (wind, energy, hydro, etc)	Livelihood	0.93787024
All (wind, energy, hydro, etc)	Training	0.10718805
All (wind, energy, hydro. Etc.)	Education	0.11564001

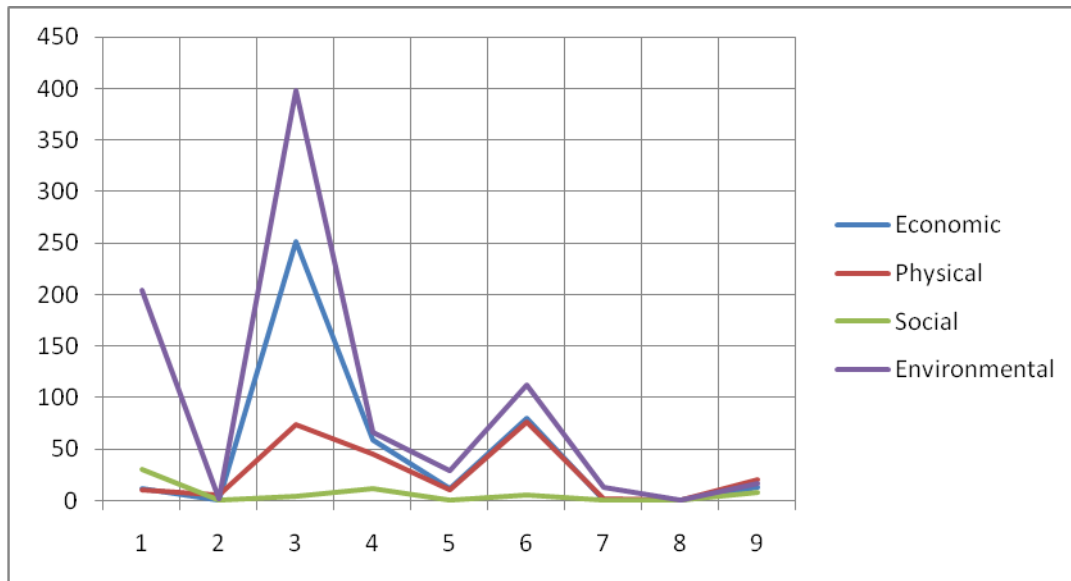
“r” results show that in most of the cases a potential strong relationship between the type of projects and SD dimensions exists and they are quite significant. In fact, if “r” is greater than 0.00 but less than 1.00, there is a positive relationship between the two variables. The closer is “r” to 1.00; the stronger is the relationship between the variables chosen.

In concrete terms and looking to findings, there is an important relationship between the CDM projects in Mexico and their potentiality to transfer technology (0.85), benefitting the environment (0.91) and the creation of employment (0.97), together with the generation of livelihood conditions (0.98) which scores the highest value. Concerning the infrastructure, the coefficient shows a medium result (0.5), meaning that contrary to what defined in the DNA-SD criteria; projects may have a relative potential benefit in the infrastructure building. This is a contrasting result given that Mexico national strategies of economic development are strongly based on the idea of creating local and national infrastructure as a development concern. But as mentioned before, as long as the projects offer potential benefits in the employment and environmental sectors, together with technology transfer, projects do satisfy Mexican DNA criteria. However this does not necessarily mean that potential benefits can really contribute to a broader SD compliance at national level, as previously discussed.

In the case of the social variables such as training and education, there is a very low relation (0.1), meaning that the CDM projects may have little benefits on such dimensions. It can therefore be argued that for CDM project designers, education and training seems to play a less significant role in the project planning. If we look at SD criteria established by the Mexican DNA authority it is also clear that those variable are poorly represented (there is no mention of the words training and education in the SD criteria).

Results are also in line with previous findings concerning the potential benefits delivered by CDM projects in Mexico in the environmental and physical dimension.

In graphical terms, the “r” coefficient is represented in the next table and linked to the economic, physical, social and environmental pillars of SD, which are made up of all the sectors analyzed (environment, pollution, training, technology transfer, etc.)



The highest correlation coefficient is represented by the environmental and economic sector, followed by the physical and social one. Again, this is in line with previous findings referred in table VIII.

5.7 Conclusion

Several conclusions can be drawn in relation to the previous findings. First, the SD co-benefits of CDM projects in Mexico match only with some of the priority areas of CDM projects outlined in the DNA national criteria and definitions, particularly the environmental one and to lesser extent the economical and physical one. CDM projects contribute very little to the social dimension. Secondly, the above asymmetries clearly reflect an unbalanced relation among co-benefits of SD which are skewed towards the environmental side (due to the large number of projects in the methane sector). Supposing that to achieve full SD benefits it is important to count with

a balanced co-benefit distribution among the different dimensions of SD, results show that current CDM projects and PDD files are designed in Mexico with a concept of SD mostly based on the economic, environmental and physical dimensions. Thirdly, the contributions of CDM projects in Mexico to SD differed across the project categories, sectors, and among individual case and result are very different. For example, if we look at the case of renewable energies, where the environmental dimensions should be dominant, the economic co-benefits are instead the most relevant.

