COMPARATIVE STUDY OF CHINESE AND INDIAN POLICY TOWARDS CLEAN DEVELOPMENT MECHANISM (CDM)

Dissertation submitted to the Jawaharlal Nehru University
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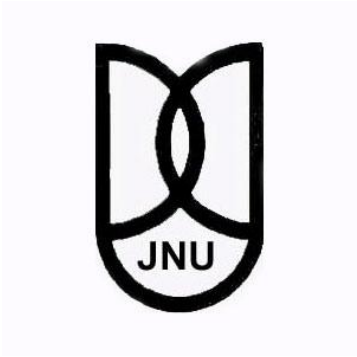
for the award of the degree of

MASTER OF PHILOSOPHY

LOOKE KUMARI



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DECLARATION

I declare that the dissertation entitled **"COMPARATIVE STUDY OF CHINESE AND INDIAN POLICY TOWARDS CLEAN DEVELOPMENT MECHANISM (CDM)"**, submitted by me for the award of the degree of **MASTER OF PHILOSOPHY** of Jawaharlal Nehru University is my own work. The dissertation has not been submitted for any other degree of this University or any other university.

Looke Kumari

CERTIFICATE

We recommended that this dissertation be placed before the examiners for evaluation.

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CONTENTS

ABBREVIATIONS

AAU	Assigned Amount Unit
AOSIS	Alliance of Small Island States
AGBM	Ad Hoc Group on Berlin Mandate
AIJ	Activities Implemented Jointly
AWG-KP	Ad hoc working group in Kyoto protocol
AWG-LCA	Ad group of long term Action
BASIC	Brazil, South Africa, India and China
CAEP	Chinese Academy Environmental Planning
CDM	Clean Development Mechanism
CERs	Certified Emission Reductions
CERUPT	Certified Emission Reduction Unit Procurement Tender
CII	Confederation of Indian Industry
CMA	China Meteorological Administration
CMA	Cement Manufacturers Association
CNCCP	Chinaôs National Climate Change Programme
CO2	Carbon Dioxide
COPs	Convention of Parties
CSE	Centre for Science and Environment
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board of CDM
EITs	Economies in Transition

ENB	Earth Negotiation Bulletin
EPBs	Environment Protection Bureaus
ERUs	Emission Reduction Units
ESTs	Entity Sound Technologies
EU	European Union
FDI	Foreign Direct Investment
FICCI	Federation of Indian Chamber of Commerce and Industry
GDP	Gross Domestic Product
GHGs	Greenhouse Gases
HCA	Host Country Approval
HDI	Human Development Index
HFC	Hydroflourocarbons
IES	Indian Economic Survey
IGES	Institute for Global Environmental Strategies
INC	Intergovernmental Negotiating Committee
IPCC	Intergovernmental Panel for Climate Change
JI	Joint Implementation
MCI	Ministry of Commerce Industry
MEA	Ministry of External Affairs
MFA	Ministry of Foreign Affairs
MNRE	Ministry of New and Renewable Energy
MOA	Ministry of Agriculture
MOEF	Ministry of Environment and Forest

MOF	Ministry of Finance
MOST	Ministry of Science and Technology
MOP	Meeting of Parties
MPPC	Ministry of Power and Planning Commission
MRV	Measurable Reportable Verifiable
MT	Million Tons
Mtoe	Million Tons of Oil Equivalent
NAMAs	Nationally Appropriate Mitigation Actions
N2O	Nitrous Oxide
NCB	National Climate Board
NCCCC	National Coordination Committee on Climate Change
NCDMA	National Clean Development Mechanism Authority
NDRC	National Development and Reform Commission
NGOs	Non Governmental Organisations
NLGCC	National Leading Group on Climate Change
OECD	Organisation for Economic Cooperation and Development
SDPC	State Development Planning Commission (now NDRC)
SEPA	State Environmental Protection Administration
PCF	Prototype Carbon Fund
PCN	Project Concept Note
PDD	Project Design Document
PMC	Project Arrangement Centre
RMB	Renminbi (Chinese Currency)

RMUs	Removal Units
SEPA	State Environmental Protection Administration of China
S2O	Sulphur Dioxide
TERI	The Energy and Resources Institute
UN	United Nation
UNDP	United Nation Development Programme
UNCED	United Nation Conference on Environment and Development
UNFCCC	United Nation Framework Convention on Climate Change
USA	United States of America

CHAPTER-1
INTRODUCTION

India and China are the two fastest growing economies in the world. Both are giants in Asia, whose energy consumption level and greenhouse gases (GHGs) emission are continuously increasing but are below average on the international level. In the 1980's China with the slogan of market socialism moved towards the neo-liberal economy, whereas India in 1990s adopted the economic reform programme. Both India and China adopted free competitive market economy based on neo-liberal policy given the pace of globalisation. In this globalised competitive era economic power became the dominant element of national interest. For economic power development is the foremost condition. If current mode of development is continued it will result in environmental deprivation but if it is changed development process will suffer. Thus the world economy is standing on this dual mode whether they can either choose environment protection or continue with the rapid economic growth. Hence to fulfil these goals, countries started to establish conciliation between the environment and development. Thus clean development mechanism (CDM) comes into picture.

Since the inception of Kyoto protocol in the year 1997, countries all over the world have become more concerned about global warming. The 1992 United Nations Framework Convention on Climate Change (UNFCCC) focussed on the stabilization of GHGs concentration as the threshold of the regulatory tool. The Kyoto protocol signed in 1997 by the parties to the UNFCCC which committed countries to reduce or limit their GHGs emissions. Kyoto protocol also prescribed 'Common but Differentiated responsibilities'. In this regard developed countries have a mandatory target to reduce their emissions by 2012 by 5.6% of their 1990 levels. Developing countries were not given a similar mandatory target; rather they were to participate voluntarily to increase energy efficiency while pursuing economic growth and development (UNFCCC, 1997).

Under Article 12 of the UNFCCC, CDM project activities result in emission credits called 'certified emission reductions' (CERs, with 1 CER is equal to 1 ton of CO2). The CERs are traded then in the world carbon market. The CDM allows developing countries to sell their certified emission reductions to developed nations if the latter cannot meet their compulsory emission reduction targets. This enables

industrial countries to offset their duties of reduction by investing in climate friendly technologies and infrastructure projects in developing countries while allowing developing nations to sell their CERs to wealthier countries. Both developed and developing countries benefit from the trade. Developing countries benefit since the CDM provides additional funds and access to advanced technologies for sustainable development. India and China have emerged as the two largest participants in the CDM. They both ratified the Kyoto protocol in 2002. In terms of CDM policies, both China and India emphasize technology transfer and financial assistance as its regulatory tools.

The discussion hereafter provides an overview of CDM. It underlines the common denominator factors of the CDM experiences in India and China. The CDM which was established under the Kyoto protocol in 1997 started operationalizing since 2001 and has exceeded all expectations regarding its potential. From an uncertain beginning it has emerged as the world's largest provider of emission offset credits and in the field of climate change mitigation. It has become primary vehicle for leveraging and channelling flows of finance and clean technology particularly from the developed countries to developing countries.

CDM has primarily two objectives:

1. Providing public or private entities from Annex-I[1] countries with flexibility in realizing their quantified emission limitation and reduction commitments.

2. Assisting non-Annex-I[2] countries who host CDM projects in achieving sustainable development. Each CDM project activity is intended to result in real, measurable and long-term GHGs emission reduction benefits that are additional to those that would occur in the absence of the project.

The CDM is thus conceived as a project-based mechanism that can provide increased flexibility in temporal, geographical and sectoral field to investor country or company which can reduce their overall compliance cost while providing host countries and local partners with additional funds and environmentally friendly technology for achieving sustainable development. Under the CDM, a project to reduce emissions may be implemented in a developing country, to the extent that this

[1] Annex-I countries are industrialized countries which are relatively wealthy and are also the members of Organization of Economic and Development (OECD) in 1992 and also the countries with Economic transition (EITs) for example Russian Federation etc. The OECD members of Annex-I but not EITs are also listed in the Annex-I countries and also listed in Annex-II countries.

[2] Non Annex-I are mostly developing countries that have no immediate restriction under the UNFCCC to sell their credits to industrialized countries.

project reduces emissions below the level that they would have been at in the absence of the project which is also known as the baseline. Level of emissions, a quantity of emission offset credits known as CERs, may be issued equivalent to the number of tonnes of carbon dioxide or equivalent in other GHGs that are reduced. These CERs may then be transferred to other entities most commonly so that they may be used to counterbalance or offset their emissions.

China and India adopted CDM as one of their policy agenda in order to gain technological and financial assistance which are the necessary component for their development process and to achieve sustainable development. However India and China come under the top five emitters of greenhouse gases. China comes second and India comes last in this group. Both countries also belong to the top five countries regarding economic size when measuring their gross domestic production in purchasing power parities, China comes second with 10 percent of the world economy and India comes fifth with 4 percent (Ganapati and Liu, 2009). China and India cover the large geographical area. Both are highly emerging economies and in terms of population both are big giants. This led to the strong feeling before the UNFCCC conference in Bali in December 2007 that China and India both had no reasonable argument for refusing binding reduction targets for their future emissions (Scholz, 2007-08).

China and India both belongs to the top five emitters. However, if they are compared to the top five emitters in terms of poverty which is extremely low emission data if calculated on a per capita basis with other top emitter countries. The average of per capita emission of the developed countries is 14.1 tons CO_2, on the other hand the average for the developing countries is 3.3 which is only 5.6 % of the world average. China has a per capita emission of 3.9 tons, which is slightly more than the average of the developing countries, but definitely it is below the world average. India's per capita emission is even lower than China that is 1.9 tons which locates it even below the average of the developing countries (Scholz, 2008).

These similarities are pertinent to the role of the countries (China and India) in the CDM process and policies. Per capita emission of both the countries is low as such they are on the same footing in international negotiation for climate change. China because of economic growth is becoming a major polluter therefore; it is going ahead for green energy. On the other hand India is also going ahead for green energy but cannot implement programme and policies successfully. In fact, both have taken

the similar stand regarding non-binding emission reduction commitment in international climate change negotiations and always said that North must take the responsibility for climate change on the premises of historical responsibility.

In spite of the subtle differences in their national policies, they appear to converge on mitigation and adaptation policies in the climate change negotiation particularly keeping in view the increasing energy demands for their domestic population. In lieu of international pressure to take binding commitment, both are clinging to self imposed commitment to reduce carbon emission. By investigating the convergences and divergences between Indian and Chinese CDM policy in international climate negotiations it will give important insight into how the policies of these countries (India and China) change in this context. These policies also scrutinise that this convergence is permanent in nature or there are some differences in that. It also investigates whether this policy instrument actually holds what it promises in terms of setting incentives for more sustainable path.

Review of the Literature

The CDM policy approaches in China and India have influenced a differential project market in these two countries. There is growing concern that "CDM credits don't reflect real emission reductions and that the mechanism is inadequate to assist developing countries in their transition towards a low-carbon economy" (Sepibus, 2009). Many questions have been raised about its efficiency, equity and effectiveness within the CDM's current architecture (Boyd, 2007). Sepibus (2009) argues that any decision to maintain the CDM in its current form within a post 2012 climate agreement has to be considered with great care. The major emitters have very different approaches to global climate negotiation as a result of their varying level of development and divergent views concerning the dynamics of economic growth. Many people in China and India think that the increasing pressures brought by climate change to the environment offer an opportunity to tackle its own environmental problems. Some also view the need to seriously link climate issues with the problems connected with the development path that it has taken in the last few decades. The climate negotiations positions as well as CDM preferences of both countries (India and China) are as follows:

China

China expects the post-2012 negotiations to be extremely difficult. China's initial position will be that developing countries cannot commit to binding national emission reduction targets while developed countries must commit to drastically curb their emission levels (Jakobson, 2009). Chinese negotiators have repeatedly emphasized that developing countries are following the UNFCCC and is contingent on the developed countries fulfilling their obligations on new and additional funding and on the transfer of technology (Yi, 2011). Hence their stand is that China is still a developing country and emissions must be allowed in order to develop its economy and industry. The argument on low per-capita emissions has been convincingly used by China in negotiations that it is 8^{th} of the US emission and about half of the world average. Chinese negotiators even argued that at least a chance has been given to China in order to fulfil the basic requirement of its people. They even said that developed countries should change their pattern of production and consumption (Jakobson, 2009).

In recent times economic development versus environment protection and global emission is in debate. China is well aware of the problem it faces in the relationship between economic growth with huge consumption of energy and pollution which result into the environmental degradation. Hence China is looking for the mechanism in order to maintain the balance between its economic growth without harming the environment. The main official priorities for Chinese government are economic growth, poverty alleviation and social ability. However environmental degradation is the key area where the conflict between poverty and sustainable development is apparent (Heggelund, 2007). On the other hand expansion of energy consumption has been critical to its socio-economic development. China is looking for energy security as it heavily relies on coal for its growing power demand and fossil based energy as it importing fuel for its transportation. It means coal dominates its energy sector as its consumption is higher and it is predicted that it will dominate China's energy policy in the next 20 years (Zeng, 2006).

Between 2002 and 2005, China's energy growth surpassed its economic growth for the first time in decades. Thus dramatic emission implication emerged and China's GHGs is growing very rapidly since 2002 (Lewis, 2007-08). The high emission of GHGs in China is partly due to the scale of its economy and also the structure of its energy consumption. Recent domestic policies also indicate that the

change in attitude is already underway. China has announced in 11th five year plan in 2006 that the country's energy intensity should be reduced to 20% from 2005 to 2010. China had raised exports taxes for three times in about 13 months since the end of 2006 on certain carbon intensive products (Zhang and Zheng, 2008).

Buchner (2008) argues that in the last decade, China has seen a strong economic growth of emissions. Yet, China also disposes of a wide array of low cost abatement opportunities being characterised by low abatement costs. China is taking a proactive and sustainable policy towards the CDM as it emphasises on clear institutional structures and implementations strategies and engages the local and central government in capacity building measures in order to gain maximum benefits from it. Chinese Government has historically approached the CDM somewhat more cautiously. China did not ratify the treaty until August 2002, its Designated National Authority (DNA) overseeing CDM projects was not established until 2004, and the state council did not adopt rules for the management of CDM projects until 2005 but CDM projects became eligible for crediting since 2000 (Lewis, 2007-08). Hence, it was initially sceptical about the introduction of these mechanisms and viewing the CDM as a way for developed countries to avoid their own responsibilities to reduce emissions but also expressing concerns about the potential for foreign exploitation of rights to ownership of emissions credits (Heggelund, 2007).

China's position towards the CDM has changed dramatically in recent years; however China has begun to realize the economic and political benefits that the CDM could provide. Thus it relatively started late in the carbon market but after sometimes with the successful enforcement of CDM it has taken a more involved role in the project approval process than other developing countries. The CDM has become an effective tool for China which helps to stimulate investment in projects that mitigate greenhouse gas emissions as well as covers the incremental cost of higher efficiency or low-carbon technology (Lewis, 2007-08). China has been an active and dominant participant in the Kyoto protocol CDM and has developed a strong national framework for the CDM which encourages private entrepreneurship for their involvement in the CDM project market. At the end of 2008, there were nearly 400 CDM projects with both Chinese and UN approval, with more being added each month. China accounts for 29% of all registered CDM projects (Korppoo, 2009). Thus we can say that initiative taken by Chinese leadership towards CDM viewed internationally as being proactive on the climate issue. Today it knows to use the

CDM to its advantage and becomes a world leader in terms of CDM induced GHGs reduction credits in the CDM pipeline.

Climate change poses challenges to the world and especially so for China because of its fragile ecosystem and high vulnerability and hence has an adverse effects of global warming and climate change. However China is a country that has suffered from billions of economic losses with the increasing frequency of extreme weather events. Countering climate change is therefore in the interests of the Chinese leadership to avoid potential enormous losses from increasing droughts, floods and other possible challenges. China's vice premier Li Kegiang said that "China should be aware of the severity and urgency of coping climate change and that the US and China were well positioned to work together on climate change, despite different national situations and development stages" (Sixth Framework Programme, 2009: 8). This explains China's supportive attitude and engagement in the international climate change campaign.

However, China is building its international image as a major responsible power; it has actively taken initiatives to address climate change under the UNFCCC which is a part of its strategy of sustainable and scientific development. China particularly started to build cooperation in the areas of energy security, economic growth and improving people's living standards so as to achieve sustainable development. China is also gaining significance and prominence in leading other developing countries in climate change negotiations through the organization of G-77 and has emphasized that developing countries must follow the UN framework for the fulfilment of technological and financial aid. Hence, it enjoys the leadership role in G-77 which partially reflects its geo-political agenda.

India

The Indian views on post 2012 climate negotiation reflects the argumentation advanced by former first women prime minister Indira Gandhi in 1972 in Stockholm stating that "we do not wish to impoverish the environment any further and yet we cannot for a moment forget the grim poverty of large number of people. Is not poverty and need the greatest polluter?" (Korppoo, 2009: 47). Global climate problem such as climate change are seen as problems caused and hence solved by North and the emissions of developing countries need to grow to legitimate poverty reduction and development needs (Sengupta, 2010). The UNFCCC in 1992 emphasized on

developed countries to change their consumption patterns and unsustainable production while providing developing countries with environmentally sound technologies and financial assistance. India is the most vital advocate of the traditional developing country position on historical ground in international climate change negotiations. However, India's responses on climate change are based on the premise of common but differentiated responsibilities and equal per capita convergence of emissions. Other than that economic development, poverty eradication, energy security and electricity access are the key priority of Indian government (Korppoo, 2009).

There are diverse impacts of climate change and hence the immediate need is to address the adverse impacts of climate change highly recognized by the world at large. Similarly "different regions have different vulnerabilities to climate change, therefore different approaches need to be applied that are context and region specific" (Rana, 2009). Traditionally, climate change experts have focussed on mitigation and adaptation measures which have been acknowledged late as an effective and equitable means to deal with climate change impacts. Most of the mitigation measures are high in terms of technology and capital. However developed countries choose to mitigate climate change by heavily investing in projects of developing countries and developing countries adapt it. Hence allocating responsibilities is complex task and involves international negotiations. It has been increasingly recognised that it is necessary to deal with it jointly and to address the mitigation and adaptation together which is most appropriate for India (Rana, 2009).

However, India in order to achieve its development goals is playing more active and involved role in the CDM process. India is the second biggest source of CDM credits with 13%, hosting the largest number of CDM projects which is 29%. A unique characteristic of the CDM in India has been that 65% of the CDM credits have been created on a unilateral basis meaning that one-third of the credits produced have had a foreign investor or a ready foreign buyer. Thus the CDM projects in India may well have influenced the Indian position on post- 2012 to become more carbon market friendly. Indian negotiators argue that the CDM and the carbon market, for now, should be primary avenue for developing countries to participate in reaching global GHG mitigation targets under the international climate regime. India is an enthusiastic participant in the CDM. Thus the spread of CDM projects in India increased the entrepreneurial spirit of the Indian industry. However it could be argued that National

CDM Authority of India acts merely as a clearing-house for the CDM projects and India has the least taxing of host country approval processes. Serious concerns have been raised about whether these CDM projects result in real reductions and contribute to the sustainable development or not. It is in recognition of such concerns that the industrialized countries are seeking to understate and restructure the CDM in the future climate agreement (Rajamani, 2009).

Discussion hereafter provides the comparative stances of policy approaches of India and China with regard to sustainable development, CDM project development and implementation process as well as their position in international climate change negotiations.

Both India and China are key players of international climate change negotiations; this not only reflects their keen desire for building an image as the responsible major power but also reflects their growing influence in developing countries as well as in Asia. Now the climate change is not only is the issue of environment or global warming but it also becomes the matter of geo-political and geo-economic concern. Both countries want maximum advantage from CDM in order to fulfil their national interest. Thus the fulfilment of national interest is the primary objective of all states.

Policy approaches of both India and China are different whether it is sustainable development or technology transfer but the goal is same that is development without putting constraints on their economic process. China and India stipulate that CDM projects need to result in financial additionality over and above the emission reduction such that the carbon emission reductions procured should not be from country's official development assistance (Ganapati and Liu, 2009). However India does not have specific priority areas for CDM projects like China.

In respect to technology transfer, policy intervention in the CDM can stimulate the transfer of environmentally sound technologies though it does not make it mandatory. UNFCCC in 2007 revealed some interesting dimension of technology transfer through CDM, which allow developed nations to offset their GHGs emissions reduction projects in developing countries, in a way that both developed and developing countries can benefit. Chhabbra (2008) argues that India's policy is very vague on the requirement of technology transfer in CDM projects. As a result of these policies, whilst only 7.3% CDM projects in India mentioned technology transfer in 2006, for China it was 55.1%. These figures reflect attention that India has much

more lowering level of technology transfer than China as it is not the problem created by developed countries or by China but it shows Indian Government's weak policy formulation to achieve technology transfer and its developmental goals. Seres (2007) and Dechezlepretre (2008) record that China has fared better than India in the technology transfer rate which is about the same as the average for all CDM projects worldwide, while India lags behind this, because of lacking resistance or intensity of its government.

In respect to sustainable development, poverty alleviation, economic and social development and environmental protection are overriding sustainable development goals and priorities of India and China. Both countries are moving forward from rapid economic development to sustainable development which takes into account environmental and social problems. On the other hand, they do not wish to see a significant decline in their real GDP growth, since it would have disadvantageous effects on the country's development process and stability (World Energy Outlook, 2007). The sustainable development goals of both countries are same but China gave more priority to economic development rather than environment protection.

In respect to project development India started its institutional preparation for CDM known as DNA by the time when protocol came into the force. However Indian DNA is the world's first DNA, also it has more projects registered and implemented than in China whereas China began to undertake CDM projects a little later than India. China's DNA emphasizes on priority sector such as renewable energy, energy conservation and energy restructuring etc. "This approach has been effective in lowering transaction costs which reflects better prospects for technology transfer and more CERs funds for achieving broader sustainable goals. By contrast India has followed a project by project approach which results into greater project diversity with higher costs" (Ganapati and Liu, 2009: 352). China lagged behind initially as it did not took the prudent attitude towards CDM implementation and foreign investment though the CDM formed only a very small part of its foreign direct investment (Zhang, 2005).

Despite this, it would be more than difficult to make China and India accept a binding commitment on climate change mitigation in the near term. Neither China nor India has expressed any official interest in cap and trade and both countries remain

opposed to putting binding commitments for developing countries on the agenda, which would be a necessary step for engaging in cap and trade.

In Bali, India and China, aggressively opposed binding emission targets on developing nations and instead asked for financial assistance for clean energy technologies. India has repeatedly said it needs access to clean technologies especially in energy, manufacturing, transportation and agriculture (Chhabara, 2008). In Asia-Europe Summit in Beijing the Indian Prime Minister Manmohan Singh stated that "Unfortunately, the international community has not lived up to its commitments for technology transfer and additional financing since the Rio conference" (Government of India, 2008).