Fourthly, CDM projects co-benefit analysis based on the methodology used in the chapter appear to be having effects on the local economic development level and somehow they appear directly linked to a specific geographical location where external conditions are favourable to the CDM development and more broadly to the general conditions of foreign direct investments reception. The geographical distribution of CDM projects in Mexico is in fact concentrated in the north of the country, where, as it was mentioned before, the industrial development of the country is advanced. Some of the previous points are further explained.

Starting from the PDD revision, something that becomes apparent fairly soon when going through PDD project files is how little thought often goes into developing and articulating the SD aspects of a project, and how unfamiliar many project developers (both national and international) are with the notion of SD. This is particularly true for projects developed in energy efficiency sectors and methane avoidance, where SD dimensions are driven more by engineering and physical approaches, more than integrated visions of all sustainability aspects. It is in fact clear that some stakeholders understood SD as exclusively an economic development, or exclusively as environmental protection, and did not see the SD concept as an integrated issue of economic development, environmental protection and social improvement.

With reference to SD criteria in Mexico, they are defined quite broadly since the beginning of the commitment period under the Kyoto Protocol and they have never been changed or revised during that time by the DNA. It can be

said that National sustainable development criteria may be criticized for being too flexible because criteria established for all PDD projects submission to DNA authority can “easily” comply with the requirements and they may always have somehow an impact on SD. Although there is an attempt to respect the three pillars of SD there is no previous monitoring or verification of the contribution to SD by the DNA. The control that the DNA has after issuance of the Letter of Approval is very limited and the idea that the types of projects introduce short or long term benefits for SD is still to be clearly defined. Besides, even though CDM projects are meant to introduce important structural changes like promoting clean and renewable technologies that may point to decarbonization processes, stakeholders do not have clear ideas how to implement those projects.¹⁵²

Concerning the projects assessment, it can be inferred the majority of projects analyzed seem to contribute to local SD and in particular to the environmental dimension, according to the criteria established by the DNA and they prove that small scale CDM projects are highly valuable from a sustainability perspective. In fact the project analysis carried on in this chapter show that most developers have taken a very broad approach to SD with potential benefits mostly in the environmental and economic sector with little benefits on the social side. A low technology transfer is also taking place among credit buyers and the country, meaning that one of the major leverage claimed by the CDM is having relative impacts. Further analysis on the projects is also difficult due to the lack of information in the available PDD files (like for example the number of jobs expected). Indicators chosen in this work and its relation with SD respond to common definitions of the concept in mainstream literature and the match with definitions adopted in this case study by the DNA authority in Mexico.

Finally the assessment quantifies the potential, not factual SD benefits received in Mexico and any further measurement of CDM projects – not only

¹⁵² This problem was highlighted in several occasions during the National forum on CDM projects held in Mexico City in August 2009 by the stakeholders.

in Mexico – would require on the ground evaluation at project sites. As Watson and Frankhauser say, *“if meeting SD criteria was a pre-requisite for CDM projects, with registration dependent on a positive contribution to each form of capital, it would be important to address inherent sector differences as well as differences in country level SD policy”*.¹⁵³ While the CDM in fact, as a market-based mechanism has generated economic profits and revenues, its potential SD benefits have not been capitalized. This leads to a further problem. CDM reform is in place at international level and in recent negotiations a lot of challenges have been identified to overcome CDM implementation difficulties, including the issue of NAMAs (Nationally Appropriate Mitigation Actions) which should introduce new targets for emission reductions and further improve SD at country level. New efforts should then be considered for creating alternative mechanisms for host countries to monitor and verify its contribution to SD through the CDM.¹⁵⁴

¹⁵³ Watson and Frankhauser; Op. cit.

¹⁵⁴ NAMAs and the Carbon Market. UNEP Risoe. Perspectives series 2009.

OVERALL CONCLUSIONS

A set of research questions guided the Phd dissertation and some general comments can be finally made on the overall findings. A strong emphasis in the conclusions will be given to the issue of how the CDM has been contributing to SD in Mexico and to what extent.

Starting with the issue analyzed in the first chapter and linked to the relation between SD and CC and as set out by the 3rd and 4th IPCC assessment report, there is a strong need to recognize that CC and SD are part of the same problem and the two ways relationship among both concepts must be further integrated. Climate change is influenced not only by climate related impacts but also by the mix of development choices and the resulting development policies applied in both developed and developing countries (human activity). Making development more sustainable by changing development paths can make a significant contribution to climate goals. This is particularly true for developing countries that since the time of Rio Conference on SD in 1992, have adopted SD as a guiding principle for implementation and action in environmental, economic and social fields. (IPCC 2007). The links between climate issues and SD are in fact manifold. Given these interconnections, the lack of close integration of the SD and CC literatures is puzzling; part of the reason for this lack of connectivity may be the very different research and policy traditions out of which each field is developed and analyzed. It is herein argued that synergies and tradeoffs between the two concepts are relevant and varies among sectors, systems and regions and they can overlap at epistemological and methodological levels. CC entered the development arena as part of the environmental considerations of the wider agenda of SD in the middle of the 90s and it now seems taking over the SD world agenda due to its potential heavy consequences and impacts as well as the larger amount of money available for facing it. But the crucial issue of how the assessment of climate change impacts implicitly reflects the adoption of SD principles remains largely

unexplored. Therefore, integrating CC and SD approaches, concepts and methods not only is a great challenge but it may also have some important benefits. To demonstrate this point, recent developments in both the climate change and SD fields and then the question of how to integrate them and to assess them were explored in the first part of the dissertation. The analysis suggests several conclusions of possible relevance to climate change and sustainable development research, including the need for an approach to develop common scenarios and frameworks that integrates all possible aspects of CC and SD research. Concerning the assessment part, although still in early stages, it can be said that there is a growing use of indicators to measure and manage the sustainability of development at both macro and micro level (sectoral) which is in great part driven by a strong demand for accountability in the context of governance and policy strategies within the international community and at country level. However progress towards SD and CC measurements is just beginning to be reported by some sectors like the government, industrial and the civil society. As mentioned in the dissertation, a review of indicators shows that very few macro-indicators include measures of progress with respect to climate change and SD. New efforts are therefore needed and new emphasis must be placed on strategic initiatives, including revised National Indicators for Sustainable Development (NSDS) and the MDGs and climate change that involve time-bound targets and require systematic monitoring of progress.

Likewise many Latin American countries and others worldwide, Mexico lacks of an integrated framework for assessing SD and CC impacts in its different dimensions. The two concepts are still conceived separately and CC only recently has begun to be seen as a SD issue and available indicators of SD provide a natural framework for developing multidimensional climate change indicators as well as offering new integrated methodologies to evaluate mechanisms such as the CDM, which helps to recognize important linkages between SD and CC.

Concerning the CDM and possible recommendations for its future after the end of the Kyoto Protocol regime (chapter 3), there is clearly a need for the CDM to move on from a business-as-usual scenario. The CDM has consolidated but there is a clear need to undertake strong reforms. Herein some other critical issues are touched and personal comments are addressed. Starting with the conflict of interest between projects developers and DOEs, CDM project developers should not hire validators. This conflict would be mitigated if the UN hired validators and randomly assigned them to each project. This would also avoid that DOEs get a “monopoly” on projects and may influence therefore project developers. In the case of Mexico for example, the DOEs validated all CH₄ methane reductions projects, which were designed by the same project developer (AGcert). This should not happen again and not be replicated, for example, with programmatic CDM.

Secondly, the UN Executive Board should create a set of mandatory guidelines for validators to use when assessing additionality. The “barriers” test should not be allowed. Clear definitions are needed for “common practice” and how to determine financial benchmarks. In many countries where for example hydropower is already a substantial portion of grid capacity and of annual capacity additions, such as in China, hydropower should be considered common practice not a CDM. As proposed by Schneider, projects should not be eligible for registration if they started more than one year before submitting a PDD.¹⁵⁵

CERs should also be discounted by both buyers and the EB. What this means is that a percentage of CERs from any project would be retired and not used for Kyoto compliance purposes. Such a measure would turn the CDM from a zero-sum mechanism at best, where an emission supposedly reduced in one location causes an equal increase in emissions elsewhere, to one where an additional project would actually lead to a net reduction in emissions.¹⁵⁶ Industrial gas projects with no SD benefits should be excluded

¹⁵⁵ Schneider, Op. cit. (2007)

¹⁵⁶ See e.g. “Making CDM Compatible with 2°C,” Environmental Defense briefing paper released at COP13/MOP3 Bali, 3-14 December 2007; “CDM and the Post-2012 Framework,”

from the CDM. It should be much cheaper to do these projects through a fund, for example managed by an international organizations, being it the World Bank/GEF or any other with a clear environmental mandate.

CDM criteria at national level (DNA) as well as international level (for example at the UNFCCC) should also be tightened in order to deliver more credible purposes; in this sense, projects should be required to meet international social and environmental standards and to comply with existing recommendations formulated for example by those organizations who have carried on best practices on the topic. The CDM should also adopt for all projects the WCD standards for stakeholder consultations, including project acceptance by affected people based on a clear understanding of project impacts. To have a reasonably likelihood of preventing catastrophic climate change, the latest climate science shows that we must almost totally decarbonize the global economy by the middle of this century. Achieving this crucial issue will require substantial and effective financial support and technology assistance to developing countries not only via the CDM.