However in recent years China has changed its negotiation style which was observed by developed country negotiators at COP – 10. China was more cooperative than for instance India (Heggelund, 2007). Even in Bali action plan India supported by the G-77 and China were successful in inclusion of the "measurable, reportable and verifiable" phrase within at the end of sub-paragraph (Rajamani, 2009). Although the developing countries with G-77 and China repeatedly advocated differentiated obligations for industrialized and developing countries, they strongly opposed any differentiation among developing countries based on their different levels of development. The strong resistance for creating a category of more advanced developing countries matched very well with Chinese interests. China with its rapidly expanding economy, large present emissions and even higher projected emission levels could easily be singled out in such a category (Chayes and Kim, 1998). On the other hand India adopted the cooperative attitude in Copenhagen and Cancun. Hence it changes its traditional position for instance. Yet, it sees the greater benefits while sticking on its traditional position and growing cooperation with developing as well as developed countries in order to combat climate change without harming its development process. As a result of which in Cancun agreement India, Brazil and South Africa tried to break the deadlock on environmental conflict on climate change and indicated for their acceptance on legally binding agreement. Thus they are ready to compromise their economic national interest for the sake of humanity and environmental protection (Atteridge, 2010). China on the other hand till now did not agree to compromise its economic national interest as it maintains its traditional stance and giving priority to its development rather than environmental protection and humanity. Here we see the clear division between China and BASIC countries which

were partially seen in Copenhagen but clearly identified at Cancun. Thus, for the first time South-South division was identified by the world at large.

Rationale and Scope of Study

The CDM, support for which was confirmed at the Bali conference in 2007, has become quite attractive for developing countries since Kyoto protocol came into force in 2005 (Streck, 2004). From a policy perspective, critics argue that some CDM projects would be carried out without the incentives. Although environmentalists argued that it has perverse impact on environment and beset with the problem of credit definition, monitoring and enforcement.

Notwithstanding the above criticisms, the CDM is a crucial element of Kyoto protocol. Thus CDM is the only mechanism that encourages the collaboration between developing and developed countries for reducing GHGs emission. Developing countries have an incentive to invest in sustainable development projects while maintaining economic growth. However CDM facilitates the trading in developing countries for reducing emissions. It on the one side encourages the developing and developed countries to control their emission in order to save climate and on the other side the developing countries by trading its emission to developed countries get the benefits. Thus it encourages the business opportunities between the two countries.

India and China are today taking more advantages from CDM. Till recently India was the leading CDM country in the world in terms of registered CDM projects. Now China has taken the lead in terms of the number of projects as well as GHGs reduction realized through these projects in terms of CERs. The achievement of the two countries in addressing the socio-economic issues indicates their strength and weaknesses.

It becomes important to analyse in this context, CDM policy mechanism of both the countries (China and India). The research though will focus on the broader questions concerning the convergences and divergences in their policy in international climate change negotiation since 2005. How have policies of these countries (China and India) changed in this context, and is this convergence permanent? By investigating the implementation of the CDM policy in China and India, the research will try to verify whether this policy instrument actually holds what it promises in terms of setting incentives for a more sustainable path.

Research Problem/Question

- Have Indian and Chinese CDM policy converged/diverged in international climate negotiation since 2005?
- What are the potential and impacts of implementing CDM in China and India?
- What is the Indian and Chinese policy towards CDM?
- Does this policy actually hold its promises in terms of setting incentives for a more sustainable path?

Hypotheses

- There are significant differences between Chinese and Indian CDM policies.
- These differences are the consequence of differing domestic, economic and political imperatives.

Research Methods

My study will make comparisons by taking different explanations for the differences between the cases of India and China. From the comparative analysis of both countries policy programmes, the study will try to find out what potential intention each country has and how the policies of these countries change in this context. Then it will try to investigate whether this policy instrument actually holds what it promises in terms of setting incentives for more sustainable path. Secondary sources from various environmental research and policy papers by UNFCCC, TERI, CII, Earth Summit etc, and journals along with academic publications would be used. The integral assessment and recommendations of the Chinese and Indian CDM implementation are based on the up-to-date relevant information coming from literature reviews. The literatures come through scientific journals, research project reports, publications, conference papers as well as updated information from relevant website.

Research Design

The schema of this research is as follows. It is divided into three substantive chapters. Chapter 2 would deals with China and its policy towards CDM. Beginning with the China's complex economical structure that is constantly changing due to strong growth and internal restructuring, it would proceed to analyse the historical evaluation of CDM in China. This chapter will also focus on the China's responses on

Convention of parties (COPs) in international climate negotiations, hence chapter outlines the policy of China and its potential features and its negotiating position in international climate change negotiation regarding CDM. It would also describe the institutional and project management set up as well as the status of CDM in China and gives the theoretical outlines of its socio-economic benefits. The chapter would also summarize the main argument regarding to CDM and define its market perspective. Finally the chapter highlights the potential impact of implementing CDM in China.

Chapter 3 throws light on the India's policy towards CDM. Here the focus would be upon understanding key elements of India's climate policy and responses in convention of parties since CDM comes into picture. Thus chapter begins with the brief discussion of its economic imperatives and impact of its rising economy on GHGs emission. It would proceed to analyze the institutional set-up, status of CDM in India. It also highlights the socio-economic profile of India and market perspective as well as the potential impacts of CDM on it. Thus chapter outlines the contextual features of India's response towards climate change negotiation and its involvement in CDM activities.

Chapter 4 deals with the comparative analysis of India and China CDM policy on Climate Change. It would also outline the contextual setting of CDM in India and China and focus on the convergences and divergences in this respect. Here the key focus would be upon to understanding the key elements of Chinese and Indian policy on CDM in terms of answering the question whether CDM actually hold it promises in terms of setting incentives for a more sustainable path?

CHAPTER – 2

Clean Development Mechanism (CDM) and China

Introduction

Climate change is a common challenge faced by the entire world and China is a key country in the international climate change for the following reasons. It is the most populous nation in the world with a huge land area. At present it ranks as the world's largest Greenhouse Gas (GHG) emitter after United States of America with 13.5 percent of global emissions.[3] With its rapid economic development, the GHGs will continue to grow and it is estimated that after 2015, China will surpass the US in emission (World Energy Outlook, 2007: 3). Both in economic and ecological terms, China is a dominant global actor. Three major energy intensive sectors are industry, construction and transportation which are the key factor in maintaining high GDP growth rate in China. Thus the rapid demand of these sectors creates a growing demand of raw materials such as steel and cement as well as energy such as electrical power and gasoline in China (IGES, 2011). China is the world's largest coal producer and consumer and coal is its largest energy source. Coal has fuelled China's rapid economic growth over the past 20 years; it is also the major cause of GHGs emissions (World Energy Outlook, 2007). It is widely expected that China given its huge emissions of GHGs and large potential for low cost emission reduction makes it a major recipient of clean development mechanism (CDM) funding (Ganapati and Liu, 2009).

However we can say that China is a country with a very complex economical structure that is constantly changing due to strong growth and internal restructuring. It is still classified as a developing country which makes it eligible for the CDM, one of the flexible mechanisms in the Kyoto Protocol concentrating on collaboration between developing and industrialized countries. The mechanism is built on the investment in clean technology in developing countries by industrialized countries in the exchange for certified emission rights (CERs). These can later be used by the investing country to meet its own obligation under the Kyoto Protocol. This chapter will focus on the China's policy on CDM and its potential features and its negotiating

[3] According to the financial express paper report on 4 Aug 2011, India Environment minister Jayanthi Natarajan said in Lok sabha that "the countries which are largest contributor, in percentage term regarding GHG emissions are China 19.5%, USA 19.2%, India 5.3%, Russia 5.1% and Japan 3.6%. Data shows china already passed the US.

position in international climate change negotiation. It would also discuss the response and potential impact of implementing CDM in China.

China ratified the Kyoto protocol in 2002, which means that China can participate in international emission trading as credit supplier till 2012 without taking any emission reduction liabilities. The CDM provides additional profits for selling the additional emission reductions and it is supposed to be a good opportunity for China to integrate market, technology and capital with environmental protection industry. However, China's attitude towards initiating CDM activity has changed gradually. From the initially 'negative' for a long time, to the later 'wait and watch' attitude and now feverish activity is underway (Zhang, 2001). On the other hand institutional preparation and capacity building measures provided forceful support for the expeditious project development in China (Liu, 2006). China is expected to become the number one host country for CDM projects but having been a centrally planned socialist country for decades makes the implementation a bit complicated (Zhang, 2001).

From the Chinese perspective, the CDM can be an instrument to finance emission reductions, to profit from the application of advanced environmentally sound technologies and finally to improve the competitiveness in the domestic as well as international market (Dr. Hausmann, 2008). China's position has changed dramatically in recent years; however China has begun to realize the economic and political benefits that the CDM could provide. The CDM has become a vehicle of China to stimulate investment in projects that mitigate GHGs emissions and to help cover the incremental cost of higher efficiency or low carbon technology. Another benefit of China's leadership in the CDM is that it provides a way in which China can be viewed internationally as being proactive on the climate issue. Now the world leader in terms of CDM induced greenhouse gas reduction credits in the CDM pipeline, China has learned how to use CDM to its advantage (Lewis, 2007-08). Hence it is trying to establish maximum CDM project plants which not only helps it to increase financial assistance and new technology but also increase its collaboration and cooperative relations with other countries.

Background

In 1992 the countries from all over the world gathered in Rio de Janeiro for a conference on climate change led by the United Nations. A convention was signed

called the United Nation Framework Convention on Climate Change (UNFCCC) by 189 countries and went into force in 1994 when it was ratified by 166 countries. The 189 countries that have signed together emit 61.6% of these countries, Australia and US have signed but have for now no intention to ratify. Countries that have neither signed nor ratified are 29 including China and Taiwan. The convention attempts to bring together all parties to solve the threat of global warming by international common regulations (Bjorkum, 2005).

At the first conference of the parties (COP-I) to the UNFCCC, parties were agreed to initiate a process called Berlin Mandate to modify the framework convention in order to reinforce the commitments of Annex-I countries beyond year 2000. The outcome of Berlin mandate was the protocol adopted by COP-3 in Kyoto protocol in 1997, which set out legally binding GHGs emission reduction objectives for its signatories. The so called Annex-I countries to UNFCCC (Annex-I countries without Belarus and Turkey) (Bjorkum, 2005). According to Article 3 of UNFCCC in 1997, Annex-I countries committed themselves to reducing or capping their emission of GHGs in the period 2008-12 relative to 1990 levels by an aggregate of 5 percent (UNFCCC, 1997).

The CDM is a key component of the Kyoto protocol, as defined in Article 12 of UNFCCC is the only flexible mechanism providing a practical link between Annex-I countries and the developing countries not bound by reduction commitments. It enables Annex-I countries to offset a part of their emission reduction commitments by implementing emissions reduction projects in developing countries. Developing countries with CDM projects in return gain the capacity technology and financing for GHGs abatement (UNFCCC, 1997).

There are four fundamental requirements regarding implementation of CDM projects of protocol. These are:

1. Voluntary participation of each party involved.
2. Real, Measurable and long term benefits related to the mitigation of climate change
3. Reduction in emissions that are additional to any that would occur in the absence of the certified project activity.
4. They meet the sustainable development criteria as defined by most developing countries.

After COP 7 in Marrakech Accord the institutional methodological, technical and procedural formalities were set up (Ojner, 2005). Thus the conference was big step for China in proving it is competent and willing country for hosting CDM projects.

In the past, we can see China has approached the CDM and has taken a more active role in the project approval process than other countries but Chinese government was pessimistic about the initiation of the carbon market. China ratifies the treaty in August 2002, although CDM projects became eligible for crediting in 2000. Its Designated National Authority (DNA) is highest approval authority for CDM projects in China, which overseeing the CDM projects was not established until 2004. However the state council did not adopt rules for the management of CDM projects until 2005 in China (Lewis, 2007).

Institute for Global Environmental Strategies (2011) reveals that the Chinese government sees CDM as an effective way to achieve sustainable development, technology transfer and environmental protection. It would also help to achieve the following prospects:

1. Socially CDM achieve sustainable development which would help to alleviate poverty by generating additional employment, removing social disparities, and contributing to the provision of basic amenities that ultimately lead to improved quality of life.
2. Economically it would generate additional investment which will bring sustainable development that must be consistent with the needs of the people.
3. Environmentally, evaluation is done of the effects of the proposed activity on resource sustainability, resource degradation, maintenance of biodiversity, impact on human health, and a general reduction of pollution levels.
4. Technologically it proposed activity that leads to the transfer of environmentally safe and sound technologies in order to assist in the upgrading of China's technological base (IGES, 2011).

In China, sustainable development is much restated in its political and economic life, but there is no official indicator for a quantified assessment of project's contribution to sustainable development. Since the government of China passed the interim regulations for CDM in June 2004 and with the entry of Kyoto protocol as well as the ongoing support from industrialized countries in capacity building measures, China has seen a move in CDM activity. China is already the top

destination for global foreign direct investment and huge potential for mitigating GHGs in all sectors (Zeng, 2006). The Chinese 'National Assessment Report on Climate Change' was officially released in December 2006, stated that "China had made great achievement in reducing GHG's" (CDM Newsletter, 2006). The Interim measures for operation and management of CDM project in China implemented in 2004 and amended in 2005, it is the fundamental regulation issued by Chinese government to manage CDM project in China. According to measures for operation and management of operation and management of CDM project in China in 2005, there are three main priority areas for CDM projects in China. These have been defined in Article 4 of it, which includes:-

1. Energy efficiency improvement
2. Development and utilization of new and renewable energy
3. Methane recovery and utilization.

Thus prioritising these projects encourages the development of relevant CDM projects and leads the transformation towards low carbon economy. This will bring about more sustainable development benefits in the form of expanding energy accessibility, creating jobs, alleviating poverty and reducing local pollution (Fejes, 2009).

Socio-Economic Status

Due to China's rapid economic development, industrialization and urbanization, the demand for energy is keep increasing and because of this increasing demand the problem of clean and safe energy supply faced by the country (Qian and Bin, 2011). However developing countries, due to their economic, technological and social background, are generally less energy efficient and hence have great potential for low-cost emission reduction opportunities (Fejes, 2009). Thus the energy is a common denominator in the climate change discussion for China. Energy is essential for the social and economic development. Nowadays economic development versus domestic pollution and global emission is in global debate. China is well aware of the dilemma it faces in the relationship between the economic boom with greater energy consumption and pollution and has already taken action to try to develop a sustainable economy. The main official priorities for Chinese government are economic growth, poverty alleviation and social ability. However the environmental degradation is key area where the conflict between the poverty and the sustainable development is apparent. Economic growth in China continues to be fuelled by fossil based energy.

Thus the expansion of energy consumption has been critical to Chinese socio-economic development (Heggelund, 2007).

China is looking for energy security and economic reasons as it is heavily relying on coal for its growing power demand, importing fuel for its increasing transportation vehicles and developing more natural gas resources. It means the stake of coal consumption is higher in China's energy sector as well as it will dominates in China's energy policy in the next 10-20 years (Zeng, 2006). China contributed 15 percent of global greenhouse gas (GHGs) emission in 2000. During 1900s, China's GHG emission increased by almost 40%, due to strong economic growth (Heggelund, 2007). Although China quadrupled its GDP in energy between 1980 and 2000, it did so while merely doubling the amount of energy it consumed over that period, which is a drastic achievement in energy intensity gain not paralleled in any of the other country at similar stage of industrialization (Lewis, 2007-08). In 2001 China announced plans for quadruple its GDP by 2020, while again doubling its energy consumption. However this delinking between economic growth and energy use is positive, China's plans also pose serious challenges as energy consumption is once more increasing strongly after a decline in the late 1990s (Heggelund, 2007).

Between 2002 and 2005, China's energy growth surpassed economic growth for the first time in decades. Thus a dramatic emissions implications emerged and China's GHGs growing very rapidly since 2002 (Lewis, 2007-08). Chinese official data of 2006, estimated that emission from energy use are up 9% from the previous year, which would make China the largest emitter on the annual basis, surpassed the US emission that year by 8%. China's increase in energy consumption, its impact and shortage of energy are obvious reasons for the renewed political focus on energy. In 2006 global carbon emissions from fossil fuel use increased by about 2.6%, driven by 4.5% increasing global coal consumption, of which china contributed more than 66% (Lewis, 2007-08). Chinese government has focussed on improvement of energy efficiency, which became a major objective in 11^{th} five year social and economic development programme. In addition, a high level task force has been set up to draft a law on energy and renewable energy endorsed by various ministries was approved in 2005 and went into force in January 2006 (Heggelund, 2007).

In sum we can say that Chinese economy is growing incredibly and this implies a likewise growing demand for energy. Because China itself lacks the

technological level to obtain a sustainable growth, thus it opens the door for foreign investors. This is where the CDM comes into the picture.

Institutional Set up of CDM in China

The state development planning commission renamed the National reform and development commission (NDRC) in March 2003 was charged in 1998 with coordinating China's climate change efforts. The National Coordination Committee on Climate Change (NCCCC)[4] is the highest climate policy making organ in China which established in Feb 1990. It is ministerial level committee chaired by National Development and Reform Commission (Zhang, 2005). In China, the Interim Measures for Operation and Management of CDM in 2004 laid the legal framework for the CDM. The framework provides the institutional structure of the DNA. The DNA located in the NDRC, which was formed in 2003 (Ganapati and Liu, 2009). DNA structure in host countries can be quite complex as CDM projects have several dimensions. It has five basic models. These are:-

1. A single government department model
2. A two-unit model
3. An inter-departmental model
4. FDI-piggyback model
5. An outsourcing model, (Lee, 2004).

First, second and fifth are simple models and these are adequate particularly for those countries who have few CDM projects. While China's DNA follows a variant of second model (Ganapati and Liu, 2009), it is undisputed that NDRC has played and will continue to play the leading role in formulating China's overall climate policy and actions (Zhang, 2005). Responsibility for approving CDM projects is shared for the time being between the climate change office and NCCCC. If transparent CDM procedure and sound governance will reduce the transaction costs of implementing CDM projects though it mobilize investment from the private sector. The priorities of the Chinese government, is the establishment of the institutional structure and streamline procedure to reduce transaction costs of CDM operation in China. For this the national CDM board has been set up under the NCCCC. This

[4] NCCCC is to supervise and coordinate ministries and agencies in their effort to address climate change. It is also responsible for deliberation and coordination of national climate strategy including CDM, regulations etc (Zhang, 2005).

board consists of seven ministries i.e. NDRC, Ministry of Science and Technology (MOST),[5] Ministry of foreign affairs (MFA), State Environmental Protection Administration (SEPA), China meteorological administration (CMA), the Ministry of finance (MOF), Ministry of agriculture (MOA) and is co-chaired by NDRC and the MOST (Zhang, 2005). Regulations and procedures for the operation of CDM projects in China has the main responsibility of the board, providing guidance to the operation of the CDM projects arrangement centre (PMC), approving the CDM projects (in particular, examining by an estimate of the CERs generated by the project and the price of CERs) that have passed the pre-screening by the PMC, reporting to the NCCCC the overall progress in implementation and performance of the CDM project activities and making recommendations to the NCCCC on both, to solve the problems encountered in implementing CDM projects and amendment to the interim regulations and procedures for the operation of CDM projects in China (Ganapati and Liu, 2009).

The state council has been set up the national leading group on climate change (NLGCC) headed by premier Wen Jiabao and Mr. Makai, chairman of NDRC heading the office of NLGCC in June 2009. The NLGCC replaced the NCCCC in policy making and in the coordination of CDM related issues. Newly established national CDM project management centre and CDM fund centre are the key institutions of CDM management under the administration of NCB and the CDM fund board (Ojner, 2006). CDM project applications are submitted directly to the NDRC from the provincial governments, but CDM applications are not subject to provincial level approval unlike most other project applications. The NDRC also sets regional grid baseline emission factors for CDM project owners (Ganapati and Liu, 2009).

In China the environmental protection system is divided into central and local level. A legal and institutional issue of central level is represented by SEPA and State council and at the local level there is Environmental Protection Bureaus (EPBs), has high degree of independence. It is also responsible for reporting as well as collecting data on emissions, which obtain partly from pollution flow. Therefore, they consider the economic situation of factories before to decide or to enforce environmental regulation (Morgenstern, 2002). SEPA is responsible for implementing and formulating the national plans for pollution control which comes as a directive from the state council under which SEPA has a direct control. Earlier the EPBs are

[5] MOST is previously known as state science and technology commission (SSTC).

responsible for SEPA but now local government provides fund to EPBs and this is depending on the wealth of the region. Hence it is curtailing the independence of the EPBs. Therefore, actual enforcement power of bureaus is very low. Thus, we can say that local government posses more power than central government because it is one who decided resources that has been given to EPBs. Even local government also has the authority to change the emission standard in their region (Ojner, 2006). Thus this institutional set-up is present in all fields in China and its economy is divided according to the region between the one who work with these environmental institutions have no cooperation with the ones who are working with economy growth. Hence, it is one of the reasons that economic growth has been a leading goal without any major integration of environmental framework.

CDM project management (legal framework)

To standardized CDM project management, the Chinese DNA issued a series of supplementary regulations in the form of notices. In 2006, the government issued the important notice on standardizing China CDM project's consultation service and evaluation, examination and approval procedures concerning CDM project application and notice on determining baseline emission factors of power grids in China (Fejes, 2009). In 2007, the government issued baseline emission factors for power grids and NDRC climate change office's notice on standardizing CDM projects application procedure etc. In 2008, the government issued the notice on adding RMB (it is popularly known as Renminbi) into CERs price unit, implementation arrangement of CDM projects in Hong Kong, and notice of informing the NDRC of CDM projects after 2 August 2008. In 2009, Chinese government issued the relevant regulation on the China's existing environmental impact assessment of construction projects, notice of income tax policies concerning China CDM fund and CDM project implementation enterprises, briefings of China's on-grid power price generating from renewable sources and explanation to issues concerning China's wind power capacity etc (Fejes, 2009). Thus above all defining project facilitation constituted with the effective supplementation to the management policies and legal basis for standardized development of China CDM projects.

Theoretically CDM can bring significant economic and social benefits, and provide a new alternate to solve the climate change issue with market forces. However, the successful policy implementation will depend on the alignment of

stakeholder interests, government commitment and government effectiveness. CDM is a project based scheme that if the project developer is the owner of the project, the developer is entitled to own the CERs and make the independent decision. However, in China, the government, at the central and local levels, holds a strong stake in deciding a project, including eligibility, project partner choices, timing and amount of selling the CERs. Thus we can say that CDM activities in China are actually developed at a way that the government can accept and control. Sustainable development, which comes with high social and environmental synergies, is the main concern of the government.

Status of CDM in China

There are three main characteristics which make country suitable for CDM projects:-

1. The country is thriving for foreign investment.
   (It is today, China is the country which receives maximum FDI in the world)
2. The heavy reliance on coal as energy resource creates many opportunities for alternative sources.
3. The relative cost of emission abatement is low in China (Szymanki, 2002).

All these factors together lead many experts to foresee China as the biggest recipient of CDM in the future. According to Institute for Global Environmental Strategies report in 2011, allocation ratio for the Chinese government (Article 4) includes:-

- HFC and PFC project – 65%
- N_2O project – 30%
- A priority area and forestation project – 2%.

Amount of transfer of CER (Article 24) includes:-

1. Emission reduction resource is owned by the Government of China.
2. Emission reductions generated by specific CDM project belong to the project owner.
3. Revenue from the transfer of CERs shall be owned jointly by the Govt. of China and the project owner (IGES, 2011).

The first CDM project was established in 2002 that was wind farm project in Mongolia put up Certified Emission Reduction Unit Procurement Tender (CERUPT), the CDM credit procurers of the Dutch government with a price of 4$ per ton of CO_2. In 2006 in China there are 23 large scaled projects ongoing at one single location and

only two small scaled (Ojner, 2006). In 2005 in China 164 projects have been approved by the DNA, most of these projects are on renewable energy. In 2006, 349 projects had been fully registered in which 5.73% of projects hold by China (UNFCCC, 2006). In 2008 there are 409 projects were fully registered in which 319 projects were in large scaled and 90 were small (Telang, 2008). Statistics shows that by December 2009 China had approved more than 2300 projects, 730 of which were registered**.** In November 2011, there were 1641 projects registered at the CDM executive board (EB) and 3284 projects were approved by DNA and 1301 projects were at the validation stage (IGES, 2011). In 2012 all projects approved by DNA of China is 4286 (China Briefing Magazine and Daily News, 2011). The characterizing feature is that there is a majority of project which are single located and large scaled in China as compared to other countries where the projects are either small scaled or run on several locations. The reason for this is the big transaction costs associated with CDM projects in China. In 2011 China made an attempt to boost CDM projects and ensure the healthy development of CDM market in China. NDRC and other departments jointly issued the revised administration measures for the cooperation of CDM projects (measures) in accordance with the UNFCCC and Kyoto protocol. CDM projects are win-win[6] for China in that they provide both improvement to the environment and great opportunities for sustainable development (Repetto, 2009). China's new measures policy says that CDM projects should advance the transfer of environmental friendly technologies and focus on key industries such as saving energy and increasing efficiency, development and utilization of new and renewable energy and methane recycling.

In the last decade, China has been seen a strong economic opportunities and its being characterized by low abatement costs. From the beginning it is expected that China would represent one of the largest host of CDM project activities and project development in future. After a long time, two emerging trends reflected in China's proactive and sustainable policy towards CDM:

[6] In narrower sense, a win-win mitigation opportunity is a measure that reduces greenhouse gas emission while saving money on a life-cycle basis or offering a superior rate of return on the investment. China has many potential energy efficiency investments that would be win-win under this definition, as the other countries do. However a broader definition of win-win energy security motivates much of the national governments energy policy (Repetto, 2009).

1. China emphasis on CDM capacity building projects at the national, local and enterprise level aiming to gain more insight into the CDM and increasing its capacity to initiate and undertake CDM project.
2. China strongly focuses on institutional structures and implementation strategies that aimed to streamlining CDM procedures and for sounding and clearing governance of responsibility and functions (Buchner, 2008).

However, the second part of China's strategy for CDM development is crucial for the achievement of sustainable development goals. Interim measures and operation and management of clean development mechanism projects which is a temporary law, indicating the number of priority areas for CDM investment and for the transfer of environmentally friendly technologies to China. Thus, differentiated CER tax technologies will produce tax revenues that can be used for investment in sustainability purposes. Through which China assesses the social and environmental dimension of sustainable development. Therefore this strategy is an appropriate design of a host country's CDM approach which would help to put more weight on sustainability component of this instrument and CDM can become a way of fostering sustainability. In sum, we can say that sustainable development strategy is one of the major national strategies of China. China's participation in CDM projects must aims to assist the local government which bring the benefits of sustainable development. CDM projects can offer financial support and accelerate technical progress, thus the joint benefits arising from CDM project, which have a large impact on its economic growth as well as improvement of quality of life.

Domestic and International debate on Global Climate Negotiations

Main argument and domestic and international debate on China's negotiating position on climate change and on binding commitments –

China is an active participant in international climate negotiations, usually acting jointly with G-77. It has ratified the Kyoto protocol, but opposed any kind of binding commitments for developing countries. Hu Angang in 2006 had given the concept of "Green Development" in China and said that "China's rise is a reality, but now green development is the only way forward." He also states that it is "China's national interest to dramatically curb and commit to binding national targets." Chinese negotiators have repeatedly emphasized that developing countries following the UNFCCC and is contingent on the developed countries fulfilling their obligations on

new and additional funding and on the transfer of technology (Yi, 2008). Their main argument has been that China is still a developing country. Chinese officials argue that increased emissions must be allowed in order for China to develop its economy and industry. The argument of low per capita emissions has been convincingly used in negotiations on eighth of the US emission and about half of the world average. Chinese negotiators have contrasted the "survival emissions" of developing countries with "luxury emissions" of developed countries, by saying that developed countries should change their own patterns of production and consumption, not force developing countries even to fulfil the basic needs of their people. Some negotiators has suggested that China conditionally accept voluntary emissions reductions targets and cut so called luxurious emissions especially when if this would be backed by financial and technical support. Thus voluntary targets are important from a moral perspective and to meet Chinese own sustainable development goals (Korppoo, 2009). Thus the policy dimension labelled differentiation of commitment, China and the other developing countries have advocated highly differentiated commitments between developed and developing countries. Therefore, the position has been that commitment should be differentiated according to historical responsibility or per capita emissions.

Argument of experts of energy efficiency is that existing energy efficiency targets in the mentioned industrial sectors would automatically result in a substantial emission reduction and these select industries would not have any difficulty in meeting a sector emission target. Expert groups within China encouraging the government to agree to either voluntary or binding emission reduction target in a few selected sectors, for example power production, cement, iron and steel industry etc. Therefore, China can be expected to push for acceptance of policy based commitments as part of the post 2012 agreement (Korppoo, 2009).

However in 2009 there was conflicting thought between the Chinese foreign policy makers as well as between the Climate change negotiators of China with regard to binding national target to reduce its emissions that whether China would accept it or not. Some argued that, if the United States accepted the binding emissions reduction target, then China would not be the only major emitter which stands alone, though under strong international pressure China would accept at a minimum voluntary national emissions reduction target. Thus China has previously comprises with staunch positions which reflect its refusal position on binding commitment.

Hence it even faced international isolation and would ultimately avoid the reputation of resister of a global pact. Those holding this view however have strong scepticism about the China's ability or even political willingness, that it actually fulfilling its promises or not, even if Beijing committed to voluntary national emission reductions. This group put emphasis on 2005 to be used as a baseline year as that would be more advantageous for China (Jakobson, 2009). The others had given the three reasons for why China will not agree to voluntary or binding national emission targets. These are:-

> "Firstly, the communist party's legitimacy is dependent on the government's ability to ensure continued economic growth and China simply cannot afford to implement the policies required to meet emission reduction targets. As economic gloom spread to China in early 2009 this stance became predominant. Secondly, the top leadership and increasingly mainstream view among government officials and several segments of society believe that west and the US in particular, is to prevent china from becoming a wealthy and strong world power. Thus this suspicion deeply rooted towards the intentions of western countries is not evident when regarding Chinese official's foreign policy document promoting cooperation and understanding between China and the west. Third, the Beijing leadership has previously been reluctant to agree to international legal obligations if there is any fear that it would not be able to meet them (China's primary goal of economic development). Therefore, one can expect China to formally agree to only what it can deliver with certainty" (Jakobson, 2009: 29).

China's position and response in International Climate Negotiations

The Chinese government attaches great importance to the issue of climate change and proactively participated in international negotiations to address climate change. It has also strengthened the multi-level negotiations and dialogues with other countries in the area of climate change and makes positive contributions to building a fair and reasonable international mechanism for addressing climate change (Yi, 2008). There are three distinct stages of China's official participation in the climate negotiations. These are:-

1. From 1990 to mid 1992
2. From 1992 to late 1997 (Rio to Kyoto)
3. From 1997 to until today (Post Kyoto period) (Harris and Yu, 2005).

In the late 1980s, climate change became an important international issue which attracted attention of public, media, scientists and policy makers around the world. Therefore it became a major issue of international political agenda, in which china respond by initiation the coordination of its own climate policy. The major scientific uncertainties were core elements of climate change which not only focus on the protection of national sovereignty but also emphasis on right and need of development of developing countries. Hence, initially China and developing countries did not want to compromise with its development as well as conditional aid and said it was historical responsibility of industrialized countries to transfer the new and additional funding and technology to developing countries (Hatch, 2003). With this developing countries influenced many times the structure of convention in several areas. Article-3 of UNFCCC focuses on the parties to protect climate system on the basis of equity and in accordance with their 'common but differentiated responsibilities' and respective capabilities. Accordingly the developed countries should take the lead in combating climate change and adverse effects thereof. Thus the principle of 'common but differentiated responsibilities' was widely espoused by China in the Intergovernmental Negotiating committee (INC) debates and remained a key principle of Chinese policy (Chayes and Kim, 1998). Although countries (G-77 and China), repeatedly advocated differentiated obligation for industrialized and developing countries which based on their levels of development. China signed the climate convention in June 1992 and ratified it in 1994 as the fifth country in the world. The central issue of COP-1 was the adequacy of the commitments of the convention including the follow up protocol. On the issue of adequacy China with G-77 stressed that implementation of existing commitments should be the COPs main concern.

Thus China was sceptical about the follow up proposal of convention and expressed that it was not interested in negotiating a protocol before the Annex-I parties had implemented all their commitment in accordance to convention (Bjorkum, 2005). The breakthrough in the negotiations, on adequacy of commitments came when key developing countries leading by India and also China supports a statements of Alliance of Small Island States (AOSIS) declaring the current commitments inadequate and called for industrialized countries to address the problem. By this the G-77 and China indicated a general recognition to address climate change. Consequently COP-I adopted the Berlin mandate to begin a process to negotiate a

follow up protocol to the convention containing more specific obligation and established the Ad Hoc group on the Berlin mandate (AGBM) (Chayes and Kim, 1998). The condition for supporting the AOSIS proposal and thereby agree to the need for a protocol. This was not accepted by developing countries and they did not ready to accept any new commitment by developing countries in the next round of negotiation. At the eighth and the final session of AGBM in Bonn, October 1997, US president Clinton called for "meaningful participation" from developing countries. In response G-77 and China used every opportunity to oppose attempts on to include developing countries into something that could be reduction commitments (ENB, 1998). However the adequacy of commitments, JI or AIJ, was the main topic for China in this period. Chinese negotiators viewed JI as an instrument created to benefit developed countries to help them. The JI was created a suspicious atmosphere among developing countries because it was a means of introducing commitments on them. This was a means of shifting responsibility from Annex-I to non Annex-I parties (Yang, 2005). Therefore JI was a discussion in both at COP-I and COP-II and China together with G-77 expressed their scepticism about JI projects which involving developing countries for the expense of financial and technology transfer stipulated in UNFCCC.

At COP-3 in Kyoto, the G-77 and China focussed on higher targets by supporting EU's emission reduction position. Thus developing countries were quite influential in Kyoto protocol. The G-77 and China also succeeded in deleting an article on voluntary commitments for developing countries (Yang, 2008). The Kyoto protocol included three flexible mechanisms namely CDM, JI and Emission Trading (ET) (UNFCCC, 1997). China and other developing countries objected Article 17 on ET and stated that it would not reduce emissions and proposed to delete it from the protocol (Yang, 2008). In that period Chinese climate diplomacy was to uphold the developing countries commitments in Kyoto protocol, especially the CDM. Despite developing countries successful effort to remove proposed article on voluntary commitments for non Annex-I countries from the protocol was brought once again by US at COP-4 in Buenos Aires. China and India and other developing countries recalled that the debate at Kyoto protocol had rejected the idea of voluntary commitments because of the principle of 'common but differentiated responsibilities'. Chinese delegation said that voluntary commitment would not to promote the UNFCCC but just a way to avoid existing commitments by some parties. China even

expressed that voluntary commitments would create a new category of parties under the UNFCCC and destroy the unity of the G-77 and China (ENB, 1998). Afterwards Chinese climate policy was changed its attitude towards flexible mechanisms. However in COP-5 in Bonn 1999, China did not raise its usual objections to flexibility mechanisms when they were up for discussions (Zhang, 2003). After this meeting China also began to take more active part in discussion on rules and procedures that guide the practical implementation of CDM projects. Thus China's initial position was focused on its interest of maximizing its share of CDM projects (Tangen, 2001).

At COP-6, China spoke in favourable terms towards the Kyoto mechanism and said that CDM is a win-win mechanism. In COP-7 the EU, China and G-77 were eager to negotiate an agreement to ensure an entry of Kyoto protocol, before the Johannesburg summit in 2002. In COP-8, the influential position of host country i.e. India reflected the strong developing country perspective. However, the G-77 and China expressed their disappointment at low level of financial assistance by Annex-I parties. Despite the fact it also influenced the future commitments and focussed on the issue such as sustainable development, poverty eradication etc and views of developing countries was supported by US who earlier repeatedly called for more action from developing countries. At COP-9 in Milan, China advocated for doubled the chances for developing countries in technology transfer. This will help to encourage the willingness of developing countries to participate in mitigating actions in the future (Bjorkum, 2005). This was possible sign that some developing countries were moving towards and becoming involved in discussion about future course of action. China also said that if developed countries have taken the lead in mitigating emissions which would encourage developing countries for contribution (ENB, 2003). In COP-10 in 2004, Buenos Aires, the Russian ratification bring optimistic certainty, after the long uncertainty since the US withdrawal in 2001 in Kyoto protocol. Central issue in Buenos Aires was "whether countries created a space within the formal process considering the question of next steps" (Bjorkum, 2005: 32). Thus this issue of future commitments was become an issue of high debates and it's led to a split in the G-77 and China coalition. It was expected that developing countries commitments will become even more central issue in the coming negotiations for the post-2012 period. China was prepared for increased pressure in the negotiations in the next

commitment period but there was no surety in changing positions of developing countries commitment in future.

In 2007, China actively attended the United Nation conference of climate change talk in Bali (Indonesia) COP-13 and made substantial contribution to the development of the Bali Road Map. China's national climate change program (CNCCP) in 2007 and white paper "China's policies and actions for addressing climate change" in 2011 reveals that Chinese government adopted the principle of 'common but differentiated responsibilities' of the UNFCCC, the parties included in Annex-I to the convention should take the lead in reducing GHG's emissions. Many efforts are underway as the Chinese government tackles the issue of global climate change. Chinese government has included the target of energy conservation and emission reduction in its five year plan (2006-10), cutting energy consumption per unit GDP by 20 percent during the period. As China over the past few years has developed a significant renewable energy industry, by withdrawing the credits and expand the market for its own technology (China Daily News, 2007).

Until COP-14 in Poznan, China insisted that developed countries should take the lead in reducing their GHGs emissions, strictly fulfil their emission reduction commitments under the Kyoto protocol for the first commitment period and make further cuts in their GHGs by at least 25-40% below 1990 levels by 2020 (Yi, 2008). Meanwhile, developed countries should also fulfil their commitments under the convention and the Kyoto protocol to support developing countries with financial resources, capacity building and transfer of technology. Chinese officials said that transferring more efficient technology to developing countries would achieve large scale emission reductions at lower costs. For their part, developing countries will also take positive and effective mitigation and adaptation measures in the context of sustainable development and with the support of developed countries (Xie, 2008).

At COP-15, China made an unconditional commitment to reduce its carbon emission intensity by 40-45 percent below 2005 level by 2020, thus it breaking away from its traditional stance of non-commitment in international climate change negotiations (Lutken, 2010). The boldness of this emission intensity target was debated clearly in climate change which shows radically different from China's approach towards the benefits of the CDM. Particularly, we can say that COP-15 was a turning point of Chinese emission reduction, which changes the entire picture of a China country which itself among victimized developing country. Thus in

Copenhagen climate change conference China played a key role in breaking the negotiation deadlock and promoting consensus among all the parties. However Chinese government put forward China's principles, goals and position including further effective and continuous implementation of the UNFCCC and quantifying emission reduction targets for developed countries for the second commitment period.

In 2009 former Chinese premier Wen Jiabao called on parties to reach a consensus, strengthen cooperation and jointly address climate change problem. Thus the leaders of China make an outstanding contribution to the promotion of international talks on climate change (Govt. of China, 2011). In 2010, China took an active participation and consultations at the Cancun conference adheres to maintaining openness and transparency, extensive participation. During the negotiations on issues with greater disparity such as the long term global goal, the second commitment period of the Kyoto protocol, the system of international consultation and analysis to reduce the burden on developing countries and reach the emission reduction goals of developed countries. Before the Cancun conference was summoned, China enhanced exchanges and coordination with developing countries through the G-77 and China and the BASIC (Brazil, South Africa, India and China) mechanisms and strengthened dialogue with developed countries through various channels for the participation of the conference. China also maintained close communication and exchanges with the host nation i.e. Mexico and provided beneficial suggestion and support. Thus the Cancun conference brought positive result and strengthens the cooperation between developing countries (Govt. of China, 2011).

In Durban 2011, China took an active part in UN conference, to achieve comprehensive and balanced result in implementing Bali road map. The white paper, titled 'China's policies and actions for addressing climate change', stated China's basic positions in participating in UNFCCC which determine the arrangements of relevant mechanisms (Govt. of China, 2008). China made efforts to promote the progress at the Durban conference to work in accordance with the Bali road map. Hence, it was agreed to work with the international community to ensure the success of the Durban conference. Recent years have witnessed a change in China's negotiation style according to observers; China was more cooperative than for instance India. There has been a generation shift in the Chinese delegation and the new negotiators have a less aggressive tone. China has attempted to influence the negotiation by keeping the issue off the agenda. Maintaining a strong and united

developing front has also been a priority for the Chinese. Together with the other developing countries China has by every means tried to keep developing country commitments out of the official agenda (Heggelund, 2007).

Most of the time China's position has been expressed through the G-77 and China group and on many occasions China acted as a leader in the group. As the largest developing country and a permanent member of the UN Security Council, China is positioned to play leadership role among developing countries in global environmental politics. Despite its recognized importance in climate change debate, China is tending to avoid placing itself along the centre of confrontation. During the negotiation of UNFCCC and subsequent COP sessions, China united with the G-77 in pressing their demands. China always insists that it is a developing country and speaking in terms of defending the interest of developing countries. China maintains that developed countries are the major culprits while developing countries are the victims of the global climate change. When Chinese negotiators interpret climate negotiations in the context of foreign affairs, China's status in G-77 is also relevant, for many of those countries hold China in a high regard because it is a shrewd. China enjoys considerable influence in this group and there are no indications of its intending to leave the G-77 in near future (Yi, 2009).

However Chinese scholar generally agree that China used to be sceptical about these regimes but this may gradually be changing as China is also interested in preserving its image as a responsible power. This interest is related to countries rising status in the world, in both economic and political terms.

Market perspective

China, as a dominant market leader in the CDM market, influences overall market price through its informal policy of requiring a minimal acceptable price before providing approval to projects. However in 2007, lots of countries use China's price floor as a basis of negotiation of near equivalent prices in their transactions (China Daily News, 2007). China has signed bilateral CDM cooperation agreement with Italy, Denmark, Austria, France and Canada, that means China has stable government buyers for the CERs, although multinational institutions have been more active in the carbon trading market in China. The credit buyers include multilateral institutions: government funds, and private funds, representing the countries of Italy, Netherlands, UK, Japan, Austria, Spain, etc., and more countries have shown interests

and preparing for investment (Liu, 2006). A senior Chinese official said that current China price level for CERs is reasonable. Thus it sets a stable price floor for global supply of CERs (China Daily News, 2007). China's large market share in carbon market and dominant influence, the United Nation has tentatively picked Beijing as the destination of Asia's first carbon trading exchange. The move could establish the Chinese capital as an important hub for the multibillion-dollar global trade in carbon credits. If successful, the exchange would be the first in the developing world. It would compete with the Chicago climate exchange and New South Wales market, and would help to open up further the lucrative Chinese carbon market.

In international environmental politics China and India are the front runners in Asia. They have large share of CERs, carbon credits that permit a country to emit carbon above its quota, is come from china. CERs contributed by Asia accounted for 80 percent of the world's total carbon trade volume, 61 percent of which was traded by China, followed by India at 12 percent and in 2005 the share taken by China was 73 percent. China market dominance may continue. Earlier China was expected to account for 41 percent of all carbon credits issued by UN in 2012. By trading CERs, china has developed an additional revenue stream to fund domestic low carbon projects. In 2006, the revenue from trading amounted to US $3 billion. For better playing of China's potential, international monetary players are also seeking more opportunities of cooperation with Chinese banks in order to financing CDM projects (China Daily News, 2007).

However China's CDM market had a comparatively low start with less than 30 projects in the pipeline in 2004-05 while India, Brazil and Mexico were leading the CDM pipeline at that time. However the development of CDM projects gain momentum in 2006 and currently it is the largest and most active CDM market worldwide. As of October 2008 China has 1445 CDM projects in pipeline and 271 projects were registered with the CDM executive board of UNFCCC. The annual emission reduction that can be achieved by the projects in the pipeline is 305 mega tonnes (mt) of CO2 eq. and 117 mega tonne eq. for the projects that are registered with the Executive Board. Based on these statistics China is the largest and most dynamic CDM market in the world (Tuebel, 2008).

The present CDM market in China is buyer dominated. The preference of investors for 'high quality' and 'low risk' projects is likely to shape the market for carbon offset. In China, no one uniform carbon price for different transferable

emission unit. But the CERs price is higher, considering the prevailing certainties about the ratification of the Kyoto protocol after Bali Road Map in December 2007 (Ye and Bin, 2011).

The key advantages in the CDM market in China are:-

1. CDM process is much better designed in china then in other developing countries.
2. The current regulatory framework is largely seen to facilitate the market and it is perceived as conducive to development of new methodologies.
3. The development of new methodologies is seen by 95% of respondents as a necessity for the further development of the CDM market in China.
4. New methodologies and new CDM project areas will have to be explored to gain a strategic advantage in this market.
5. Energy efficiency projects in building and industry are seen as the strongest potential new growth areas (Fejes, 2009).

China has been an active and dominant participant in the Kyoto protocol CDM. Beijing has developed a strong national framework for the CDM and encouraging the private entrepreneurship for investment for their clean energy projects. At the end of 2008, there were nearly 400 CDM projects with both Chinese and UN approval, with more being added each month. China accounts for 29% of all registered CDM projects. To summarize, we can say that, the Chinese Government has historically approached the CDM somewhat more cautiously and has taken a more involved role in the project approval process than other developing countries. However, China involved relatively late in the international carbon market. Despite that CDM projects became eligible for crediting in 2000 when China did not ratify the treaty until August 2002, its DNA overseeing CDM projects was not established until 2004, and the state council did not adopt rules for the management of CDM projects until 2005. However, China was initially sceptical about the introduction of the Kyoto mechanisms under the UNFCCC, not only viewing the CDM as a way for developed countries to avoid their own responsibilities to reduce emissions but also expressing concerns about the potential for foreign exploitation of rights to ownership of emissions credits. China has had long protectionist tendencies and resisted foreign involvement in various sectors and activities, particularly industries deemed to have

an impact on national economy security. Such policies exist in many sectors including several in low carbon energy technology.