Many analysts have proposed the scaling up of the CDM (e.g programatic) as the primary mechanism for providing such support in the follow up of the Kyoto Protocol. But increasing the size of the CDM will probably only exacerbate its problems. If additionality and the other mentioned issues will not solve before the scaling up, CDM will only deliver the same problems in a larger scale. And financial transfers to developing countries will need to be mainly based on traditional fund-type systems, potentially funded from carbon taxes and the auctions of emission permits under cap-and-trade schemes. At the moment all these concerns are not fully addressed by international negotiations.

Going to the topic of this dissertation, whether the CDM is promoting SD at general level (chapter 3) and particularly in Mexico (chapter 4-5), it can be

said that the CDM itself was designed to promote changings in developing countries as well as assisting them in the transition away from fossil fuels. Evidence to date, however, is that most industrialized country governments and corporations are using the CDM merely to reduce the costs of complying with their Kyoto targets and as such are searching for projects that deliver large volumes of cheap credits. These are the most common projects that capture or destroy gases with high global warming potentials like methane, nitrous oxide (N₂O) and hydrofluorocarbons (such as HFC-23) at existing facilities. Following an economic rationale, these projects merely shift the location at which emissions reductions are made through the Kyoto Protocol without delivering additional SD benefits to host countries and do not help catalyses fundamental shifts in energy production and use. An OECD overview of the CDM summarises the current trend: *“a large and rapidly growing portion of the CDM project portfolio has few direct environmental, economic or social effects other than GHG mitigation, and produces few outputs other than emissions credits. These project types generally involve an incremental investment to an already-existing system in order to reduce emissions of a waste stream of GHG (e.g. F-gases or CH₄) without increasing other outputs of the system”*. (Ellis et al.2008)

Even more, this has been indicated as negative incentive for developing countries to strengthen their sustainability requirements, because this will decrease their opportunities to develop CMD projects, since once these issues are mandated by law this type of projects will become the baseline. Thus, CDM is accused to create a “race to the bottom” phenomenon in developing countries policies. Is the CDM therefore *rethorically* mandated to assist in achieving SD in host countries? Apparently this is the case. If the CDM continues to function as a project-based market mechanism designed to deliver cheap carbon credits then SD in the CDM will be always a rhetorical exercise. The market-based approach also means that real technology transfer and capacity building for SD are simply not attractive to project financiers.

Furthermore, 'unilateral CDM' is a term we see increasingly creeping into the remit of CDM, in fact, nearly one third of the proposed CDM projects are designated as 'unilateral'. This means that the PDD is submitted without an Annex I investor. This is not how CDM was envisaged to work, as put simply 'unilateral CDM' is as an opportunity for private sector initiatives, to participate in the emissions trading market at their own risk. Where is then the claimed technology transfer, capacity building or partnership? And above all: do the current transaction costs that the CDM process involve, outweigh the benefits particularly when there are no economies of scale that make any significant contribution to SD by way of technology transfer, capacity building or contributions to improve employment rates?

Just to give an example, hydropower is the most common technology transfer in the CDM pipeline, with almost 900 projects as of April 2010 – more than a quarter of all projects. Biomass is the second most common project type, followed by wind power. Non-hydro renewables together make up 36% of CDM projects. Only 16 solar power projects, less than 0.5% of the project pipeline, have applied for CDM approval. Demand-side energy efficiency measures, although a top priority in the fight against climate change, make up just one in every 20 projects. Non-hydro renewable projects tend to be smaller than other project types and so each renewable project generates relatively few CERs. The proportion of offset funding going to renewables is thus much smaller than the percentage of renewables projects would suggest. Many observers had originally hoped that the CDM would primarily be a mechanism for promoting funding in emerging renewables and energy efficiency and therefore transferring technology. Yet if all projects currently in the pipeline generate the CERs they are applying for up to 2012, non-hydro renewable would attract less than one-sixth of CDM funds, and demand-side efficiency just 1%. Dams would attract 14%, of which four-fifths would go to large hydro. The theoretical framework developed from the present research does not completely answer to those questions but it addresses a possible framework under which analyzes current CDM conditions and limitations.