China's position towards the CDM has changed dramatically in recent years, however as China has begun to realize the economic and political benefits that the CDM could provide. The CDM has become a vehicle of China to help stimulate investment in projects that mitigate greenhouse gas emissions and to help cover the incremental cost of higher efficiency or low-carbon technology. Another benefit of China's leadership in the CDM is that it provides a way in which China can be viewed internationally as being proactive on the climate issue. Now the world leader in terms of CDM induced greenhouse gas reduction credits in the CDM pipeline, China has learned how to use the CDM to its advantage.

To conclude, we can say that CDM is a mechanism that provides reduction of GHGs to developing countries. Hence developing countries benefit since the CDM provides additional funds and access to advanced technologies for sustainable development. However China is gaining benefits of external revenues, environmentally friendly technologies, more employment, human and institutional capacity building etc in some extent but with the domestic capacities, awareness level, diverse and uncertain market restrict the future deployment. Moreover, protecting China's economic interest and promoting economic development are the first and foremost consideration of Chinese policy makers. However we can say that CDM is not the panacea to solve the all development issues in China. Thus, it can be viewed as a complement, which continuously improved Chinese energy and environmental policies. Initially China was sceptical about the CDM but later on this view has changed. Now China enjoyed the maximum benefits from CDM. In contrast, China relation with developing countries reflects its dominant position and a leadership role among developing countries in global environmental politics.

CHAPTER: 3

Clean Development Mechanism (CDM) and India

Introduction

India has undergone a transformation from an underdeveloped, agricultural economy into an important player in the global economy and an assertive member of global elite. The country has experienced rapid industrialization and high economic growth since the economic liberalization after 1991. India is a country of great contrasts and the second demographic giant, contributes only 4 percent of total Greenhouse Gas Emissions (GHGs). In terms of per capita GHG emission it is about 23 percent of the global average. Around 55 percent of India's population still does not have access to commercial energy. India is the fourth largest emitter of GHGs and GDP of 1.4 trillion dollars, resulting in a GDP per capita $1200, the country emits 2.5 billion tons of carbon per year, corresponding to 6 percent of total global emissions, with 2.1 tons of carbon per capita and 1.8 tons for each $1000 of GDP (Filho and Viola, 2011). Hence it has low rate of per capita emissions, since it is a country with low per capita income and high carbon intensity, due to low efficiency and high share of coal and oil is its maximum source of energy. Greenhouse Gas emissions in India have grown 10 percent a year, being the country that most increased their percentage share in total emissions (World Energy Outlook, 2007).

From a long time, the issue of climate change has been a subject of international debate. Ironically, instead of developed nations responsible for GHGs emission, developing countries like India suffer the most from it. Climate change disproportionately impacts developing countries as well as under developed countries in all over the world. Since the inception of Kyoto Protocol in 1997, countries all over the world have become more concerned about global warming. India being one of the developing countries has ratified the Kyoto protocol and is emerging as one of the leading carbon trader under the clean development mechanism (CDM) of Kyoto protocol. Kyoto protocol is an agreement made under the United Nation Framework Convention on Climate Change (UNFCCC). The treaty was negotiated in Kyoto, Japan in December 1997 and came into force on February 16, 2005 under which the industrialized countries will reduce their collective emission of GHGs by 5.2 percent compare to 1990 (Sahu, 2007).

The CDM is an arrangement under the Kyoto protocol which allows industrialized countries for GHGs reduction commitment to invest in emission reducing project in developing countries. Hence it is an alternative for industrialized countries, instead to invest in their own country emission reduction projects which are generally considered more costly. Under the CDM a developed country can take up GHG reduction project activity in a developing country where the cost of GHGs reduction project activities is usually much lower. The developed country would be given carbon credits[7] for meeting its emission reduction targets, while the developing country would receive the capital and clean technology to implement the project (UNFCCC, 1997). The UNFCCC divides the countries into two groups:-

1. Industrialized countries known as Annex-I include the relatively wealthy industrialized countries that were members of the Organization for Economic Cooperation and Development (OECD) in 1992 and also countries with economies in transition (EITs), including the Russian Federation, the Baltic States and several central and Eastern European states. There are 41 industrialized countries listed in the convention's Annex-I. The OECD members of Annex-I (Not EITs) are also listed in the conventions Annex-II, they are 24 in number.

Annex-I countries agreed to reduce their emission to target levels below their 1990 emission level. If they fail to do so then they must buy emission credits from developing countries or invest in conservation.

2. Non Annex-I countries are 145 in numbers, are mostly developing countries who have no immediate restriction under the UNFCCC, it means that they cannot sell emissions credits to industrialized nations to permit those nations to over-pollute (Sahu, 2007).

India comes under the Non Annex-I countries. India signed and ratified the process in August 2002 and has emerged as a world leader in reduction of GHGs by adopting CDM in the past few years. Article 12 of the Kyoto protocol in Indian perspective sets out three goals for the CDM:-

1. To help mitigate climate change.

[7] Carbon credits are certificates issued to countries that reduce their emission of greenhouse gases which causes global warming. Carbon credits are measured in units of certified emission reductions (CERs). Each CER is equal to one ton of carbon dioxide reduction.

2. To assist Annex-I countries attain their emission reduction commitments, and
3. To assist developing countries in achieving sustainable development (Sathaye, 2001).

Background

The UNFCCC signed in the 1992 United Nations Conference on Environment and Development (UNCED) in Rio was the first international treaty to address the global climate issue. Throughout the UNFCCC conferences and negotiations, the developing countries maintained the same general stance that developed countries are historically responsible for causing climate change, hence they should take up the main responsibility of addressing the problem. Non-Annex-I countries also highlighted that they need the financial and technological resources to address the problem.

According to the Preamble of UNFCCC in 1992, the majority of historical and current GHG emissions have originated in developing countries is low and it will grow to meet their developmental needs. The UNFCCC goes on to specify principles that should guide this process: - Equity, Common but Differentiated Responsibilities, Precaution, Cost effectiveness, the right to sustainable development and avoidance of arbitrary restriction on international trade. Kyoto protocol is based on common but differentiated responsibilities, the Kyoto protocol legally binding emissions limits for Annex-I countries while no such commitment were proposed for non Annex-I countries. These emission reduction must be achieved by 2008-2012 the so called 'first commitment period'. The Kyoto protocol allows developed countries to achieve their targets in different ways through flexibility mechanism. This includes:

1. Emission Trading
2. Joint Implementation
3. Clean Development mechanism

India has always emphasized that equity is the way forward to tackle the climate change problem, as every human being has the right to an equal share of the world atmosphere. Therefore the per capita convergence of emission is the only equitable long term solution for climate change, which would only be possible if developed countries reduce their per capita emissions not developing countries, as they are going through the nation building process. This result into the rising per capita emission of developing world and it will naturally help the development

process in developing countries (Rajan, 1997). On the other hand, the developed countries underscored their responsibility of causing climate change. They sought binding commitments from all countries. Developing countries was not in a favour for binding commitments in the convention of climate change but they will accept the voluntary commitment with some condition that developed countries provide them financial and technical support to fully implement these climate change measures (Dasgupta, 1994).

India's Stand and Response in Conference of Parties (COPs) of UNFCCC

The UNFCCC signed by 152 countries in 1992 was later ratified by 186 countries including India. The UNFCCC set the stage for the annual Conference of Parties (COP), where parties to the UNFCCC would meet for negotiating climate change issues and actions. In 1995 COP-I accepted as a pilot phase of Activities Implemented Jointly (AIJ). Through AIJ developed countries could invest in developing countries in GHGs mitigation projects. It also develops another concept i.e. clean development mechanism. The Indian delegation played an important role in achieving AIJ. It is interesting to know when the negotiation leading to Kyoto protocol started seriously in 1995 at the first conference of the parties (COP-1) to the UNFCCC in Berlin, "India broke up with the G77 that wanted to retard progress mainly OPEC countries that feared that climate policy would reduce oil demand and their exports revenues" (Katharina and Mikhaelowa, 2011: 7). In a green paper,[8] India with 50 other developing countries called for a 20 percent emission reduction by industrialized countries in the year 2000 compared to 1990 levels, essentially putting its weight behind the protocol proposal of the Alliance of Small Island States (AOSIS) (Katharina and Mikhaelowa, 2011). Finally the Berlin Mandate was adopted to strengthen developed country commitments in 2000, based on the premise that the current voluntary commitments for emission reduction were inadequate. India played a crucial role in securing Berlin Mandate, as it united with G-77 again and isolated OPEC, which led to the strengthening of commitments. At the end, of the Berlin Mandate an ad-hoc group was established to begin this process through legally binding protocol (Paterson, 1996). In 1996 COP-2, US finally agreed to a legally binding protocol. However this changed position was linked to the acceptance of

[8] Green papers are official papers of green group countries. These are mostly developing countries including India and G-77.

tradable permits or emission trading (ENB, 1996). After that India showed some flexibility by changing its initial attitude of opposition to cautious support to the policy of Annex-I countries. However in 1997 before COP-3, India did not play a vital role and was surprised to see Brazil cooperating with the US, which led the emergence of the clean development (Katharina and Mikhaelowa, 2011). In 1998 COP-4 held in Buenos Aires and set a deadline for countries to come up with an effective position to give essence to the Kyoto protocol (Clemencon, 2008). COP-6 met in Hague to finalize the Kyoto protocol. With the disagreements over many issues including Kyoto's flexibility and rising emission trends in most industrialized countries resulted into the collapsed of talks (Bhardwaj 2002). India was eager for revival of the Kyoto protocol in COP-6 part-II in Bonn (Mikhaelowa, 2011). Hence 180 countries will again met in Bonn for COP-6 part-2, whereas US president Bush withdrew from the protocol in 2001. Again in 2001 COP-7 held in Marrakech which produced a rectifiable treaty without the US (Vrolijik, 2001).

India hosted the COP-8 in New Delhi in November 2002 and introduced the GHGs mitigation measures by the promotion of renewable and guidelines and small procedures for small scale CDM projects. Up to COP-8 in Delhi, little concern was shown for the issues of economic and social development and poverty eradication in developing countries, which constitute 75% of the global population. Thus these aspects were deliberated in COP-8 and become the first and overriding priorities of developing countries. In COP-8 India's former Prime Minister Atal Bihari Vajpayee highlighted the lack of capacity in developing countries to tackle to adverse impacts of climate change and urged in the UNFCCC convention for paying more attention on vulnerable situation and adaptation in the areas of water, energy, health, agriculture etc (Chatterjee, 2008). However, COP-8 allowed Indian negotiators to get exposed for the first time, to the full range of climate policy stakeholders. With the spreading of information and capacity building plan of industrialized countries, the Indian business community became aware of climate policy and opportunities offered by CDM and started pressurizing government to sell emission credits (Korppoo, 2009). As a consequence of this Indian position regarding market mechanism changed and now fully embracing the CDM and setting up the national CDM project approval authority known as DNA in 2003 and rapidly becoming a leading player in hosting such projects. In COP-9 developing countries have focussed on several areas which include:-

- Capacity building in the areas of adaptation and CDM.
- Massive transfer of financial resources from North to South as well as environmental sound technologies for rapid economic development.
- Creation of large adaptation fund for the developing countries to take up research and measures for implementation on adaptation particularly the areas vulnerable to climate change (Chatterjee, 2008).

Thus COP-9 encourage the submission of many small scale CDM projects which can reinforce sustainable development efforts in developing countries like India such as :-

1. CDM advocacy and awareness generation.
2. Development of criteria for CDM.
3. Analysis of CDM eligibility.
4. Determination of CDM baseline and environmental, financial and technological additionality (Chatterjee, 2008).

In 2004 at COP-10, India did not adopt any GHGs emission reduction targets during first commitment period of Kyoto protocol because of the rapid clearance of CDM market which was recently established in India. In 2005 in COP-11 and in 2006 at COP-12, the CDM projects that reduce emissions in developing countries generate tradable emission reduction credits that can be applied by developed countries towards their emission targets. This allows developed countries to lower cost reduction while drawing investment to clean development in developing countries. As a result the vast majority of projects approved to date are in large countries such as China, India and Brazil (Bhardwaj, 2002). In 2006, former UN Secretary General Kofi Annan announced the "Nairobi framework" to promote a broader distribution of CDM projects that was a joint initiative of the UN climate secretariat, United Nation development programme, the UN Environment program, the World Bank group and African Development Bank (UNFCCC, 2006).

In COP-13 at Bali (Indonesia) in 2007, India aggressively opposed binding emission targets for developing countries and instead asked for financial assistance for clean energy technologies from Annex-I countries (Chhabara, 2008). Indian Prime Minister Manmohan Singh in 2008 in ASEM summit at Beijing stated that "Unfortunately, the international community has not lived up to its commitment for technology transfer and additional finance since the Rio conference". Indian negotiators argued that "there is nothing in the protocol which binds non Annex-I

countries to commit the GHGs abatement in the post 2012 period and reaffirmed the principle of allocating emissions allowances per-capita and accounting for historical responsibility. They even reiterated the India's position on technology transfer from industrialized countries should take place without any strings attached" (Katharina and Mikhaelowa, 2007: 8). Thus we can say that India is aggressive protector of interests and coalition builder which always ready to defend the interest of the South. The Bali Action Plan endorsed the principle of "nationally appropriate mitigation actions" (NAMAs) in developing countries, reflected India's position clearly. However India is among the top five emitters of GHGs emission in terms of population, economic size, purchasing power parities and poverty. So, there had no reasonable argument for refusing binding reduction target for their future emissions but accepted that mitigation should also be done by developing countries. Hence India played a key role in formulating Article 1b (ii) of the Bali Action plan which links developing countries action to measurable, reportable and verifiable (MRV) financing (Korppoo, 2009).

In COP-14 at Poznan in Poland in 2008, demand from developing countries for fund and technology faced resistance from developed nations. The international negotiators at Poznan are under pressure to produce a framework for technology transfer to developing countries in order to keep up the hopes of a final deal in Copenhagen by the end 2009. Thus in COP-15 at Copenhagen, India gave the proposal on improvement of Emission Trading and project based mechanism that is CDM, which includes:-

1. Adoption of country/region specific baselines based on commonly used technology.
2. Adoption of summary procedures for similar CDM activities.
3. Prescribing and ensuring adherence to time limits of CDM processes.
4. Further simplification of the procedures for small scale CDM activities.
5. Direct interaction between the CDM executive board and proponents of CDM activities.
6. Provision of clear guidelines by the CDM executive board for reckoning environmental additionality.
7. Avoiding unnecessary duplication of validation of CDM activities.
8. CDM executive board to be made full time.
9. Funding developments

10. Enhanced requirement for certification and recertification of DOEs personnel.
11. Promotion of renewable energy CDM activities.
12. Systems of Validation and Verification to be standardized etc (Babu, 2009).

Jairam Ramesh said at Copenhagen summit, "Our national interest has been not only protected but enhanced…Copenhagen is not a destination but the beginning of a long process…" Thus he strongly contributed and presented "India as a deal maker rather than deal breaker" (Mathur, 2010). One of the important features of Copenhagen was the coordination between the BASIC countries and their clear stance on transfer of green and clean technology. The Minister added that "I believe the BASIC group has emerged as a powerful group in climate negotiations. Their unity was instrumental in ensuring that the Accord was finalized in accordance with the Bali Action Plan and the Kyoto Protocol" (Mathur, 2010). He even said that India had "continued and will continue to work with G77, the Group of 77 countries together with China conducts climate negotiations as a bloc (Mathur, 2010).

Here we see that India in Copenhagen summit was more cooperative than instance and increasing its efforts in order to achieve the sustainability goals without harming its development process. The United Nations Climate Conference at Cancun in 2010 has done well to strengthen the multilateral process and restore much-needed momentum to negotiations on one of the biggest challenges faced by all countries. Thus the outcome of the conference was made a path for better prospects in other negotiations for developed and developing countries. Hence it comes up with two important decisions which set the stage for measures that to be taken beyond 2012, when the first commitment period of the Kyoto Protocol ends. Thus, in Cancun Agreement targets were set by industrialised countries for reduction of greenhouse gas emissions which were recognised as part of the multilateral process. Afterwards they drew low-carbon development plans and strategies and also report their inventories annually. In the case of developing countries, actions for emissions reduction would be officially recognised and match their mitigation actions to finance and technology support from Annex-I countries in which they have to report after every two years. These form a good preamble for target-setting for all member-countries under an agreed framework at Durban next year (The Hindu, 2010).

In COP-16 at Cancun in 2010, Jairam Ramesh has suggested that some form of binding cuts on carbon emission would have to be accepted by all countries in legal

form. Now it is time to recognise the need for CDM reform widely. The standardized baselines which were rejected in 2009, was being considered again in Copenhagen (The Hindu, 2010). However at Cancun Climate Summit, Jairam Ramesh also announced that India's Twelfth Five Year Plan, to be launched in April 2012, will be centrally on a low-carbon growth strategy, fulfilling a key demand by industrialized countries (The Hindu, 2010). In COP-17 at Durban India had gone with three predominant objectives. These are:

1. To secure the continuance of the Kyoto protocol that is scheduled to an end in 2012.
2. To ensure its particular concerns on equity, intellectual property rights and unilateral trade measures, neglected in previous negotiating rounds.
3. To preserve the notion of 'common but differentiated responsibilities' in the United Nation Framework Convention on Climate Change. However in Durban India failed to attain most of its stated objectives (Sengupta, 2012).

Jayanthi Natarajan Environment minister of India in 2011 at Rajya Sabha stated that "for developing countries, the responsibilities and obligations in a post – 2020 scenario will have to be clearly built upon the principle of equity and common but differentiated responsibility" (The Hindu, 2011). Thus we can see that over a time Indian diplomacy played a crucial role in all climate change negotiations and conferences and India become a radiant player in global climate politics and become a leader of developing countries. Hence Indian climate policy shifted towards a more proactive and flexible strategy. However, traditional elements keep reappearing from time to time but it becoming less frequent.

Socio-Economic Profile of India

India has a federal structure; state governments are independently elected bodies. Projects in oil, steel, coal, chemicals and fertilizer and forestry are come under the national government, other project require state and local governments involvement. The state government in particular have a stake in developing CDM projects, which has resulted in CDM promotional centres being established at the state level (Ganapati and Liu, 2009). In the first year after independence India sought to build the mixed economy. Thus the main objective of general economic policy inherited with a weakness with a poor capital and infrastructure base. However over a period of time its economy steadily developed and now India is the fourth-largest

economy in the world after the US, China and Japan. In OECD countries it is the thirteenth largest in the world. India holds a unique position as a nation that rushes towards development but still struggling as a developing country. There is still a mass poverty, lacking access of nutrition, clean water, sanitation, basic health care and education benefits. The United Nations Development programme ranks India at a level of "medium human development" number 119 on the list of 169 countries in 2010. India is currently placed 134th out of 187 countries in the Human Development Index (HDI). A large part of growth will be offset by population growth. The per capita income is estimated to increase fivefold, from over 480 US dollar in 2002 to over 2000 US dollar. The expected population GDP growth can be used to make assumptions and projections about future (Pachauri, 2001).

India's GDP would grow 8-10 % annually over the next 25 years so it is very hard to eradicate poverty early. Thus the eradication of poverty is one of the burning issues in India today which is no doubt is big hurdle in India's development process. Therefore, India is looking forward to the new prospects to overcome or to solve all of these emerging issues. Exports have grown significantly since the economic liberalization of the early 1990s and currently play a significant role in the Indian economy. The share of international trade in still relatively small compared to some major exporters, the share in GDP of international trade in goods of China was much higher than India in 2005 (World Energy Outlook, 2007:135). In 2011 the India's share in world export is 1.9 % whereas China's share is 10.1%, which is a huge gap between India and China in world export market. Indian exports are somewhat more carbon intensive than China and EU (Indian Economic Survey, 2011: 65).

Indian potential for energy demand growth is enormous. To deliver the 8% GDP growth, India needs to increase its primary energy production three to four fold and electricity generation capacity five to six fold by 2031-32 from the 2005 level (Planning Commission, 2005: 2). Electricity production is firmly coal based, as coal accounts for nearly 70% of the domestic oil, gas and coal resources are in short supply and need for imports is growing (World Energy Outlook, 2007: 184). This is alarming time for lack of non-renewable energy for India. This is the time for promoting renewable energy sources for fulfilment of energy deficit. India already suffers from power shortages and blackouts that hinder the economy as well as everyday life of people. The gap between demand and supply nationwide reached 14% in 2006 during peak period (World Energy Outlook, 2007: 522). India's economy is highly reliant on

climate sensitive sectors such as agriculture and forestry. India's main focus on the transfer and adaptation of technology and integrate sustainable development with national development programmes. Indian negotiators have repeatedly stated that although international pressure to mitigate climate must be resisted at all cost, it is in India's national interest to decarbonise the economy for the long term. India is highly vulnerable to climate change. Thus India's development plan strives for a balance between both economic development and taking the responsibilities for the environment. Currently, the top most priority for India is economic development and poverty alleviation. Meeting these national imperatives would create pressure on energy demand which would lead to carbon emission. Initiatives have been taken by both from the government as well as private sectors, together with reforms in the energy sector to accelerate the economic development and increase energy efficiency. These include:-

(a) Emphasis on energy conservation.
(b) Promotion of renewable energy sources.
(c) Abatement of air pollution.
(d) Afforestation and wasteland development.
(e) Economic reforms, subsidy removal and joint ventures in capital goods.
(f) Fuel substitution policies (Parikh, 2002).

However India for addressing the challenge of climate changes as well as to secure their energy security and economic development is looking for new imperatives. With the advent of the Kyoto protocol India took new initiatives in order to balance its economic development and energy demand. Thus it adopted the CDM as one of the flexible mechanism of Kyoto protocol, which come into force in 2005 and believes that it would help India in following ways:

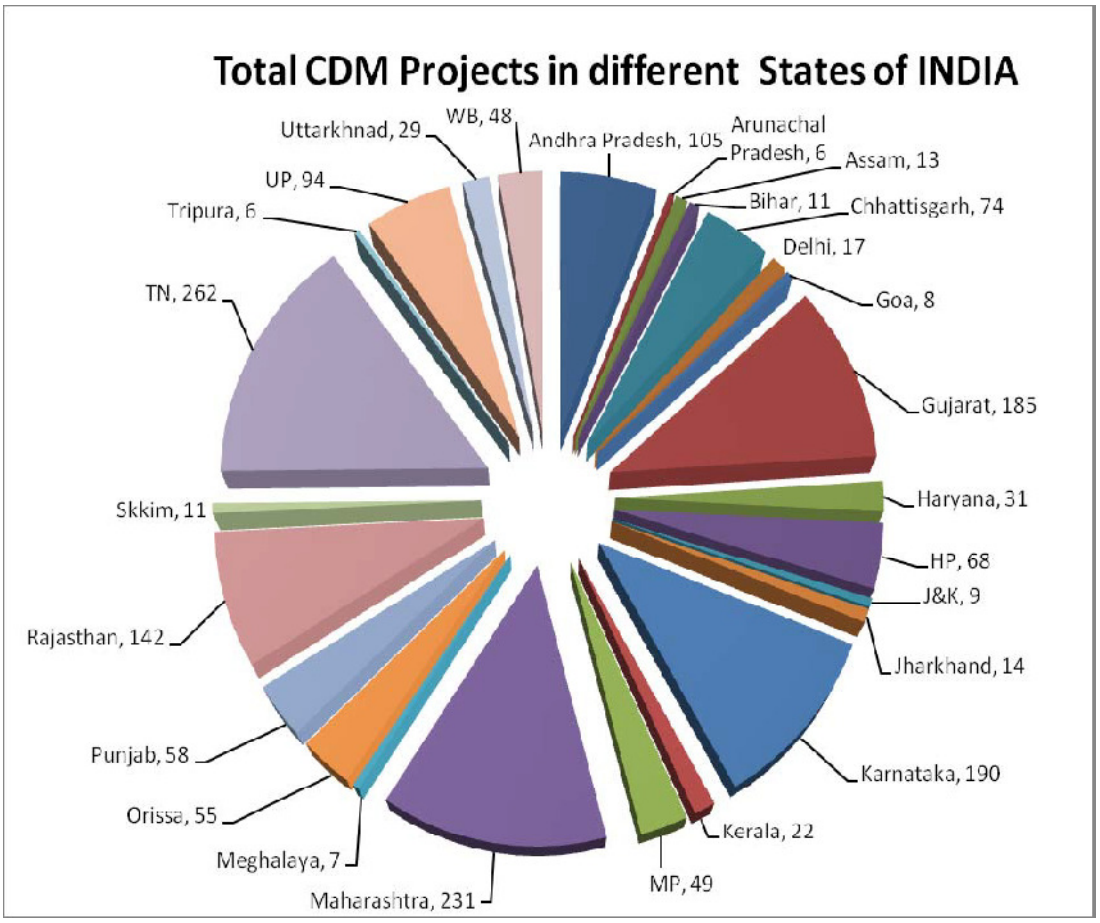
1. CDM project activity should lead to the alleviation of poverty by generating additional employment, removing social disparities and contributing to the provision of basic amenities to people with the aim of improving their quality of life.
2. CDM project activity should bring in additional investment.
3. CDM project activity should have a positive impact on resource sustainability, resource degradation, bio-diversity, human health and pollution.

4. CDM project activity should lead to the transfer of environmentally safe and sound technologies that are comparable to best practices in order to assist in the upgrading of technology from other countries as well as within the country (Liu, 2008).

Thus, the developing countries perceived CDM as one of the means of achieving sustainable development as well as increased Foreign Direct Investment (FDI) and transfer of Entity Sound Technologies (ESTs). However CDM played a very important role in funding mitigation efforts in developing countries like India. It has provided three times more funding for renewable energy and energy efficiency projects. India has been one of the highest recipients of CDM finance.

Status of CDM in India

One of the important feature of CDM in India is its large share of unilateral CDM projects, CDM projects developed by Indian stakeholders without the involvement of Annex-I countries (Ganapati and Liu, 2009). However CDM projects in India are unevenly distributed among its several states. Mostly projects are concentrated in the industrially advanced states in the South. Thus the entrepreneurship of the states has played an important role in distribution of the projects. Tamil Nadu comes first in terms of number with 262 CDM projects in which 85 has been registered projects. Tamil Nadu has country's maximum number of wind projects with 177. Maharashtra comes second in terms of number with 231 CDM projects. 104 are wind energy projects out of 231. Maharashtra, with the maximum number of registered projects in the country is 91. Karnataka stands third with 190 CDM projects. Gujarat with 185 CDM projects tops the list in terms of CERs issued and is also expected to generate the maximum quantity of CERs by 2020. Rajasthan with its 142 CDM projects stands second in issued certified emission reductions. In Rajasthan, more than 60% of the CDM projects are wind energy projects. Himachal Pradesh host 57 and Karnataka 40 CDM projects. More than 80% of CDM projects in Himachal Pradesh are hydro. The highest number of biomass projects in India is in Uttar Pradesh which is 54. In West Bengal, total CDM approved projects are 48. Sikkim has only 11 CDM projects, all are hydroelectricity projects, only one of which has been registered so far. Sikkim stands with the 8th position in the country in terms of credit issuance by 2020.



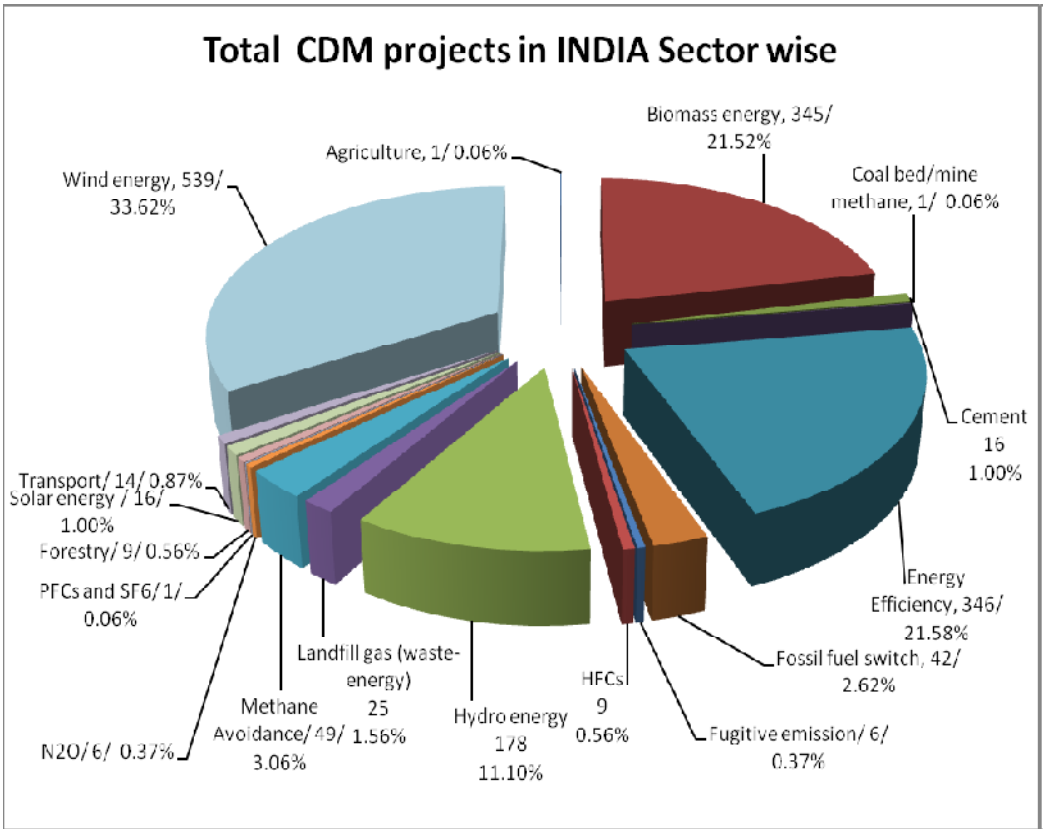
(Source: Ghosh, Soumitra and Subrat Kumar Sahu (2011), "The Indian CDM subsidizing and legitimizing corporate pollution: An overview of CDM in India with case studies from various sectors", Sasanka Dev publications DISHA, Kolkata)

Thus, out of 28 states, only the north eastern states of Manipur, Mizoram & Nagaland remain non participants in the CDM projects until now (Ghosh and Sahu, 2011).

Indian project developers implement the project by bearing the transaction costs of CDM and taking all the risks of projects. Therefore, the price of credits issued by unilateral CDM projects tends to be higher than bilateral or multilateral CDM projects. In the initial stage of CDM project development in India, biomass utilization project, waste gas/heat utilization projects, renewable energy like wind; hydro projects were mainly being implemented but later on other energy efficiency projects such as cement, steel, fuel etc were included (Slariya, 2007).

Most of the CDM projects in India comes under the four sectors which includes wind energy with 539 CDM projects which is a large stake of total CDM projects hence it is one of maximum source of clean energy. There are 346 CDM

projects of energy efficiency which is the second largest source of energy development. Biomass with 345 CDM projects and hydro with 178 CDM projects covers the 21.52 percent and 11.10 percent total number of CDM projects respectively. Other major sectors include fossil-fuel with 42 CDM projects, biogas with 49 CDM projects, cement with 16 CDM projects, landfill gas with 25 CDM projects, and HFC with 9 CDM projects. These projects are helping in reduce the GHGs emission and it is expected that these energy efficiency projects are earn the maximum number of CERs in coming future (Ghosh and Sahu, 2011).



(Source: Ghosh, Soumitra and Subrat Kumar Sahu (2011), "The Indian CDM subsidizing and legitimizing corporate pollution: An overview of CDM in India with case studies from various sectors", Sasanka Dev publications DISHA, Kolkata)

Although the CDM project development in India has a relative success story because always some doubts have arisen over the quality of projects and the role of the Indian Designated National Authority (DNA). In most part of India CDM have under criticism due to the challenges in proving additionality in the projects, but improving of CDM projects in India may well have influenced the Indian position

post 2012 to become more carbon market friendly (Korppoo, 2009). The big industrial power houses such as TATA and Reliance etc have shown interest in the emerging business opportunities of the carbon market.

Let us have a look on Indian CDM project development since 2005. In 2005, UNFCCC has registered 114 projects out of 395 projects of India. In 2006 CDM executive board has cleared highest 91 Indian CDM projects. Then in 2008, 309 out of 918 projects were registered by CDM executive board were from India. In 2010, 536 projects registered in which 442 projects are unilateral. Then in 2011, 738 projects registered at the CDM executive board in which 603 are unilateral projects and now in 2012 it is expected to go higher than as before (UNFCCC, 2011). Here we see that every year India's project development improving and goes higher and higher, which reflects not only how India benefitted from CDM, not only in terms of technology transfer, financial assistance but also its growing participation and involvement in CDM activities and in international climate change negotiations.

Institutional Set-Up of CDM in India

National clean development mechanism authority (NCDMA) or DNA in India is one of the early established DNA of the world, which started operating from December 2003. NCDMA is located in the Ministry of Environment and forests (MOEF). Hence it is chaired by the Secretary of the MOEF and its day to day activities are overseen by the director of the MOEF's climate change division. The NCDMA board includes representatives from the Ministry of External Affairs, the Ministry of Finance, Ministry of Commerce and Industry (Industrial policy and promotion developments), the Ministry of New and Renewable Energy, the Ministry of Power and the Planning Commission (Ganapati and Liu, 2009). Indian DNA is one of the most dynamics ones, which has a scientific and at the same time flexible clearly process for CDM projects. It normally takes maximum two months for clearance system only. A project proponent is required to submit a project concept note (PCN) and Project Design Document (PDD).

The NCDMA in India is a single window clearance for CDM projects. The approval procedural in India has its specialities. It emphasizes on the interactive communication between the NCDMA and project developers. The NCDMA examines the documents and preliminary queries which are addressed with the proponent. The project proponent is invited to give a brief presentation on the proposal. The members

of NCDMA can seek clarifications during the presentation and additional clarifications can later be sought once the members are satisfied, the Host Country Approval (HCA) is issued (Liu, 2006).

Negotiating Position of India

India has been a key player in the international climate negotiations since their start. Initially the Indian position determined by without general interest in the issue. In the first international conference in 1989, the Indian delegate argued against emission targets for developing countries, but called for the mechanism to involve developing as well as underdeveloped countries in the international climate change negotiation (Gupta, 2001). Later on when it was decided in climate change negotiations that industrialized countries should reduce emissions and cover the costs of emission reductions implementation in developing countries that reflects the developing countries concern towards the participation in the negotiation process (Vihma, 2011). Here we see the India's willingness to participate in the climate change negotiation process, but at the same time India refused to accept any kind of binding agreement for emission reduction target.

India was strictly adhered and even took strong position towards the differentiated responsibilities and said South cannot bear the burden of climate change without any financial and technology assistant. India always said it is the primary responsibility of the North. India's stand in the Conference was however very clear. India's international negotiating position relies heavily on the principles of historical responsibility, as enshrined in UNFCCC (Sengupta, 2010). India became a faithful supporter of a unified G-77 position which reflects a clear division between the poor developing countries and the industrialized countries. On the one hand developing countries asked for resources for development to developed countries and on the other hand they want that rich industrialized countries took historical responsibility as well as moral responsibility for the global climate change (Katharina and Mikhaelowa, 2011). Thus Indian strategy was clearly successful regarding to non binding commitment in international climate change negotiations. Hence, it was remaining loyalist to its central position and in support of poor developing countries which always seen in international negotiations. India even becomes member of the group of emerging powers, linking up with China, Brazil and South Africa in the BASIC group, and played a cooperative and leadership role in that. India is now in the same

category as China, an economically powerful country. However with its flexible handling of difficult negotiation situation in Copenhagen as well as in Cancun, even within the BASIC group it seems to become more preferred and relevant negotiating partner like other major player such as the US (Hallding, 2010). India is a partner to the New Asia Pacific Partnership on clean development and climate change which consists of some key developed and developing countries such as Australia, China, Japan, South Korea and the USA besides India. It focuses on the development, diffusion and transfer of clean and efficient technologies and is consistent with the principles of UNFCCC (Prasad and Kochher, 2009).

Despite the climate change negotiations India's position is also well defined in other fields such as international trade, promoting diplomacy, restoration of universal human rights etc, where India always eager to build prosperous and peaceful relation with various countries. The strong pressure for differentiated rules depending on capacity and responsibility is also very characteristic feature of Indian negotiation in general. However, over a time, the international negotiation process brought up new opportunities. The future development of the market mechanism and allocation of other climate finance are of immediate economic interest for Indian entrepreneurs as well as for the Indian government. These developments increased the perceived relevance of the international climate negotiation within the India.

Various Domestic Responses

The environment movement in India is quite strident, with NGOs having considerable opportunities to influence relevant policies. Private trade and manufacturing associations such as Confederation of Indian Industry (CII), the Federation of Indian Chamber of Commerce and Industry (FICCI) and the Cement manufacturers Associations (CMA) are stakeholders in the CDM process and consensus on the CDM and to develop an array of projects. Also think-tanks such as The Energy and Resources Institute (TERI) and the Centre for Science and Environment (CSE) have been involved in setting the CDM agenda and critiquing the process. TERI in 2005 prepared the national strategy study for CDM in India (Ganapati and Liu, 2009). In addition to engaging in research on operationalising CDM, TERI has been active in bringing CDM and climate change stakeholders together through conferences and workshops. The fact that TERI's president, Dr. Pachauri, has been elected as the chairman of Intergovernmental Panel for Climate

Change (IPCC) gives greater visibility to India and Indian NGOs participation in climate change mitigation.

The CSE[9] has been quite vocal in critiquing the CDM, arguing that short term economic advantages from emission trading should not adversely affect longer term environmental interest (Bhardwaj, 2002). Winrock[10] India prepared India's first national communication about sector wise GHG emissions and adaptation strategies. It fulfils the gap that exists in the country in terms of information of GHG emission and help India to fulfil its commitments regarding communications of GHG emission under the UNFCCC. It also prepared India specific baselines for key off-grid Renewable Energy Technologies in India (Ghosh and Sahu, 2011).

To summarize we can say that initially India opposed CDM but later this stance changed. Promotion of CDM in India with the efforts of organization such as CII, have influenced the government policy on the CDM. The MOEF, as a lead climate change mitigation agency in India. Other ministries such as non-conventional energy sources are also playing a strong role in initiating CDM in India. NGOs like TERI and Development Alternatives as well as business groups are working to create awareness, capacity building and planning of CDM project. However various states of India like Madhya Pradesh, Tamilnadu and Andhra Pradesh etc, organised CDM workshop and is planning to implement a CDM cell in the state pollution control board. Collaboration between the government of India and organisation such as TERI and CSE was identified. However CDM was earlier expected to be a private sector driven but now it includes both the Government and NGOs in India. This might result into the better alignment with national development priorities (Bhardwaj, 2002).

Market Perspective

Indian market mechanisms approach is highly liberal and calling for simplified methodologies in the CDM and its expansion to technologies such as nuclear power that are currently excluded (Clemencon, 2008). India is the second biggest source of CDM credits with 13%, hosting the largest number of projects with 29%. A unique characteristic of the CDM in India has been that 65% of the CDM credits have been created on a unilateral basis which means that one-third of the credits produced have had a foreign investor or a ready foreign buyer (Ganapati and Liu, 2009). The

[9] CSE has largely played a watchdog role, informing the government of India and larger research community on climate change.

[10] Winrock India is an affiliate of an international non profit organization based in Arkansa, US.

mushrooming of CDM projects in India may well have influenced the Indian position on post- 2012 to become more carbon market friendly. The big and influential industrial powerhouses such as Tata, Birla, and Reliance etc. have shown interest in emerging business opportunities of the carbon market. CDM has come as a boon for Indian corporate sector. Private sector presence in the Indian CDM becomes more pervasive and visible each day, both in terms of market share and number of project (Ghosh and Sahu, 2011).

In the negotiations, the Indian delegates have frequently emphasized scaling up the project-based CDM, but developing tool towards a sectoral CDM has met sharp resistance (Ghosh and Sahu, 2011). Indian negotiators argue that the CDM and the carbon market, for now, should be Primary Avenue for developing countries to participate in reaching global GHG mitigation targets under the international climate regime. India is an enthusiastic participant in the CDM. Thus the spread of CDM projects in India is a testament to the entrepreneurial spirit of Indian industry rather than positive government action. Indeed it could be argued that the government, represented in this instance by the National CDM Authority, acts merely as a clearing-house for the CDM projects presented to it, and India has the least taxing of host country approval processes. Serious concerns have been raised about whether these CDM projects result in "real reductions," additional to those that would have anyway occurred, and whether they do, as they are required to, contribute to sustainable development in the host countries. It is in recognition of such concerns that some in the industrialized world are seeking to downplay and restructure the CDM in the future climate agreement (Rajamani, 2009). It is said that in India's with its unprecedented thrust on industrialization during the past two decades, big companies are increasingly setting up new plants and increasing their turnover. While doing so they are adding greenhouse gases to the atmosphere like never before. The irony is that they are also making money simply by putting a so-called clean development tag to some of their dirtiest projects. Notwithstanding this critique, a strong point of Indian CDM market is its advanced institutional landscape. The NCDMA primarily sees as a public service provider and concentrates on a speedy appraisal of project sustainability. Many national enterprises are also interested and there is an ample pool of CDM consultants and developers (Alex, 2008).

The MOEF routinely boost of its CDM projects building measures, and points to carbon trading are not only a foreign money earning option but this is a way to

mitigate the country's domestic emissions. "This is the potential for FDI that India stands to earn from carbon credits. In fact, 10 per cent of India's annual GHGs emissions can be neutralised because of this," said Jairam Ramesh in December 2009 (D'Monte, 2009). Chamber of Indian Industries organised a Conference titled 'Climate Change – Response and Action: Promoting the Carbon Market' in April 2010 stating that its clear objective was to "focus on areas of tremendous potential for industries in CDM" (Newell and Matthew, 2010: 92). Jairam Ramesh in 2009 stated that "India may be the second-largest country in terms of the number of CDM projects after China but it is the best in terms of implementing them" (D'Monte, 2009). The stakeholders of carbon markets in India see it as an added opportunity for growth and investment. It is slowly creating a class of people that are interested in trading in the new commodity known as carbon. This is also 'changing the dynamics of North-South relations in the global climate change negotiations' (Newell and Matthew, 2010: 92).

To conclude we can say that India is a country which is believed to be one of the most important CDM hosts. Thus it has been target of a number of capacity building efforts from Annex-I countries. However, for a long time the principal stance of the Ministry of External Affairs that aimed at an equitable per-capita distribution of emission rights prevented a positive official position towards the CDM. Even approval of AIJ projects proved to be difficult. This cautious attitude changed in 2000 when a cabinet decision endorsed the CDM. India became the country with the highest number of proposals that passed in the initial screening under the first round of the Dutch CERUPT. The hosting of COP-8 provided a further boost to CDM activities in India with a large number of CDM side events organised by Indian NGOs and representatives of private companies. Thus India is a country getting maximum benefits from CDM and it is believed that India will become a major player in near future. However, the main benefit that can be expected from the project based Kyoto mechanism on the one hand, potentially reduce industrialized countries cost of meeting the Kyoto protocol targets whereas on the other hand they are to support the host countries objective regarding sustainable development. Hence we can say that India took several positions in order to achieve its development goals. India is a country which is continuously striving for poverty, unemployment, time taking technology, low GDP etc. It is not new for any country that to fulfil their national interest they several times changes and mould their policies for the better and

prosperous development. Thus similar has been done by India in international climate change negotiations; sometimes we see its position hardened and sometimes cooperative. India always serves the interest of the poor developing countries in the entire negotiations as it does not mean that there is no Indian interest. But we cannot take it negatively as India is also not so much as developed. However we see that Indian position over a period of time shifted towards legally binding emission cuts commitment to its traditional position of non-binding emission reduction commitment. Thus changes are necessary for development process. Thus we can say that Kyoto protocol given a way to developing countries to progress or to get resources and build good and cooperative relation with developed countries and on the other hand it reflects attention towards the global warming. Thus CDM come as an effective tool to overcome with all these problems, we cannot say that it alone can solve the entire problem of climate change or the issues of the countries which generally of their personal interest such as border problem or trade problems. But it can help in a way through which developing countries get new and effective technologies as well as financial aid and on the other side it creates a business friendly atmosphere between the developed and developing countries.

CHAPTER - 4

Comparative study of Indian and Chinese CDM policy

Introduction

Today, we are in the era of globalization and modernization and it goes without saying that these processes have had a great impact on such countries as China and India. These countries have had changes in social, political, economic and cultural spheres. The main aim of every country is to maximize their national interest rather than country positions on issues. Hence this is in agreement with the Realist negotiating strategy which includes building on agreement, avoiding polarized issues, addressing single issue separately and provides selective incentives such as access to funding, resources, markets and technologies (Richards, 2001). Thus Indian and Chinese policies have new directions taking into account the Realist principle. The main changes in these countries are connected with industrialization, globalization and urbanization and getting to the world market. However, both countries aim all their efforts to have the traditional market economy and to be successful on the world market. One of the steps in this direction was the attempt to divide policy and economy and was rather successful (Rana and Shukla, 1995). As far as modernization is concerned, it can bring profit but at the same time there has been a negative aspect of this phenomenon. One of the most important among them is the environmental one.

Now India and China are the two fastest growing economies in the world and both are biggest Asiatic giants in terms of economic, population and strategic etc, whose energy consumption level and GHGs emission are continuously increasing but are below average on the international level. In the 1980's Chinese reformed in their economic sector with the slogan of market socialism and they moved towards the neo-liberal economy, whereas India in 1990s adopted the economic reform programme. Both India and China adopted free liberal market economy based on neo-liberal policy given the pace of globalisation. In this globalised competitive era, economic power became one of the dominant factors to raise national interest. Development is the foremost condition for economic growth. Both countries are running high ecological deficits, with increasing growth prospects as well as essential improvement in human development. It is therefore a challenge for both countries to provide prosperity and opportunity for all without harming environment.