Evaluating CDM projects and its impact on SD is also a quite difficult task because it depends mainly on two issues: the first being the definition of SD which is used by most countries in very broad terms. Secondly, DNAs authority decides CDM criteria based on national priorities and needs. In fact many countries have established and published criteria to assess whether a project contributes to SD. However, they are often very general and comprise many different aspects, including environmental, social, economic and technological criteria. Most projects comply with some of the criteria but only a few comply with criteria that are related for example with the achievement of the MDGs. For example, many CDM projects, directly or indirectly, reduce air pollution or contribute to the diffusion of environmentally sound technologies, whereas only very few projects directly contribute to poverty alleviation, which is the overarching goal of the MDGs in developing countries. (Schneider: 2007)

As shown in the dissertation, when looking at the ongoing trends in CDM projects development, three main findings can be stressed: the Kyoto Protocol does not specify what “SD” stands for and this is one of the original troubles that complicate the understanding of the relation between CDM and SD. Secondly, even though the number of CDM projects in the pipeline is growing rapidly with the amount of CERs expected to reach 550 billion US\$ by the end of 2012, the SD component is widely neglected at the time of submitting projects at the UNFCCC pipeline given that for the majority of the projects, the sustainability component is addressed only as a minor aspect in the project design document. Thirdly, the geographical distribution of CDM projects remains highly uneven and is concentrated on a limited number of technologies, usually characterized by low CO₂-abatement costs and by the cheap generation of CERs. The CDM also does not include a framework that would ensure that projects are prioritized in accordance with their impacts on the poor and vulnerable and the environment in developing countries. This is of great concern for developing countries because many CDM projects still

promote projects and activities (like dams and small hydro-powers) which are not environmentally friendly or not necessarily abate GHG emissions. Moreover, developing countries are benefiting differently from CDM implementation and SD benefits; this is mainly due to the fact that in order to be regarded as “sustainable”, CDM projects are in fact required to meet the development objectives defined by the DNAs of the host countries that are free to develop their own list of criteria and indicators, on the basis of the aspects that are considered of prior importance within each national context (such as the case of Mexico). Sustainability guidelines or criteria can be used by the DNAs for this purpose and they may be very flexible and very broad. If we consider the last two points, it can be inferred that there is a feeble support to SD in CDM projects, which according to several scholars, should be promoted on a more equal basis and should encourage technology transfer. As a matter of evidence, present trends and assessment are also in contrast with the idea that the CDM is a tool for reaching technological improvements in non-Annex I countries. On the contrary, assessments show that technology transfer is happening at low level. Approaching SD in the CDM therefore clearly requires understanding that the delivering of SD is based on the context of specific conditions, including national and institutional priorities (DNAs criteria), market demands and the involvement of stakeholders at multiple levels. A better knowledge of the processes of governing SD in CDM projects must be therefore revisited in several aspects. Some of them can be seen both in terms of the project cycle process, the approval by the DNA and a subsequent monitoring to ensure that promised SD benefits are really delivered. But in particular, a careful revision of CDM projects and their contribution to SD at ground level must be carried on in order to determine new and stronger insights concerning the real contribution of SD through CDM projects. Assessing how many tonnes of a specified greenhouse gas have been reduced or stored by an individual project in a delineated project boundary as compared to a theorised business as usual scenario is complex enough. Yet quantifying and commodifying the additional

benefits that a project provides to SD outside that boundary it's even more difficult and probably very expensive for each individual project.

Therefore how can we address the issue of how the CDM is delivering SD impacts and benefits? As mentioned along the thesis, SD is in most cases not well reflected in the PDD; one of the main challenges in the development of CDM project activities consists therefore in including stricter rules for including sustainable development at the project design level, which also implies a prior measurement of the project impacts on the three different dimensions mentioned above. SD criteria and indicators are in fact developed as a result of public policy and local practices combined and often resulting from processes and dialogues among non-expert citizen participants, government bureaucrats and technical experts. The process allows participants to define relevant aspects of sustainability from their unique perspectives, anchored by their own values but they may not reflect broader views or stricter international standards. This is why the sustainability component in CDM projects is often a reflexion of particular and local perspectives of the concept. Concerning the empirical evaluation of CDM, some methods suggest a weighing of different sustainability criteria, in order to reflect this complex scenario and therefore the relative importance of SD in different contexts. This procedure might imply the involvement of representatives from different social groups. It is worth noting that current debates at the CDM-EB suggest also that it would be useful to adopt methods that seem more suitable in the context where the CDM project activities are developed and according to country specific needs¹⁵⁷.