In 1992 UNFCCC gave the pace for the stabilization process of GHGs concentration. With the inception of Kyoto protocol in the 1997, countries all over the world have become more concerned about global warming. The Kyoto protocol signed in 1997 by the parties to the UNFCCC committed countries to reduce or limit their GHGs emissions. The protocol prescribed 'Common but Differentiated responsibilities', which enable developing countries to participate voluntarily[11] without the similar mandatory targets and hence they were to participate to increase energy efficiency while pursuing their economic growth. The protocol introduced three mechanisms through which country can reduce greenhouse gas emissions such mechanisms are:

1. International Emission Trading (IET): Article-17
2. Joint Implementation (JI): Article-6 and
3. Clean Development mechanism (CDM): Article-12 (UNFCCC, 1997).

International Emission Trading (IET) is a non project mechanism established under Article 17 to govern the Assigned Amount Units (AAU) and acquire emission reduction units (ERUs), CERs and removal units (RMUs) from Annex-I countries to another (Haites and Yamin, 2004). Joint Implementation (JI) is a project mechanism established under Article 6 to govern the issuance of emission reduction units (ERU) for emission reduction and sink enhancement in Annex-I countries. Under Article 12 of the protocol, CDM project activities result in emission credits called certified emission reductions. The CERs are traded then in the world carbon market which brings benefits for both developed and developing countries. Developed countries benefits as they invested in developing countries which are far cheaper than their own country and developing countries benefit since the CDM provides additional funds and access to advanced technologies for sustainable development (UNFCCC, 1997).

[11] "The word voluntary has been strategically used in the negotiations and developing countries tend to see it as a part of a developed country strategy of 'divide and rule'. For example, it was introduced in the Activities Implemented Jointly (AIJ) at COP1 suggesting respect for the position of the majority of developing countries who were opposed to JI, while allowing a minority to participate in it. But the word voluntary is misleading, as in the practice most developing countries would feel obliged to participate in it rather than lose access to the resources and technologies that could accessed through it. The term was again used at COP3 but was blocked in Kyoto protocol; hence it reappeared in COP4 in Argentina where the host country and Kazakhstan said that they wanted to adopt voluntary measures. This placed other developing countries in a difficult negotiating position since it open the door to pressure being put on them to accept emission targets, as demanded by the US in particular" (Richard, 2001: 13).

In this chapter I am only focussing on clean development mechanism as it relates to China and India. Thus this chapter outlines the contextual setting of India and China, leading to a comparative analysis of their policies and their responses towards climate change and their policy on CDM. It would also focus on convergences and divergences in this respect.

To participate in the CDM project implementation the host countries must fulfil three fundamental requirements. These are:

1. Participation must be voluntary.
2. Establishment of Designated National Authority (DNA).
3. Ratification of the Kyoto protocol (UNFCCC, 1997).

There are various debates on CDM. Does it achieve the objective of reducing greenhouse gases as well as deliver sustainable development goals in developing countries? "CDM emphasis on least-cost carbon credits entails a race to the bottom, in the process, sidelines the valuable projects like renewable by not rewarding the multiple benefits they provide" (Ganapati and Liu, 2009: 353). CDM is a crucial element of Kyoto protocol. It is the only mechanism that facilitates collaboration between developing and developed countries for reducing GHGs emission under the protocol. Developing countries have an incentive to invest in sustainable development projects while maintaining economic growth. CDM is a trading mechanism that benefitted developing countries for reducing emissions and also provided funds to them for better development (Ganapati and Liu, 2009).

Background

India is a developing country and it faces a number of environmental problems. Environment problems make the weak point of its government policy. It is obvious that the government is able to incorporate only a small number of markets based economic instruments in environmental planning. Environmental degradation becomes serious problem in India and so this problem is becoming of current importance in this country as well as all over the world. The rapidly growing population has a great impact on the country's climate. This factor together with industrialization affects Indian infrastructure and natural resources. Urbanization puts obstacles in the way of the rural development of the country and leads to serious air pollution. Air and water pollution, deforestation, soil erosion, degradation of resources, increasing deforestation, rapid industrialization and urbanization increased

transportation and input intensive agriculture are some of the major causes of environmental problems being faced by the country. Poverty is another negative factor for such heavily populated country where the resources are limited. Indira Gandhi in 1972 at Stockholm was stated that "we do not wish to impoverish the environment any further and yet we cannot for a moment forget the grim poverty of large number of people. Is not poverty and need the greatest polluter?" (Korppoo, 2009: 47). Taking into account domestic environmental problems, India must aware of global ones, such as global warming. However India becomes an active participant in the problem of stopping the greenhouse effect and controlling some of its gases such as carbon dioxide and others. India is just moving in this direction and thus become signatory of UNFCCC.

India is the fourth largest economy with the population of 1.2 billion people in the world. India has experienced exponential economic growth since 2003, with GDP growing at an average of 9% at the end of 2008. However India's economy is heavily reliant on coal energy for electricity production. Maintaining high economic growth while using the coal fired plant will potentially increasing India's carbon emissions. India priorities economic growth and will not sacrifice it for the sake of climate change mitigation. This means that country will, if needs be, drive economic growth with no consideration to potential effects on the environment. This is a puzzling view given the progress India has made in implementing CDM projects (Seroka, 2009).

Economic development and, within its framework, poverty eradication, energy security and electricity access is the central and enduring perception of India. Furthermore, global environmental problem such as climate change are seen as problems caused and therefore solved by the North. The developed countries are called upon to change their consumption patterns and unsustainable production while providing developing countries with environmentally sound technologies and financial assistance. India is the most vital advocate of the traditional developing country position on global climate change negotiations by holding its views on historical responsibility (Korppoo, 2009).

However the economic reform in China had a complex and contradictory effect. Agricultural stagnation, low industry rates and low living standards made Chinese political leaders look for the means to improve the situation. Hence it adopted that ideology which helped to direct the economy of the country and economic reform became the way for improvement. In general post-Mao economic reforms were

characterized by independent agriculture and opening country market to foreign investors and the world trade. Reforms were firstly tried in rural areas as these areas brought more than half of the budget income. After successful result reforms were spread to the urban areas. These reforms became a shift to the market economy so called open policy, which made some areas of China preferential for foreign investment and bases for the export development and also created new opportunities for economic development in the country (Buxton, 1988: 99). However agriculture played very important role in China for example eradication of poverty. By international standards, China special indicators reflected its universal access to primary education, low infant mortality and high life expectancy as well as China's low initial per capita income. For the development of agriculture the action that were taken are privatization of farming, intensification of industry and liberalization of market. However the rise of China as an economic power is one of the greatest developments of the latter half of twentieth century (Buxton, 1988).

China's economy continues to grow at a rate of 8-12 percent annually and now it is the fastest growing economy and second largest exporting nation in the world (World Energy Outlook, 2007). Such progress in economy and agriculture industry could be achieved through the combination of both renewable[12] and non-renewable resources[13]. State still controls the economy practically at all the levels and at the macroeconomic in particular. China even continues to use the same natural resources that have been used for centuries and in general technology of agricultural industry which hasn't changed greatly although rapid economic growth has brought a lot of damage to environment. There are several key problems of environment faced by China. These are air pollution, land degradation and water pollution etc. China's SEPA reported that four of the five most polluted cities of the world are situated in China. There are several reasons of pollution in China but the main one is relying on coal as the main source of energy. However in the past decades it has experiences the exponential economic growth. It is also predicted that its economy grows substantially over the next decades. Hence it poses the immediate development need and sustainability challenges for the country. Growing the economy while controlling

[12] Renewable resources in china represented in foreign economic relations, suppressing of consumption and choosing quantity instead of quality.

[13] Non renewable resources explained by the long lived china's history and traditions and as a result specific ways of agricultural industries development. However agriculture is mostly based on hard working numerous populations.

pollution as well as reducing greenhouse gases remains China's priority (Shiqiu, 2008).

However we can say that energy consumption has also been on a continuous rise in the two countries, with industry being the largest end-use consumer of energy sources, accounting for nearly 45% of the commercial energy consumption in 2006-07 for India and about 70% for China in 2006 (World Energy Outlook, 2007). In 2011 energy demand of both China and India goes even higher than ever. Global energy demands increases by one-third from 2010-2035, with China and India accounting for 50% of the growth (World Energy Outlook, 2011). It is estimated that China will surpass the US in 2035 in energy consumption which is nearly 70%. The growth rate of energy consumption in India is even faster than the China (World Energy Outlook, 2011: 2). Hence reacting to the rising energy demands and dwindling energy sources, the governments of these countries have been proactive in addressing the energy issues. Looking at the energy mix in India and China, both countries are largely coal dependent as well as growing dependence on oil imports is increasingly implying economic and security risks for China and India.

Here we see that both countries faced the similar problem whether it is environment or development since the past decades. There is enough evidence to suggest that India and China are the most severely affected countries by climate change, posing threats and challenges at various levels. Although the overarching issues on climate change for both India and China are similar in nature whereas differences lies in their method of development. Today China and India are among the top five emitters of GHGs in which China comes second and India comes last (Ganapati and Liu, 2009). Both countries also belong to top five countries regarding economic size when we measuring their gross domestic production in purchasing power parities. The countries are among the key players in international trade with exports of goods and services as a percentage of GDP standing at 21 percent of India and 42 percent of China in 2007 (World Energy Outlook**,** 2007).

Above arguments are pertinent to the role of the countries in the GHGs emission as well as showing their increments in GDP process and project policies. Per capita emission of both the countries is low as such they are on the same track in international negotiation for climate change. Both India and China, with diverse culture and histories, are presently following the development pathways, which in some sense are increasingly intersecting, often competing and occasionally

coordinating. In fact, the Prime Minister Manmohan Singh, has stated that "more and not less development is the best way for developing countries to address themselves to the issue of preserving the environment and protecting the climate" (The Times of India, 2007).

However, both the countries were initially sceptical about the CDM and integrity of the Kyoto protocol. Hence their positions changed dramatically in recent years. Now they realize the economic and political benefits that the CDM could provide. The CDM has become that derive for China and India that stimulate investment in projects and mitigate GHGs emissions and to help cover the incremental cost of higher efficiency or low carbon technology. The Chinese and Indian government sees CDM as an effective way to achieve sustainable development, technology transfer and environmental protection.

Both India and China have become the leading CDM project host countries in the world and play an important role in the global carbon markets. India has emerged as one of the leading CERs supplier, next to only China. In India the huge GHGs emission reduction potential, several capacity building measures and GHGs emission reduction projects got support from the international development community. In view of the huge potential of CDM projects in the country, the Government of India has put in place an institutional mechanism called national CDM authority (NCDMA) to approve the various projects being submitted. The NCDMA was set up in December 2003. Joint report of CAEP-TERI in 2011 reveals that India's CDM potential represents a significant component of the global CDM market.

> "As of March 2009, the NCDMA has accorded host country approval to about 1,226 projects facilitating an investment of more than Rs 1,513.97 crores. Of the total 2,144 projects, 499 registered by the CDM Executive Board (EB) are from India, which is next only to China's with 800 projects, as of 15 April 2010 These projects are in the sectors of energy efficiency, fuel switching, industrial processes, municipal solid waste, and renewable energy. Similarly, China has become the foremost CDM project host country in the world and plays an important role in the global carbon market. The quantities of China's CERs and CDM projects both rank the first in the world. By 15 April 2010, EB had registered 2,144 CDM projects and the expected CERs is 352,362,447 to CO2 equivalence where China's CDM projects were 800, accounting for 37.31%; expected CERs accounting for 59.61%" (CAEP-TERI, 2011).

Thus the above distributive characteristic of CDM projects in both India and China covers a healthy mix of various sectors whose primarily focus on sustainable

development, with renewable and energy efficiency. These projects also help in achieving the major goal regarding energy security for the countries. This also helps the industries in making the transition from their older and short viable process to newer, cleaner, and efficient technologies and, hence their long-term viability. However, Indian CDM projects are smaller in size as compared to China. Most of the Indian projects are unilateral[14] whereas China follows the bilateral[15] projects development. Though the number of projects registered in India is almost 75% of that of China and the number of CERs generated remains 20% of those generated by China. Thus we can say that CDM is a key flexible mechanism whose main purpose is to reduce the compliance costs of projects. As compared to China, the role of Indian National CDM Authority has so far remained limited to approval and verification of sustainability criteria of projects. It is now that efforts are being made to promote the programmatic CDM as it is in the larger interest and will help to achieve the developmental goals of the country (CAEP-TERI, 2011).

Despite the similarities, some comparisons must be made between India and China, as the behaviour of their societies which is extremely important for the present and the future, given the dramatic growth of their contributions to global warming. India is much more vulnerable to climate change than China, since a significant portion of its population relies on waters that are comes from the Himalayas which is under the Chinese sovereignty, the country with increasing temptations to divert rivers to meet the consumption demands of its huge population, and whose glaciers are shrinking because of global warming. Moreover, India has a significant proportion of its population living in low lands subject to monsoons and devastating shocks between the atmospheric, land and oceanic circulation. The average Indian population is less materialistic oriented than the Chinese because of religious orientation and is, therefore, more sensitive in terms of values related to the state. The Indian government is highly fragmented in comparison with China which makes it much more difficult to bring about a change towards lower carbon intensity. Thus, there

[14] Unilateral projects: the whole exercise of project development, financing and all the associated risks are concentrated in the host countries. However unilateral projects are expected to be more consistent with developing country priority.

[15] Bilateral projects: In this, mostly CDM activities such as project selection, financing and sharing of credits is worked out directly between Annex-I and Non Annex-I parties on a project by project basis. It is preferred more by the private sector and industrialized countries. Thus bilateral projects are high transaction costs that might favor more capital intensive projects rather vis-à-vis the small renewable energy projects.

would be significant share of the carbon space to be used at the expense of developed countries and middle-income countries (Filho and Viola, 2010). Thus in China, the central government is now actively pushing for a swift development of the CDM, also in its eastern provinces and more remote areas. And India's administration has, so far at least, worked much better and more efficiently towards CDM management than in other public policies. Economically, China in particular perceives the CDM essentially as a business opportunity and makes every effort to generate as many CDM projects as possible and to gain as much as possible financially whereas India did not use the CDM to such an extent, although India's attempt to boost investment in sectors where public-private activities fall behind national development targets for an example in rural electrification, which indicates that the government is aware of the economic opportunities of carbon governance as well (Fuhr and Lederer, 2009).

India and China have differed in their policy approaches towards sustainable development. China prescribes specific priority areas such as energy efficiency improvement, development and utilisation of new and renewable energy and methane recovery, for these purposes it sets its Agenda 21 in 1992 which reflects the broader environmental goals within socio-economic agenda. Hence, it was articulated the National climate change programme which was adopted in 2007 whereas India does not have such kind of priority areas for CDM projects and sustainable development (Berger and Gjoski, 2009). However the political governance in India and China may differ in its basic structure, but environmental protection has always been an important part of the overall governance structures. Thus, the two countries have put in place an extensive framework for environmental protection, which have kept evolving to encompass the changing needs and scenarios, both nationally and globally Indian projects contribute more to infrastructural development than Chinese projects, but with less technology transfer which is indicative of the increase in unilateral Indian projects (Watson, 2009).

In China CDM measures stipulate that the project owners, alone or together with their foreign partners can submit CDM project proposals. Beyond the general requirements of the CDM that the projects should conform to the national laws and Kyoto Protocol provisions, China requires that the CDM projects should not introduce any new obligation other than those under the protocol. Even it requires that the CDM promote the transfer of environmentally sound technology in China. In this regard China prescribes the priority areas such as energy efficiency improvement,

development and utilisation of new and renewable energy etc but India does not have specific priority areas of CDM projects as China. Thus India seeks to develop CDM projects for financial additionality (Ganapati and Liu, 2009).

The Chinese government had very clear objective regarding the CDM. These are:-

1. It sought to participate in the market to gain a substantial amount of market share.
2. Foreign Investment and Technology Transfer.
3. To improve energy efficiency or to build up energy infrastructure in it's less developed regions.
4. Prevention of Foreign companies to acquire majority control in Chinese projects. For example Chinese government taxes CDM projects, only the 2 percent rate revenues generated but in some projects such as industrial gas, taxation may be stepped up to 65 percent. Thus the profits are channelled into the CDM Fund, which is supposed to finance renewable energy projects. Therefore, CDM projects can only be set up in companies that are at least 51 % Chinese owned.
5. Government has set an unofficial floor price for CERs to avoid dumping prices. Overall, the state relies heavily on traditional command and control and regulates. Apparently Chinese state has captured the carbon market (Fuhr and Lederer, 2009).

On the other hand India set up the high level committee on climate change. Developing countries sees CDM and carbon market as an overall opportunity to enhance their domestic growth and diversified business. However India adopted the Openness policy towards CDM projects which resembles India's changing attitude towards CDM and hence it is opening up towards foreign investment in carbon market. With the growing maturity of Indian carbon market, CDM activities are no longer considered exclusively as a business issue. State agencies expect individual CDM projects to contribute to investment in public infrastructure such as electricity sector. However some state government are more active in setting up CDM projects than others. Thus regulatory framework of India faced the criticism on its additionality criteria of CDM particularly on wind energy but meanwhile Indian DNA responded to such concerns and takes various steps to improve its quality of its

operations without falling back of bureaucratization and overregulation. Overall, the Indian state appears to act as a market facilitator (Fuhr and Lederer, 2009).

Despite this, it would be more than difficult for both China and India to accept a binding commitment on climate change mitigation process in the near term. Neither China nor India have expressed any official interest in that and both countries remain opposed to putting binding commitments for developing countries on the agenda, which would be a necessary step for engaging in cap and trade.

Debate between Developed and Developing Countries particularly China and India in Climate Change Negotiations

The UNFCCC recognizes the principle of "common but differentiated responsibilities" and respective capabilities which is based on the principles of practicality and equity. The asymmetric position of various countries, characterized by divergent social and economic burdens justifies the selection of differentiated reduction targets. Thus scope and application of this guiding principle of the climate change movement has been the subject of much debate, with the developed and the developing nations interpreting it in different ways according to their convenience. The stand taken by the developing countries is that their overriding objectives include eradication of poverty, enhancing economic well-being, improving public health, providing basic amenities and improving infrastructure. These constraints make it difficult for them to focus their full attention to climate change issues, while developed nations face no such obstacles (Nelson, 2009). Therefore they claim that the developed nations bear a historical responsibility for GHG's emission and for global warming (Dasgupta, 1994; Talwar and Saha, 2010).

According to developed countries, climate change is taking place not due to current level of GHGs emissions, but as a result of the cumulative impact of accumulated GHGs in the atmosphere. Developing countries argue that the final target should be for each country to have the same pollution levels per person, or the same emissions per capita. Thus they were not in a favour of binding agreement and raised a slogan of "Polluter Must Pay" (UNFCCC, 1997). On the other hand developed countries responses that to avoid the problem of global warming, developing countries must accepted the binding commitment and equal participation in climate change. They even said that if developed and industrialized countries stopped emitting GHGs henceforth, the emission rise in developing countries. Therefore, it is impossible to

stay under 2 degree temperature rise business as usual scenario. They even believe that adherence to a per-capita approach for determining emission levels is unfair as it rewards over-population and if India and China have the same per-capita emission levels as advanced nations, the pollution levels will increase high enough to destroy the Earth. Their main concerns are carbon leakage and exposure to unfair competition from developing countries through the delocalization of carbon intensive countries (Talwar and Saha, 2010).

Thus on the one side, developed countries insisted that the post-2012 negotiation address the emissions of all of the major economies, developing as well as developed countries. On the other side, developing countries argue that they are not historically responsible for the climate change problem, have less capacity to respond, and hence should not be expected to undertake specific international emissions reduction commitments. However we can say that both developed and developing countries have their specific interest regarding climate change. Both are trying to get maximum benefit by one or the other way. Developed countries focussing on such policies through which they can benefit more without harming their interest and developing countries want such policies which maximum benefits them. Therefore it is clearly seen climate change is not rather the issue of global warming but it becomes an issue of geo-economic and geo-political.

India and China in International Climate Change Negotiations

India and China have produced an impressive response to the global climate change. However, the major emitters have very different approaches to global climate negotiation as a result of their varying level of development and divergent views concerning the dynamics of economic growth. India largely played a defensive role in international climate change negotiations and hence promoting the argument that the burden of responsibilities regarding to climate change lies with industrialised countries. Thus it refused to accept any form of binding commitment to constrain its own GHG emissions. However, since 2009 India's approach in international climate change negotiation has been shifting towards more constructive engagement with international partners and in the UNFCCC negotiations (Hallding, 2010). Indian negotiators argue that, the CDM and the carbon market, for now should be the primary avenue for developing countries to participate in reaching global GHG mitigation targets under the international climate negotiation (Rajamani, 2009). Indian

climate diplomacy is now being focus into the wider foreign policy objectives, particularly its strategically important relationships with the United States and China. Although Indian cooperation at the international level has increased, the ideological norms that supported India's traditional stance in negotiations are still highly influential domestically. Furthermore, the energy and industry sectors of India tackling GHG emissions challenging, both technically and economically. Both these factors will continue to constrain how far India can move in committing to emission reductions at the international level (Hallding, 2010).

After becoming party to the UNFCCC in 1994, "China has made name for itself as a recalcitrant player, known for its reluctance to follow the rules of the game", for example in COP15, China have coordinated much of the procedural resistance by G-77. However there is growing concern if China overtook the US as the world's largest emitter of greenhouse gases, it has increasing its mitigation efforts and makes them more transparent to commit its domestic efforts in international regime (Hallding, 2010). Recent years have witnessed a change in China's negotiation style. Though, China was more cooperative in COP-10 than India (Heggelund, 2007). Even in Bali action plan India supported by the G-77 and China were successful in including of the measurable, reportable and verifiable phrase within at the end of sub-paragraph (Rajamani, 2009). Although the developing countries with G-77 and China repeatedly advocated differentiated obligations for industrialized and developing countries, they strongly opposed any differentiation among developing countries based on their different levels of development (Chayes and Kim, 1998). Thus China created a category of more advanced developing countries which matched very well with Chinese interests. China with its rapidly expanding economy, large present emissions and even higher projected emission levels could easily be putted in such category (Chhabra, 2008).

Thus we can say that climate diplomacy has consequently gained importance on the foreign policy agenda, and now the climate issue is more become an eco-political[16] concern. However China and India are seen as responsible actor, they remain committed to its traditional position but China did not allows international interference in its domestic development. Hence China did not want to slow down its development procedure in the cost of climate change. Thus we can say that it wants to

[16] Eco-political means countries involving in climate issue not for the wholly sake of environment but to fulfill their economic and political goals.

strike a balance between domestic pragmatism and principled foreign policy strategies.

Generalization of Indian and Chinese position in International Climate Change Negotiations

India and China had impressively responded towards global climate change. The protocol, signed as a part of Kyoto protocol to the UNFCCC, declared that India and China had joined the New Asia Pacific Partnership on clean development and climate which consists of some key developed and developing countries such as Australia, China, Japan, South Korea and the USA besides India. It focuses on the development, diffusion and transfer of clean and efficient technologies and is consistent with the principles of UNFCCC (Prasad and Kochher, 2009).

Since in 2005, the parties to the UNFCCC began to negotiate in the second commitment period of Kyoto protocol which enters into force after 2012, when first period ends. Thus it established an ad-hoc working group in Kyoto protocol (AWG-KP), which has a responsibility to establish quantified targets for reducing emissions for the group of countries in Annex I, as well as instruments by means of which developed countries could achieve their targets (Filho and Viola, 2011). The Bali Action plan held in 2007 and scheduled to come to an end in 2009. However India went to it with clear goal that is to retain and strengthen the differential treatment in the climate treaties between developed and developing countries whereas US believes that meaningful contributions from countries with significant emission profile will be critical thus it want to ensure parity in treatment between all major emitters (Rajamani, 2009). Moreover, when Bali Action Plan endorsed the principle of nationally appropriate mitigation actions (NAMAs) in developing countries, it probably reflected India's position and preserving the opposition against binding commitments for developing countries, but accepting that mitigation should also be done by developing countries (Katharina and Michaelowa, 2011).

Thus in Bali, India and China aggressively opposed binding emission targets on developing nations and instead asked for financial assistance for clean energy technologies (Chhabara, 2008). Moreover, India was supported by China and G77 successfully in order to place the phrase "measurable, reportable and verifiable" at the end within the sub-paragraph of Bali Action Plan (Rajamani, 2009). However with the serious deficiencies in the implementation of UNFCCC in Bali, the parties decided to

launch a process to enable the implementation of the convention by means of the long term cooperative term and for this purpose it established an ad hoc-group of long term cooperative action (AWG-LCA) (Filho and Viola, 2011). Thus it was agreed in Bali Action that both the AWG-LCA and the AWG-KP should conclude its activities in 2009 and present the outcomes of their work to the Conference of the Parties for adoption at its 15th session and the Conference of the Parties serving as the Meeting of Parties to the Protocol (COP/MOP) at its 5th session, respectively. This process was recognized as two track process (Filho and Viola, 2011). Under the two track procedure of climate change BASIC countries insisted for the second commitment period of Kyoto protocol to developed countries but they had opposed the any new kind of legal agreement (Saha and Talwar, 2010). Thus India and China played an important role in the process of Bali action Plan. However in Bali, COP-15 Copenhagen had been defined as the deadline for acceptance of comprehensive post-2012 climate policy framework. Before the Copenhagen summit, Indian position emphasized its refusal to accept any national emission commitments, a specific year for peaking of global emissions or international verification of NAMAs (Katharina and Mikhaelowa, 2011). At the same time, commitment made by India and China marked the first step for strict adherence to the principle of common but differentiated responsibility. Wen Jiabao, the Former Chinese Prime Minister, specified that "China's position was unconditional, stating that China would fulfil its commitment, irrespective of financial or technical support" (Saha and Talwar, 2010: 15). China said it tries to voluntarily reduce its emissions of carbon dioxide per unit of economic growth, a measure known as carbon intensity by 40 to 45 percent by 2020, compared with 2005 levels. India set a domestic emissions intensity reduction target of 20 to 25 percent by 2020, compared with 2005 levels, excluding its agricultural sector (Katharina and Mikhaelowa, 2011; Saha and Talwar, 2010).

The emergence of the BASIC group in late 2009 was a forum for dialogue between Brazil, South Africa, India and China, and their continued meetings throughout 2010, which was an interesting feature in the climate politics delegation. A decision to align with the other three countries in a group carries some risk for India initially, but it is expected that it might ultimately be treated the same as China in future international agreement. However, BASIC participation makes sense if seen in the context of India's wider foreign policy goals such as building international status and fulfilment of their important economic relationship with others. It was also a

natural reaction to the fragmentation of interests among the G-77 and China group during 2009 (Hallding, 2010). Thus in Copenhagen, India took a leading role, enhanced its membership in the newly formed group of advanced developing countries (BASIC). However the economic relevance of this group of countries and its relevance for the development of global emissions clearly represent a strong middle power coalition with the potential to play decisive role in the negotiating process. In fact, the final negotiation of Copenhagen Accord brought together the heads of state of the US and the BASIC which shunning the EU. However India managed to play as its dominant role as its Chinese partners were not prepared for the last discussion on heads of state (Katharina and Michaelowa, 2011). As a result they left the negotiating table when the relevant part of the negotiation actually started. India on the other hand, negotiated actively and quite successfully at this stage and was largely recognized as significant actor with its contribution in Copenhagen Accord and reflected its core position, although it failed to bring any fruitful result regarding legally binding agreement by Annex-I countries for the period of post 2012 but with its cooperative nature it highlighted that it is a deal maker rather than deal breaker (Katharina and Mikhaelowa, 2011: 9). Thus India felt the need of some kind of flexibility in future climate negotiations. The Copenhagen outcome must be concluded on the principle of equity which recognized every citizen of the globe has an equal entitlement to the planetary atmospheric resource. With this India defend itself on per-capita ground and proclaimed that comparison in the polluting nature of economies should be based on per-capita emissions and not the basis of emissions in absolute terms. Thus India therefore, strongly relied on the principles of historical responsibility (Saha and Talwar, 2009).

Throughout the negotiations in 2010, the BASIC maintained relatively united as a group and China, India and Brazil have kept the same positions that were expressed at COP 15. There was no new announcement by any of the three countries on more ambitious mitigation commitments than those expressed at, or soon after, Copenhagen (Filho and Viola, 2010). Some of the difficulties BASIC countries faced in their coordinating position during COP-16 Cancun, which also showed that individual members of the BASIC group are willing to put one another in difficult positions to push for individual issues of importance. Thus the disagreement occurred within the BASIC countries on the issue of binding agreement in Cancun when Brazil and South Africa gave hints for acceptance of legally binding agreement and India for

the first time opened up to the possibility of accepting legally binding commitments whereas China was in shock with the changed attitude of their coordinating countries and gave no such indication to discuss on this prospect with other major emitters on mandatory emission reductions (Halliday, 2010). Thus the "statement given by Jairam Ramesh in respect to possibility of acceptance of binding agreement under an appropriate legal form divert ones attention towards the breaking with the long standing paradigm of Indian International Climate policy" (Katharina and Mikhaelowa, 2011: 9). However in Cancun agreement India, Brazil and South Africa tries to break the deadlock on environmental conflict on climate change and indicated for their acceptance on binding agreement. Thus they ready to compromise their economic national interest for the sake of humanity and environmental protection. Although India compromises with its economic national interest but it does not mean that it compromises with its vital national interest and basic foreign policy objectives which means India always ready to secure the interest of the third world as it always emphasizes to provide economic aid to least developing countries like African countries in its previous negotiations. China on the other hand till now did not agree to compromise its economic national interest as it is maintain its traditional ego-centricism and giving priority to its development rather than environmental protection and humanity. However it can be seen as compartmentalization among BASIC countries. Basically in all climate negotiations held before Cancun we have seen the division between North-South on the environmental issues but for the first time in Cancun we clearly identified the emergence of South-South division, which was partially seen in Copenhagen summit.

Thus with the above discussion it shows that developing countries are changing their attitude as they are feeling the need of better collaborative efforts with developed countries in order to fulfil their developmental goals. Throughout the negotiations developing countries maintain the similar position regarding non acceptance of binding agreement but now they feel the necessity of changing their stance towards it. India and China on the other hand trying to build their influencing image in international scenario as both are the established powers in Asia and emerging powers of world. Thus we can say that both India and China in order to fulfil their broader foreign policy objective maintaining and improving their relation with developed countries such as US.

In briefly, we can say that India and China, being the largest developing countries with a large population, with centrally planned economy have had increasing large impacts on GHGs emission. Thus both are responsible for combating the global climate change, but are also highly affected by the impacts of the same. Therefore, while maintaining the economic growth and improving living standards, the two countries have many common concerns on the way to address and mitigating the impact of climate change and various policies to undertake. India and China could mutually cooperate to strengthen their development and dissemination of low carbon coal utilization technologies. As coal is a predominant source of energy and is crucial from the energy security point of view for the two countries, they share common interest and would mutually benefit from developing low carbon technologies while continuing to rely on coal as the main energy source. In order to overcome with all these environment and energy security as well as for sustainable development problem both countries were become the party to the UNFCCC in 1997 and signed Kyoto protocol which committed countries to reduce or limit their GHGs emissions. In essence the clean development mechanism one of the flexible mechanism of Kyoto becomes a means for collaboration between developed and developing countries. However initially their position was sceptical towards CDM but their stance was changed over a period of time. India and China are today taking more advantage of Kyoto protocol. Till recently India is the leading CDM country in the world in terms of registered CDM projects. Now China has taken lead in terms of number projects as well as GHGs reduction realized through these projects in terms of CERs.

However China and India differ in their approaches towards sustainable development but they have similar policy emphasis in terms of technology transfer and foreign investment. The achievement of the two countries to address socio-economic issues indicates their strength and weaknesses. Addressing climate change and enhancing environmental protection are challenges that India and China will inevitably face on their path to development. A collaborative initiative in this regard could focus on synergies between measures addressing climate change and environmental protection, respectively, in India and China. The economic and security dimensions of the international system have an impact on decisive environmental dimensions particularly the climate and it is necessary to take them into account in any realistic analysis on the future of international negotiations.

CONCLUSION

This chapter is divided in three main sections. First section will attempt to lay down the conclusion in the form of the main findings of this research work. The second section deals with the theoretical aspect of India and China position in world politics in respect of climate change negotiations and the last section will give substantive conclusion in the form of lessons for both India and China with regard to their contemporary CDM policies. The research work began with an aim to analyze the Indian and Chinese policies on CDM in a comparative manner and the potential impact of CDM on both countries. The main question that I tried to answer whether the CDM policies of India and China diverged or converged in international climate negotiation and how have policies of these countries (India and China) changed in this context, and is this convergence permanent. By investigating their policies research will also try to verify whether this policy instrument actually holds what it promises in terms of setting incentives for a more sustainable path. Based on the theoretical and empirical background of chapter two, three and four, this chapter will present theoretical and substantive conclusion.

Subsequent Differences between Indian and Chinese CDM Policy

Today in the era of free competitive market economy every country started looking forward to their economic imperatives. For the fulfilment of their economic interest they continuously challenge the environment which resulted into global warming. In order to prevent the risks and future social and economic impacts that associated with global warming are the strong motivating factor for reducing the intensity of economic development. Both India and China are the two fastest growing economies of the world, whose energy consumption level and GHGs emission are continuously increasing but are below average on the international level. Although there are differences between China and India in the areas of environment, natural resource endowments, socio-economic attributes, political system, and cultural traditions hence they faces the challenges, which are many times similar if not same in nature, with regard to several environmental and developmental issues. At present, ensuring the sustainable use of natural resources during rapid socio-economic development poses a big challenge for the two countries. With the developmental rise of two countries, the implications of the issues confronted by them internally would

be felt by the world at large. Thus in order to prevent their developmental and environmental goals both India and China adopted CDM the one of the mechanism of Kyoto protocol. CDM is an effort that has been developed by UNFCCC to combat climate change without harming the economic and social interest of developing countries on the one hand and reducing GHGs used by developed and developing countries on the other hand. Thus CDM is framed in such a manner that it will benefit both developed as well as developing countries. It benefitted developed countries for reducing emissions and helps to invest in project market of developing countries and on the other side it provides funds and technology assistance to developing countries as they trade their CERs to developed countries. However India and China were initially sceptical about the additionality of CDM but now they realized the greater opportunity that CDM could provide and sees it an effective instrument to achieve sustainable development and environment protection. Though, both countries have the similar priority areas such as poverty eradication, energy security, electricity access and growing their economy while reducing GHGs without harming their developmental need.

India and China has more or less similar objective that is development and to reach that goal both have adopted the CDM but they are differ in their policy framework on CDM for example Indian projects are unilateral and smaller in size whereas Chinese projects are larger and bilateral in nature. Secondly, Indian CDM authority is limited to the approval and verification of sustainability criteria of projects and its government is highly fragmented and lacks in dealing with CDM projects whereas Chinese government working very hard to gain maximum benefits of financial and technological aid that is why it is developing maximum projects with the collaboration of their local government. Thirdly, Indian advanced Southern states are more concerned and active in developing CDM projects whereas China spreading it almost in the every part of its country mostly in remote areas. Fourthly, China sees CDM as business opportunity and making every effort to generate maximum project whereas Indian government not too much bothered about it. Fifthly, China prescribes specific priority areas such as energy efficiency, development of renewable energy and methane recovery etc whereas India does not have such kind of priorities. Fifthly, Indian projects are more contributed to infrastructural development therefore it wants financial aid and adopted the open policy towards foreign investment in carbon market whereas China prevent the foreign companies to acquire majority control in

Chinese projects therefore it allowed those CDM projects which are 51% Chinese owned. Sixthly, Chinese entrepreneurs are low risk oriented whereas no such indication is given by entrepreneurs of India; the project developers implement the project by bearing the transaction costs of CDM and taking all the risks of projects. Seventhly, Chinese by giving importance to their specific priorities has been effective in lowering transaction costs which reflects better prospects for technology transfer and more CER funds for achieving broader sustainable goals. By contrast India has followed a project by project approach which results into greater project diversity with higher costs. Thus we can say that Chinese DNA is more effective than India. Above discussion proves that there are consequent differences between Indian and Chinese policies on CDM.

Substantial Factors that influenced the Implementation process of CDM policy in India and China

China has one party communist government and India is the largest democracy with federal and multi-party system. India is a pluralist society and our constitution provides freedom of speech as fundamental right to all, therefore people can influence the policies of India because they have differed in their interest so that implementation of any policy taking more time here whereas in China people do not have similar right as Indian has, they could not easily influenced the policies of its government. In respect to economy, India is democratic welfare state with mixed economy, although after 1990s due to economic reform programme its private sectors are more effective than public sectors and Indian state has less control or regularized its economy whereas in China market socialism exist with communist system, although there is competitive market system but state still controls and regulates its economy. In respect to social standard poverty, low primary education, high infant mortality, high malnutrition, and low life expectancy are high in India as compared to China. India is also facing internal disturbance like naxalism, regionalism, trans-border terrorism, caste based problems and high corruption etc in its social and political life while these problems are not so much inherited in the case of China. It means China is much more forward in its nation building process than India. Wholly we can say that the domestic, socio-economic and political condition of every country influence its policy formulation process. Thus same happened in the case of China and India. As a result China who lagged behind initially in CDM project approval and

formulation process is now leading to India which is a result of its domestic and socio- economic and political condition. With this respect my second hypothesis also proves correct that the differences in CDM policies of India and China are the consequence of differing domestic, socio-economic and political imperatives.

Changing Scenario of Climate Negotiation in International Politics

This section deals with the theoretical aspect of Indian and Chinese position in international politics of climate change and their changing position in this context. After the disintegration of Soviet Union neo-liberal ideology become influential in world politics. Fukuyama (1992) saw it as a victory of neo-liberalism. As a result of which countries are looking forward to geo-economic interest rather than geo-political. Thus we can say that the basic presumption of countries behind environmental negotiation is to fulfil their economic interest. For example through CDM both the developing and developed countries get benefits. Developing countries like China and India achieving financial and technical assistance while developed countries by trading CERs trying to sustain their economic growth. So, the policies like CDM create the economic interdependency among states. According to Keohane and Nye (2001) complex interdependency is beneficial for every nation thus it minimizes the struggle among the nations. Hence we can say that CDM is based on non-zero sum game where the gain of one country is not the loss of others. Some or the other way it somewhere related to countries national interest. As we see that countries are started collaborating with each other in respect of their economic interest which is a part of their national interest and on the other hand countries cooperating with each other in international climate negotiation but not on the cost of their vital national interest. As a result of which some climate negotiation failed to bring any fruitful result for example US quit the Kyoto protocol in 2001 and more recently Canada quit the same in 2011 in order to fulfil its national interest like China and US. However we can say that national interest are paramount in international politics which even bring disagreement among BASIC countries on the issue of binding commitment at Cancun summit.

In respect to India and China, both are emerging economies in the world and established power in Asia. Both have similar perspective on CDM that is to gain maximum benefit from it. In international climate negotiation both refused to accept the binding agreement as their overriding goal is to maximize their national interest.

Hence we see that both are converged on the issue of development but the means of fulfilling their national interest of both countries are different. Both countries want to balance each other power in Asia and with this purpose both wanted to establish their relation with US. If we see the Asian dynamics of power we found that it bends towards China and India want to counter balance it. In Cancun summit India was more cooperative and changed its traditional attitude towards binding commitment in order to gain support of US, Brazil and South Africa. Both the countries are heavily relied on energy for their economic growth but they have limited sources to obtain it in their own country that is why they imported it from other countries and for this purpose they are competing with each other not only in the Asia but also in the Africa. Hence we can say that the policy of the two countries diverged on the issue of energy and power accumulation in international climate change negotiations. Thus India constructively engaged in climate change negotiations and focus into the wider foreign policy objectives. One of the important aspect I found in international climate negotiation is that China was more aggressive than India as it left the Copenhagen summit in between as well as in Cancun summit it was not agreed with the BASIC countries on the issue of legally binding commitment and not even discussed on this prospects in the entire Cancun summit. Hence we see that both the countries in order to achieve their foreign policy objectives and to secure their national interest competing with each other with diverged policies.

In concluding remarks we can say that CDM is a good means to prevent environmental pollution if it can be used rationally. CDM can open the path for constructive North-South cooperation and negotiation. South countries must build a collaborative platform for the development of CDM projects in order to gain multiple benefits from it. Carbon footprint must be calculated on the per-capita basis because the consumption level of small population of developed countries is very high and to fulfil their consumption need of small population they exploit maximum the environment whereas developing countries exploit the environment just to fulfil the basic needs of its huge population which is even less as compare to developed countries. Thus it can be right to said that Indian stand on per-capita emission is justifiable which is in the favour of qualitative measurement of carbon emission. On the other hand we see that developed and developing countries did not come up with any effective result in all climate change negotiation as both struggling with each

other in order to gain maximum benefits. Hence Waltz (1979) is right in its structural dimension, which focuses on the anarchist nature of international system in the absence of any central regulatory power that is why nation state constantly struggling with each other. Thus there is a need for an apex body which will be democratic in nature in order to come up with fruitful decision regarding climate change. At last I come to the conclusion that in this era of globalization, maintenance of economic growth is compulsion of nations but it should not be at the cost of environmental destruction. In this regard, means like CDM will establish the conciliation between development and environmental protection and given the way for sustainable development.

REFERENCES

(*indicates primary source)

"A New Beginning", *The Hindu*, Opinion/Editorial, New Delhi, 13 December 2010.

Abele, C (2005), '*CDM Market Brief – P.R. China*', DEG and bfai, [Online: web] Accessed 14 November 2011, URL: http://www.jiko-bmu.de/files/english/application/pdf/cdm-markt-china-english.pdf

Agarwal, A (2001), "Pact Politics: Down to Earth", Vol. Issue: 20010731. [Online: web] Accessed 20 November 2011, URL: http://www.indiaenvironmentportal.org.in/opinion/pact-politics.

Alex, Boren (2008), "CDM Market Brief: India", DEG Deutsche Investitions Bfai, [Online: web] Accessed on 20 November 2011, URL: http://www.kyoto-coaching-cologne.net/publikationen/CDM%20Indien%20Endversion-englisch.pdf.

Andrews, Philip (2004), *Energy policy and regulation in the people republic of China*, The Hague: Kluwer Law International

Angang, Hu (2006), "Green Development: the inevitable choice for China (Part one)", China dialogue, [Online: web] Accessed on 10 March 2012, URL: www.chinadialogue.net/article/show/single/en/134.

Atteridge, Aaran (2010), "Shifting Sands: India's New Approach to the Politics of Climate Change", *Policy Brief*, published by Stockholm Environment Institute, Sweden.

"At G-8: India will rebuff pressure to cut emissions", 7 June 2007, The Times of India, Europe, [Online: web] Accessed on 11 November 2011, URL: www.articles.timesofindia.indiatimes.com/2007-06-07/europe/27994715_1_climate-change-binding-targets-greenhouse-gas-emissions.

Austin, et al. (1999), "How much Sustainable Development Can We Expect From The Clean Development Mechanism?", World Resource Institute Climate Notes, Printed on Recycled Paper, Washington DC.

Bang, Guri et al. (2005), "*Shifting Strategies in the Global Climate Negotiations,* Joint Report by FNI and CICERO, FNI Report 6/2005/CICERO Report 2005:08, Lysaker Oslo.

Baumert et al. (2000), "Designing the Clean Development Mechanism to meet the Needs of a Broad Range of Interests", World Resource Institute, Climate Energy & Pollution Program.

Berger, Gerald and Gjoski Nisida (2009), "Sustainable development strategy beyond Europe", *ESDN Quarterly Reports*, European Sustainable Development Network.

Bhardwaj, Asmita (2002), *Responses in India towards the CDM*, Masters Thesis, Urban Affairs and Planning, Virginia Polytechnic Institute.

Bjorkum, Ida (2005), "China in the International Politics of Climate Change: A Foreign Policy Analysis", *The Fridtjof Nancen Institute,* FNI report 12/2005.

Boyd, Emily et al. (2007), "The Clean Development Mechanism: An assessment of current practice and future approaches for policy", Working Paper 114, Environmental Change Institute Oxford, Tyndall Centre for Climate Change Research UK.

Buchner, B.K. (2008), "*CDM* – A Policy To Foster Sustainable Development?", in C. Clini et al. (eds.), *Sustainable Development and Environmental Management : Experiences and Case Studies*, Springer 2008: 317-331.

Buxton, Leonard, H (1988), 'China: The Land and the People', W.H. Smith Publications, New York: Gallery Books.

CAEP-TERI (2011), *Environment and Development: China and India*, Joint Study by the Chinese Academy for Environmental Planning (CAEP) and The Energy and Resources Institute (TERI), Commissioned by CCICED and ICSD, New Delhi: TERI Press.

CDM Newsletter (2006), Fourth Issue, [Online: web] Accessed on 5 April 2012, URL: http://www.helio-international.org/Newsletter_December.pdf

Chhabara, Rajesh (2008), "From Politics to business: Technology Transfer to Asia", *ClimateChangeCorp.Climate news for Business*, 8 December 2008.

Chatterjee, Kalipada (2003), "COP 9 and Beyond: Developing Countries Perspectives", *Climate Change Special*, Vol.13, No. 11.

Chayes, Abram and Kim Charlotte (1998), "China and the United Nations Framework Convention on Climate Change" in M. B. Elory, C. P. Nielson and Peter Lydon (eds.) *Energing China: Reconciling Environmental Protection and Economic Growth.* Newton, MA: Harvard University Press, 503-540.

China Briefing Magazine and Daily News Service (2011), "China Revises Measures on CDM Projects", *China Briefing Magazine and Daily News Service*, 28 September 2011, [Online: web] Accessed on 3 February 2012, URL: http://www.china-briefing.com/news/2011/09/28/china-revises-measures-on-clean-development-mechanism-projects.html.

China Daily News (2007), "China has Bigger Role to Play in Carbon Trading", 14 Nov. 2007, [Online: web] accessed on 10 April 2012, URL: www.china.ORG.CN/english/environment/231869.htm

Clemencon, Raymond (2008), "The Bali Road map: a first step on the difficult journey to a post- Kyoto Protocol Agreement", *The Journal of Environment and Development* 17: 70-94.