However, during this work it has been stressed that even if a plurality of assessment methods is available, detailed sustainability assessments are difficult to be included on the PDD files as well as in the CDM at practical level. This leads also to the issue that very unlikely, future CDM negotiations will change the role of DNAs in establishing new sustainability components

¹⁵⁷ CDM-EB, 55th Meeting report. July 2010 (previous) <http://cdm.unfccc.int/EB/index.html>

and criteria. What lies beneath this steady position within DNAs in developing countries is the fear that increasing SD standards may possibly curb incoming foreign investments related to the CDM in the host country. Additional obstacles such as high transaction costs and lack of information and institutional capacity contribute to make SD assessments a time consuming process, which may also discouraging project developers from performing accurate analysis. Furthermore, many projects developers can be reluctant to adopt sustainability assessment methods based on approaches usually require availability of reliable data, and time and costs might increase during the collection of information. This is probably another reason why sustainability assessments presented in the PDDs provide more qualitative information in nature. Currently, it seems that the only incentive for a project developer to address SD in CDM in more profound ways is in terms of personal commitment to the issue of SD or personal benefits in terms of image (such as the case of the Social Corporate Responsibility mark used by companies involved in CDM projects to demonstrate their compromise with the environmental cause). This is also why the approach adopted in the dissertation to assess the potential impacts of the CDM project has been mainly qualitative in nature. This choice has been motivated as well as by the scarce amount of data available from project developers. Secondly, the link between the CDM and SD can be seen as the CDM's possibility to channel investment flows towards prioritized areas of renewable energy, and to reform the energy system of developing countries through making low carbon energy sources a more competitive alternative. From this perspective it is seen as problematic that the financially most attractive CDM projects are large projects reducing emissions of industrial gases at very low cost, projects that do not contribute at all to a reform of the host country's energy system (Wara, 2007). With these expectations, investments *per se* are thus not seen as enough to contribute to SD focus is on the effects of these investments on a structural level.

Finally and concerning the Mexican case, despite important efforts undertaken by the government, the country still lags behind with the commitment to promote SD in the country and complying with the MDGs, where Mexico is not on track. One of the main reasons for not having yet a balanced environmental governance that include a sound SD policy and the implementation of adequate climate change policies deals with many issues. To remember, the key to Mexican reform policy since the 1980s is its objective to increase national economic efficiency by stimulating the private sector. This is being achieved by stimulating domestic competition and by exposing Mexico's economy to global market forces. Mexico's entry into GATT in 1986 was a cornerstone of that strategy. Its 1989 negotiation of a free trade agreement with Chile, a 1993 free trade agreement with Colombia and Venezuela, and its successful pursuit of the North American Free Trade Agreement with the United States and Canada (1994) also reflect this approach. In this strategy, Mexico has largely dismantled the system of import barriers and subsidies that protected the private sector. Despite the attention given to NAFTA, much of Mexico's import liberalization has been unilateral. Exports are being encouraged not by export subsidies but through broader measures designed to stimulate confidence within the Mexican business community. Competitiveness is also being stimulated by the withdrawal of the state from management of all but the most "strategic" sectors (petroleum), by deregulation and by a more receptive attitude toward foreign investment (FDIs). The CDM in Mexico is therefore an instrument among the varieties of other tools in a broader system of mitigation activities and it used in developing countries as a complementary tool for climate change national actions. As a Governance instrument, the CDM is supposed to encompass a regulatory framework and an operational framework, both at international at national level. In this sense it constitutes a multilevel mechanism. Regarding the regulatory structure, the CDM needs an institutional set up and operational procedures to work properly. If we, however, examine the operational framework, particularly the CDM project cycle from developing a

CDM project to selling CERs, the effectiveness of the CDM depends on a variety of actors and interactions among the different stakeholders. In short, the CDM can be seen as a new form of governance on both accounts: in its systematic inclusion of new actors and in its incorporation of new forms of coordination. However, the latter aspect has to be better qualified and explored in the sense that individual CDM projects cannot necessarily be described as a form of governance, as they simply represent part of a market mechanism (Benecke, Friberg: 2008). So far the successful performance of the CDM has been stronger in countries where institutional settings, but in particular, market conditions and investments are better framed. For example, not only stronger host countries such as China, Brazil, India and Mexico have a higher institutional capacity to steer investments towards prioritized areas, but since they are attractive countries to invest in they can also afford to pick and choose between different foreign direct investments opportunities. However, it is also worth remembering that it is very difficult to have positive impacts of CDM activities where the environmental governance and in particular the Public-Private partnership is weak. For instance, in the specific case of Mexico, the PPP is incipient. The private sector has begun to address the issue of climate change only at the beginning of the 2000s. Although many private sector activities are focused on reducing GHG emissions through energy efficiency, most private sector activities to date have involved large multi-national corporations and national energy monopolies, and coalitions of regional businesses and associated trade or professional organizations. The National commission of electricity (CFE) and PEMEX, the national oil company, which are among the mayor emitters, are modestly engaged in the government initiative of the special program of climate change. Trans-national corporations also, mainly based in the US border are not yet keen to treat the issue, especially for economical reasons (cost-benefit concerns).