*Climate Change Centre of India (2011), "CDM Can Catalyse Sustainable Development Process in India" [Online: web] Accessed on 5 November 2011, URL: www.climatechangecentre.net/pdf/SDprocess.pdf

"Climate Talks: Wrong to blame India for Deadlock", *The Hindu*, New Delhi, 23 September 2009.

Dasgupta, Chanchal (1994), The Climate Change Negotiation in Minzter I M and Leonard J A eds. *"Negotiating the Rio Convention: the inside Story of Rio Convention"*, Stockholm Environment Institute, Cambridge University Press, Cambridge.

*Department of Climate Change (2005), "Measures for operation and Management of Clean Development Mechanism Projects in China", National Development and Reform Commission, China, [Online: web] Accessed on 5 April 2012, URL: http://cdm.ccchina.gov.cn/english/newsinfo.asp?NewsId=905.

Dechezlepretre A, Glachant, M & M Yann. (2008), "The Clean Development Mechanism and the international diffusion of technologies: an empirical study" *Energy policy*, Elsevier, Vol. 36 (4): 1273-1283.

D'Monte, Leslie (2009), "Carbon Credits offer us a Rs 28,000-cr opportunity", 11 December 2009, New Delhi, Business Standard, [Online: web] Accessed on 4 April 2012, URL: www.business-standard.com/india/news/carbon-credits-offer-usrs-28000-cr-opportunity/379231/

*Dr. Hausmann (2008), 'CDM in China: Opportunities for Sino-German Cooperation', Speech 6 December 2008, [Online: web] Accessed on 4 January 2012, URL: http://china.ahk.de/mar/...cdm-in-china/welcome/speech

*Earth Negotiations Bulletin (1995), '*Summary of the First Conference of the Parties to the UN Framework Convention on Climate Change'*, 12(21).

*Earth Negotiation Bulletin (1996), '*Summary of the Second Conference of the Parties to the UN Framework Convention on Climate Change'*, Vol. 12, No. 38.

*Earth Negotiation Bulletin (1998), '*Summary of the Fourth Conference of the Parties to the UN Framework Convention on Climate Change'*, Vol. 12, No. 231.

*Earth Negotiation Bulletin (2003), *'Summary of the Ninth Conference of the Parties to the UN Framework Convention on Climate Change'*, 12(31).

*EIA (2005), *International Energy Outlook 2005*, Energy Information Admintration, U.S Department of Energy, 2005, [Online: web] Accessed on 15 April 2012, URL: www.eia.doe.gov/oiaf/ieo/index.html. and ftp://tonto.eia.doe.gov/forcasting/0484(2005).pdf

Economic Intelligence Unit (EIU) (2008), "The World in Figures: Countries", *Economic Intelligence Unit*, The World in 2008, 105-114.

Fejes, Jonas (2009), 'EU-China CDM Facilitation Project', Stochholm Beijing, [Online: Web] Accessed on 15 May 2012, Available at www.ivl.se/download/18.3175b46c133e617730d80007636/A1915.pdf

Fenhann, Jorgan (2005), "Status and Analysis of the Current CDM Portfolio", Carbon Market Update, Issue No. 1, UNEP, IETA, URC, May 2005.

Filho, Eduardo and H. M. Viola, (2011), "China, India and Brazil: a Bloc or individual countries making efforts to combat Climate Change", *Routledge*, Taylor and Francis Group.

Figueres, C and K. Newcombe (2007), "Evolution of the CDM: towards 2012 and Beyond", Sage Publications.

Fischer, C (2005), "Project-Based mechanisms for emissions reductions: balancing trade-offs with baseline", *Energy Policy*, 33: 1807-1823.

Fuhr, Harald and Markus, Lederer (2009), "Varieties of Carbon Governance in Newly Industrializing Countries", *Journal of Environment Development*, Sage Publications.

Fukuyama, F. (1992), *The end of history and the last men*, University of Michigan: Free Press.

Ganapati, Sukumar and L. Linguang (2009), "Sustainable Development in the Clean Development Mechanism: role of a Designated National Agency in China and India", *Journal of Environment and Planning Management,* 52(1): 43-60.

Ghosh, Soumitra and Subrat kumar Sahu (2011), "The Indian CDM subsidizing and legitimizing corporate pollution: An overview of CDM in India with case studies from various sectors", Sasanka Dev publications DISHA, Kolkata.

*Government of China (2011), "China Basic Position in International Climate Change Negotiation", [Online: web] Accessed on 5 April 2012, URL: http://www.china.org.cn/government/whitepaper/2011-11/22/content_23977422.htm

*Government of China (2007), "China's National Climate Change Programme", National Development Reform Commission, People Republic of China, [Online:

Web] Accessed on 15 April 2012, URL: www.ccchina.gov.cn/Website/CCChina/UpFile/File188.pdf.

*Government of China (2008), "White Paper: China's Policies and Actions on Climate Change", [Online: web] Accessed on 5 April 2012, URL: http://www.china.org.cn/government/news/2008-10/29/content_16681689.htm.

*Government of India (2003), "Operationalising CDM in India", Planning Commission, Govt. of India.

*Government of India (2008), "PM's Statement on Sustainable development", Press Information Bureau, Govt. of India, 25 October 2008, RCJ/SH/LV, Released ID: 44241, [Online: web] Accessed on 25 November 2011, URL: www.pib.nic.in/newsite/erelease.aspx?relid=44241

Gupta, Shreekant (2003), "Implementing Kyoto-type flexibility mechanisms for India: Issues and prospects", [Online: web] Accessed 15 November 2011, URL: http://ccsindia.org/ccsindia/policy/enviro/articles/sg_cde_working_paper.pdf.

Gupta, Shreekant (2003), "India, CDM and Kyoto Protocol", *Economic and Political Weekly*, 38(41): 4292-4298.

Haites, E and F. Yamin (2004), "Overview of the Kyoto Mechanism", *Review for Environmental Strategies*, 5(1): 199-216.

Hallding, K. et al. (2010), "Together Alone: Brazil, South Africa, India, China (BASIC) and the Climate Change Conundrum", Stockholm Environment Institute.

Huang, Yasheng and Tarun, Khanna (2003), 'Can India Overtake China?' *Foriegn Policy*, 137: 74-81

Hatch, Michel (2003), 'Chinese Politics, Energy Policy, and the International Climate Change Negotiations' in Harris, P.G. (ed.) *Global Warming and East Asia: the Domestic and International Politics of Climate Change.* London and New York: Routledge. Pp 43-65.

Haya, B (2007), "Failed Mechanism: how the CDM is subsidizing hydro developers and harming the Kyoto Protocol", *International Rivers*, Berkeley.

Heggelund, Gorrild (2007), "China's Climate Change Policy: Domestic and International Developments", *Asian Perspective,* Vol. 31, No. 2, P.P-115-191.

Huang Y and Khanna T (2003), 'Can India Overtake China?' *Foriegn Policy*, 137: 74-81.

*IGES (2011), "Market Mechanisms Country Fact Sheet: People's Republic of China", [Online: Web] Accessed on 5 April 2012, URL: http://enviroscope.iges.or.jp/modules/envirolib/upload/984/attach/china_final.pdf.

*IGES (2010), "Towards CDM reform: Report of the IGES CDM capacity building Kyoto to General Meeting", [Online: web] Accessed on 5 April 2012, URL: http://enviroscope.iges.or.jp/modules/envirolib/upload/2798/attach/towards_cdm_reform.pdf

Indian Economic Survey (2011), New Vishal Learning Media, New Delhi.

"India against binding part on emission cuts: Jayanthi Natarajan", *Environmental News*, 28 December 2011.

International Energy Agency Statistics Division (2006), *CO2 Emission from Fuel Combustion (2006 ed.)*, Paris: IEA.

*IPCC (1998), *The Regional Impacts of Climate Change: An Assesment of Vulnerability, A Special Report of Intergovernmental Panel on Climate Change,* Working Group II, Cambridge University Press, UK.

*IPCC (2001), *'Impacts, Adaptation and Vulnerability*', IPCC Third Assessment Report, [Online: web] Accessed 15 November 2011, URL: www.grida.no/climate/ipcc_tar/wg2/index.htm

Jakobson, Linda (2009), "China", in Korppoo Anna et al. *Towards a new Climate Regime?: Views of China, India, Japan, Russia, United States on the road to Copenhagen*, Finnish Institute of International Affairs Report 19/2009.

Jiang, Liu (2005), Speech made by Mr. Liu Jiang, Deputy Director of the National Development and Reform Commission, at the High Level Forum for the "Celebration of the Entry into Force of the Kyoto Protocol", 16 February 2005, Beijing, China. [Online: web] Accessed on 7 January 2012, URL: www.ccchina.gov.cn/english/source/aa/aa2005021702.htm.

Katharina and Mikhaelowa, Alex (2011), "India in the International Climate Negotiations: From traditional nay sayer to dynamic broker", CIS Working Paper Nr. 70, Published by the Centre for Comparative and International Studies , ETH Zurich, University of Zurich.

Waltz. K. N. (1979), *Theory of International Politics*, New York: McGraw-Hill.

Keohane, O. R and J. Nye. (2001), *Power and Interdependence*, 3rd ed., United States: Library of Congress Cataloging in Publication Data.

Korppoo, Anna et al. (2009), "Towards a new Climate Regime?: Views of China, India, Japan, Russia, United States on the road to Copenhagen", *The Finnish Institute of International Affairs*, FNI report: 2009.

Lee, M. K. (2004), CDM Information and Guidebook, UNEP Risoe Centre: Roskilde, Denmark, [Online: web] Accessed 15 November 2011, URL: http://cd4cdm.org/Publications/cdm%20guideline%202nd%20edition.pdf

Lewis, J. (2007-08), "China's Strategic Priorities in International Climate Change Negotiations", *The Washington Quarterly,* Vol. 31, No. 1, Winter 2007-08, pp. 155-174.

Liu, Linguang (2006), *Clean Development Mechanism in China: Seeking Synergies to Achieve Sustainable Development,* Masters Thesis: Roskilde University.

Liu, Jiang (2005), Speech on 'The Challenge of Climate Change and China's response Strategy', [Online: web] Accessed 15 November 2011, URL: http://www.ccchina.gov.cn/en/NewsInfo.asp?NewsId=5348

Liu. W, G. Heggelund, Tangen and L. Feng. (2004), "*Efficient Implementation of CDM in China*", Joint Project Report of Energy Industries Association (TERI), The China Renewable Energy Industries Association (CREIA) and Fridtjf Nancen Institute (FNI), Lysaker and Beijing.

Lutken, Soren (2010), "A Grand Chinese Climate Scheme", Riso DTU Climate Paper Series, No. 1, Nov 2010.

Mathur, Ajay (2010), "India Review", Vol.6, Issue 1, A Publication of the Embassy of India, Washington, D.C., www.Indianembassy.org/India_Review/2010/Jan%202010pdf.

Michaelowa, Alex (2003), "CDM host country institution building", Published in Mitigation and Adaptation Strategies for Global Change, pp.201-220.

*Ministry of Commerce (2006), 'Measures Governing the foreign Acquisition of Domestic Enterprises', Chinese Ministry of Commerce, Government of China.

*Ministry of Environment (2005), "CDM Country Guide for China", Ministry of Environment Japan, Institute for Global Environmental Strategies (IGES), Chinese Renewable Energy Industries Association (CREIA), Ist edition, Electronic edition publication.

Morisette, P.M. (1996), "Climate Treaty Creates Atmosphere of Reform", *Forum for Applied Research and Public Policy*, Vol. 11, Issue 2, Knoxville.

Morgenstern et al. (2002), "Demonstrating Emission Trading in Taiwan, China, Resources", *Summer 2002,* Issue 148.

Nelson (2009), "Manmohan Singh Blames West for India's Climate Change Problems", [Online: Web] Accessed on 15 April 2012, Available at http://wwwtelegraph.co.uk/news/worldnews/asia/india/5768824/manmohan_singh_blames_west_for_India's_climate_change_problems.html.

Newell, Peter and Matthew, Patterson (2010), *"Climate Capitalism: Global Warming and the Transformation of the Global Economy*", Cambridge: Cambridge University Press.

*The Ministry of Environment and Forests, (2007), *'Newsletter , From The President Desk'* Government of India, New Delhi: National Solid Waste Association of India.

*OECD (1997), 'Applying Market Based Instruments to Environmental Policies in China and OECD Countries', OECD, Paris, 1997.

Ojner, Joseph (2006), "The Implementation of CDM in China: Looking towards a Greener Future", Department of Economics, Lund University.

Pachauri, Rajendra (2003), '*Global Climate Change : Indian perspectives restated and revisited',* In India and the Global Climate Change: perspectives on Economics and policy from a developing country, Toman MA, Chakravorty U, Gupta S (eds). *Resources for the future*: Washington, D.C.

Pachauri, P.K and P.K. Batra (2001), *Green India 2047 Directions Innovations and Strategies for Harnessing Actions for Sustainable Development,* Innovative Designers and Printers.

Parikh, Jyoti K and Parikh, Kirti (2002), "Climate Change: India's Perception, Positions, Policies and Possibilities", Climate change and development, OECD.

Paterson, Matthew (1996), *Global Warming and Global Politics*, Routledge, London.

Pew Centre (2006), 'COP-12 Summary', [Online: web] Accessed on 5 February 2012, URL: www.pewclimate.org/what_s_being_done/in_the_world/cop12/summary.cfm

*Planning Commission (2005), "Draft report of the experts committee on Integrated Energy Policy", Planning Commission, Govt. of India.

Positive Climate Care Report (2003), '*CDM-Basics'*, [Online: Web] Accessed On 15 October 2011, URL: www.positiveclimatecare.com.

*"PM's Statement on Sustainable development at the ASEM Summit", 25 October 2008, [Online: web] Accessed on 25 November 2011, URL: www.pmindia.nic.in/speech-details.php?nodeid=715.

*Prasad, H.A.C and J. J Koccher (2009), "Climate Change and India-Some major Issues and Policy Implications", Department of Economic Affairs, Minstry of Finance, Govt. of India, Working paper No. 2/2009- DEA.

Qian, Y. and J. Bin. (2011), "Clean Development Mechanism Cooperation in China", *Sci Res Journal,* LCE, www.sciRP.org/journal/Ice

Rajamani, Lavanya (2009), 'India and Climate Change: What India Wants, Needs and Needs to do', *India Review*, 8(3): 340-374.

Rajan, G. K. (1997), "*Global Environmental Politics: India and North-South Politics of Global Environmental Issues"*, Oxford University Press, Delhi.

"Ramesh calls for legally binding commitments" *The Hindu*, New Delhi, 10 December 2010.

Rana, Neelam et al. (2009), "Mitigation and Adaptation Information Network for Sustainable Communities: Climate Change Mitigation in India", UNEP/GRID-Arendal, Development Alternatives.

Rana, A and P. R. Shukla (1995), '*Macroeconomic models for long term Energy and Planning Commission'*, Urban Solid Waste Management in India, report of high power committee, Govt. of India.

Repetto, Raymond (2009), "Win-Win Climate Negotiations", United Nation Foundation.

Richards, M (2001), *Working Paper: A Review of the effectiveness of developing country participation in the climate change convention negotiations*, Overseas Development Institute, London.

Saha, A. and K. Talwar (2010), "India's Response to Climate Change: The 2009 Copenhagen Summit and Beyond", *NUJS LAW Review*

*Sahu, P. (2007), Government of India, Ministry of Environment and Forest, *Newsletter of Urban Municipal Solid Waste Management,* Seventh Issue, February 2007, Reg No. BOM. 137/1996 GBBSD.

Ghosh, Soumitra and Subrat Kumar Sahu (2011), "The Indian CDM: Subsidizing and Legitimizing Corporate Pollution: An Overview of CDM in India with Case Studies from Various Sectors", Sasanka Development Publication, DISHA.

Sathaye, J. et al. (2001), *Barriers, Opportunities, and Market Potential of Technologies and Practices, in Climate Change 2001: Mitigation*. Contributed Paper of Working Group III to the Third Assesment Report of the Intergovernmental Panel. Hohenheim, Stuttgart, April 2012.

Scholz, Imme (2008), "Climate change: China and India as contributors to problems and solutions", paper prepared for workshop, 'Asian Drivers of Global Change: Challenges for Europe', Institute of Development studies

Sengupta, Sandeep (2010), "Climate Change and India's National Strategy", [Online: web] Accessed on 5 January 2012, URL: www.idsa.in/nationalstrategy/eventDec10/P_SSengupta.ppt.

Sengupta, Sandeep (2012), "Lessons from the Durban Conference", *The Hindu*, 14 February 2012.

Seres, S. (2007), "Analysis of Technology Transfer in CDM Projects", Report prepared for the UNFCCC, Registration and Issuance Unit CDM/SDM, [Online: web]

Accessed on 8 January 2012, URL: http://cdm.unfccc.int/Reference/Reports/TTreport/TTrep08.pdf.

Sepibus, J. De. (2009), "The environmental integrity of the CDM mechanism-A legal analysis of its institutional and procedural shortcomings", Working Paper No 2009/24, NCCR Trade regulation, Swiss national centre of competence in research.

Seroka, L (2009), *International Successes in CDM implementation: Lessons for South Africa*, A research project submitted to the London Institute of Business Science, University of Pretoria.

Shiqui, (2008), "China: Facing the Challenges to link Climate Change Responses with Sustainable Development and Local Environmental Protection", *Globalization*, 5(1): 81-82.

Shukla, P.R (1996), *"The Modeling of Policy Options for Greenhouse Gas Mitigation in India"*, Vol. XXV, No.4, pp 240-248.

*Sixth Framework Programme (2009), "Technology-Oriented cooperation and strategies in India and China: Reinforcing the EU dialogue with developing countries on climate change mitigation", Electricity policy research group, United Kingdom, [Online: web] Accessed on 5 November 2011, URL: www.tocsin.ordecsys.com/uploads/docs/TOCSIN-PolicyBrief.pdf.

Slariya, M.K (2012), "Viability of CDM projects in India: A Study of Chanju CDM Project in Chamba district of Himachal Pradesh in India", contributed paper prepared for presentation at the International Scientific Conference on Sustainable Land Use and Rural Development in Mountain Areas" Hohenheim, Stuttgart, 16-18 April 2012.

Schneider, G. K. (2006), "Capacity development for the CDM: Lesson learned in Ghana, India, Indonesia, South Africa and Tunisia..", *Federal Ministry for Economic Cooperation and Development*, printed by W.B Druckerei Gmbh, Eschborn.

Stern, N. (2008), "The Economic of Climate Change", *American Economic Review,* 98: 1-37.

Streck, C. (2004), 'New Partnerships in global environmental policy: the clean development mechanism', *Journal of Environment and Development*, 13: 295-322.

*Swedish Environmental Protection Agency Report (2002), 'Kyoto and Beyond – Issues in Global Response to Climate Change', Naturvards, Verket.

*Swedish Environmental Protection Agency (2004), 'Report on Beyond Kyoto: India in a Climate Perspective', Naturvards, Verket.

Szymanski, Tauna (2002), "Clean Development Mechanism in China", *China Business Review,* Nov-Dec 2002.

Telang, Shailesh, (2008), '*CDM Project of India and China; Their Critical Analysis*', Scientist –D, Biodiversity and Climate change Division, ICFRE, Dehradun, [Online: web] Accessed on 14 November 2011, URL: http://discovershailesh.files.wordpress.com/2009/12/cdm-projects-of-india-their-critical-analysis-doc.pdf

*TERI (2003), '*TERI Energy Data Directory and Yearbok 2002-03'*, The Energy and Resource Institute, Rajkamal Electric Press.

*The National Strategy Study (2005), *CDM Implementation in India*, TERI Press [Online: web] Accessed 17 November 2011, URL: http://www.teriin.org/nss/fullreport.pdf.

*TERI (2001), "Clean Development Mechanism project opportunities in India", New Delhi: TERI Press.

Tuebel (2009), "CDM Country study China 2009", [Online: web] Accessed on 9 January 2012, URL: www.slideshare.net/tuebel/CDMCountrystudychina.

*UNFCCC E - Newsletter (2006), Fourth issue December 2006, http://cdm.unfccc.int/EB/028.

*UNFCCC (1997), "Kyoto Protocol to the United Nation Framework Convention on Climate Change" [Online: web] Accessed on 5 April 2012, URL: http://unfccc.int/resource/docs/convkp/kpeng.html.

*UNEP (2011), *Report on Climate Change Mitigation in India, Mitigation and Adaptation information network for Sustainable Communities*, UNEP, GRID-Arendal and Development Alternatives.

Umashankar. R, S. Babu and S. Roy (2009), "COP 15 COPENHAGEN: Setting a level playing field- Climate control", *Centre for Sustainability (CFS) KPO*, ITC Infotech, www.itcinfotech.com.

Vihma, Antto (2011), "India and the Global Climate Governance: Between Principles and Pragmatism" *Environment and Development Journal*, 20(10), pp. 7-20.

Vrolijk, Christiaan (2001), the Marrakech Records: Meeting Report, RIIA, 2000.

Wen, D.T (2009), "*Climate Change and China: Technology, Market and Beyond"*, Report for Focus on the Global South, Creative Commons Attribution.

Wen, Jiajun, Dale (2009), "Climate Change and China: Technology, Market and Beyond", A Report for Focus on the Global South, Occasional Paper 6, Focus on the Global South.

*World Bank (2004), '*Clean Development Mechanism in China – Taking Proactive and Sustainable Approach,* Washington, DC: World Bank.

*World Bank (2009), *World Development Indicators*, Washington D.C, USA: The World Bank.

* "World Energy Outlook (2007), "China and India Insights", [Online: web] Accessed on 19 November 2011, URL: https://www.iea.org/textbase/nppdf/free/2007/weo_2007.pdf.

World Energy Outlook (2011), "World Energy Outlook: Executive summary", International Energy Agency, [Online: web] accessed on 7 July 2012, URL: www.iea.org/Textbase/npsum/weo2011sum.pdf

Yi, Yang (2011), "Domestic Constraints and International Forces: Exploring China's Position on International Climate Change Policy", *CS Canada,* Canadian Social Science, Vol. 7, No. 6, pp. 138-147.

Zeng, Lei (2006), "Clean Development Mechanism (CDM) Policy and Implementation in China", Malardalen University Press Licentiate Theses No. 69, Printed by Arkitektkopia, Vasteras, Sweden.

Zhang, Y. and Y, Zheng. (2008), "New Development in China's Climate Policy", Dicussion paper 30, China House, University of Nottingham, U.K.

Zhang, Z.X. (2001), "An Assesment of the EU proposal for Ceiling on the Use of Kyoto Flexibility Mechanisms", *Ecological Economics,*Vol. 26, No. 1, PP 3-19.

Zhang, Zhixong (2003), "The Forces Behind China's Climate Change Policy: Interests, Soveriegnty, Prestige", in Harris, P.G. (ed.) *Global Warming and East Asia: the Domestic and International Politics of Climate Change*, London and Newyork:Routledge, PP 66-85.

Zhang, Zhongxiang (2005), "Towards an Effective Implementation of CDM Projects in China", Research program, East-West Centre, Honolulu.