Regarding in particular the CDM, among the different national players around the issue, the Mexican federal government is the one that has been promoting and developing the most relevant institutional actions to promote a

better environment for the CDM growth. Civil society and the private sector, although in different forms and levels, have been constructively engaged in the process but with little incidence in the overall. But much still need to be pursued in terms of better coordination, information exchange and open dialogue among the three sectors. As mentioned in chapter 4, problems for implementing a better CDM don not only rely on the lack of a clear SD definition but the problem of funding national actions on the environment, has been among the major hindrances for implementing national public policies. Insufficient Federal spending on environmental protection, limited application of the user and polluter pays principles, the limited revenue-raising ability of states and municipalities and low reliance on external financing all explain Mexico's difficulties to implement a better environment for CDM projects. Devolution of environmental policy implementation also has not been accompanied by adequate capacity building at state and municipal levels. This implementation gap reflects, in particular, the complex and sometimes unclear distribution of environmental competency across levels of government and limited local authority to raise revenues from taxes or charges.¹⁵⁸

Bearing in mind all these peculiarities, the approach adopted towards the CDM in Mexico therefore, as institutionalized in the procedural framework and the criteria for SD, has clear implications for the outcome in terms of registered projects. So far, the approach adopted by the Mexican DNA does not personally seem to ensure CDM projects that significantly contribute to SD, at least not in the meaning of complying with all SD classical dimensions such as the environmental and social. Many of the Mexican CDM projects have only negligible SD benefits as shown with the assessment provided in chapter 5, especially with regard to social aspects and poverty alleviation. From a social perspective, SD criteria established by the DNA are probably an inadequate tool to secure sustainable CDM projects. In effect, the portfolio of registered projects reflects a CDM process that is characterized by ad-hoc

¹⁵⁸ Ibid.

decisions and lack of clarity regarding SD criteria. Both weaknesses are prevalent over the Latin American continent where participation in the CDM has been more opportunistic than strategic (Figures 2004). This is because as with most DNAs, the Mexican DNA together with other Latin America DNAs such as the Brazilian one has largely limited itself to project identification and evaluation without aspirations of changing economic development policy (Figures 2004). In this way, CDM is seen and treated like an investment tool and a way to attract foreign capital more than an instrument to contribute to SD in the wider sense of the term. For instance, despite the fact that poverty alleviation lies at the core of the Mexican National growth with equity' development strategy, the CDM does not seem to be regarded as an important instrument in this regard. A second reflexion concern the fact that Mexican current priorities on environmental issues focus on areas where there are only few CDM projects with high potential benefits for SD at national level: water and forest management, which have become issues of national security; integrated management of natural resources; environmental management and environmental planning at the watershed level; decentralization of environmental management and decision-making.¹⁵⁹ Clearly, these priorities encompass few strategic areas while many others who have direct impact on climate change policies – such as land use, energy efficiency, coastal areas management - are not yet addressed at national level and very few CDM projects have been directed towards these areas of interest. Interviews conducted in the case of Mexico with some stakeholders such as the FOMECAR (Mexican Carbon Fund), the DNA and project developers Ecosecurities, have highlighted that this is the direct consequence of how the CDM itself was designed: in the Marrakech Accords it was specified that it is exclusive prerogative of the host countries to define their own priorities with regard to SD and “no interferences” on national development processes can be accepted.

¹⁵⁹ OECD Report; Policies to address climate change: the OECD experience and relevance for Mexico. 2007.

This leads to a further consideration: in most cases the project developers do not have any incentive to perform detailed sustainability assessments prior to the submission of the PDD because they simply have to ensure that the project meets the minimum requirements developed by the local authorities. Thus, contrary to the general hopes and expectations tied to the mechanism, the CDM in Mexico is perceived as a largely marginal tool with regard to achieving SD. But again this is in clear contradiction with the fact that emissions trading scheme envisaged by the CDM is obviously one of the market-based instrument for environmental control that Mexico may welcome for its neoliberal economic context. However, as shown in the dissertation, reality is more complex than that. Mexico has chosen to focus on the economic dimension of sustainability through prioritizing an efficient approval process. In my view, the Mexican DNA has adopted a minimal definition of SD as compliance with environmental regulations; the approach adopted by the DNA reflects a concern for effectiveness as a primary objective. Without expressing further judgments on the normative implications of this, it might simply be stated that CDM is in Mexico regarded as a tool and a vehicle for attracting FDI and promoting transfer technology in the energy sector, rather than as a tool for SD in a larger extent. The Mexican case thus illustrates that maybe the 'race to the bottom' in the CDM is not a structurally determined outcome, but a deliberate choice by an authoritative actor. Other experiences in China, India, Brazil and Chile show exactly the same.¹⁶⁰

A large part of this personal explanation lies in the country's export-oriented, open and liberalized economy. Mexico in fact has, since the CDM's inception, managed to position itself as one of the best countries to invest in, due to its political stability, business-friendly politics and effectiveness of the DNA. The CDM, a market-based mechanism, is comfortably growing in this context. Thus, it is argued that the treatment of the CDM is in line with Mexico's overall economic development strategy. The same conditions, on the other hand,

¹⁶⁰ Teresia Rindeljäll, Emma Lund and Johannes Stripple; *GCD Working Paper 004, March 2010*. Wine, fruit and emission reductions: CDM as development strategy in Chile

also provide part of the answer to why the social and environmental benefits of the CDM in Mexico continue to lag behind. With a strong focus on the economic benefits of the CDM, the volume of CERs produced for export becomes the overriding concern, at the expense of SD objectives.

On the other side, it can also be inferred that the Mexican experience so far reflects existing tensions and trade-offs within the concept of SD. Contrary to what is generally expected, the Mexican situation shows that developing country participation in the CDM is not always driven by an interest to use it for long-term development purposes, such as poverty alleviation and local development. Other means than those provided by the CDM are both available and considered more effective for these purposes, including NAMA's and other strategies put forward on the climate change agenda by the national government. Instead, the decision to adopt rather broad SD criteria has enhanced the CDM of benefiting projects with a business orientation and few social benefits attached to them.

However, it would be unfair to claim that the CDM approach in Mexico is completely missing of SD considerations. As shown in the dissertation, for Mexico the CDM is an investment tool, and stakeholders emphasize technology transfer and projects in the energy sector as a crucial area for investment. This is the reason why CDM projects, especially the programmatic, are in great consideration by the Mexican authorities and a number of measures are currently being taken in order to produce CDM projects in the energy sector under the programmatic scheme. In this effort, the DNA is a central actor. One of its functions in relation to the CDM is to act as a facilitator by promoting regulations that create favorable conditions for projects in the renewable energy sector. Thus, to some extent the CDM seems to be increasingly used in a strategic way by the Mexican Government. It remains to be seen to what extent the efforts to support new large projects (programmatic) in the energy sector, a state monopoly sector, will translate into registered CDM projects.

CDM in Mexico shows that authorities seem to consider the CDM can be used as a tool to complete national CC policies; the economic dimension of SD is given clear priority in the Mexican approach and instead of making the CDM process part of an integrated SD strategy and elaborating criteria for the sustainability assessment, the approval process has been integrated into an already existing institutional infrastructure, not necessarily related to SD. Thus, while the CDM is supposed to balance environmental concerns with economic growth strategies and poverty reduction, CDM practices in Mexico illustrate how concern for economic growth overrides the other dimensions of SD. CERs are seen therefore as a product for export markets and the Mexican project portfolio apparently reflects this view. This research, although a deeper analysis is needed, tends to support that hypothesis with the important addition that the 'race to the bottom' is not simply a structural feature of the CDM, but a deliberate strategy of some host countries. This is also reflected in the SD definition provided for the Mexican case since the beginning.

Having said that, why is that the assessment exercise carried out in chapter V showing some possible potential benefits between CDM and SD? Although all methodological precautions have been taken in order to avoid tautological results, it is clear that several factors concur to explain the findings. In particular it is worth reminding once again that findings are strongly biased towards the environmental dimension of SD given that 80% of the projects analyzed belong to only a sector (methane avoidance) that is having by definition a potential strong impact on SD and in particular on the environmental side.

First, to assess the sustainability of the CDM projects in Mexico and their possible impact on SD in Mexico, it is only partially possible to define the contribution of such a projects to SD. Indicators and criteria used for the evaluation were selected carefully between those that seemed more relevant with respect to the CDM possible benefits to SD in the country. The main

difficulty in assessing the projects, among the factors mentioned in chapter 5, deals with the uncertainties derived from the definition of SD adopted by the Mexican Government together with stakeholders position concerning CDM projects. Other factors include the current lack of impulse by the institutional framework (such as the DNA) to the launch of further initiatives to promote the CDM in Mexico. Critical issues concern the extent to which Mexican authorities and other stakeholders will further support the use of CDM in the country not only as a tool for climate change reduction risk but also as a tool to improve SD conditions. Furthermore, there are still some uncertainties about future developments of CDM regulatory framework in Mexico, such as the identification of concerned authorities (ERPAs, CERs) and a stronger involvement of the private sector among other issues.

Mexico offers however an important example of a developing country where the national institutional environmental framework and especially the economic one, can impulse the effective implementation of CDM projects that can reduce CO₂ emissions and may improve SD (as in the case study presented here). But sluggish political reforms in the energy sector play a negative role in the improvement of CDM projects, that bears a consequence in terms of delaying the attraction of potential CDM projects in crucial sector such as the energy one. The Mexican experience, as well as the one of other Latin American countries, shows a clear dilemma when it comes to the implementation of CDM projects: national institutional framework (not only the the DNA authority), the lack of guidance for a clear SD implementation, as well as the different stakeholders position, result the most important variable affecting the final success of the CDM. At the same time, it represents the limits to the development of projects with a significant potential for the effective promotion of SD in the country itself.

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