

# **Sustainable Development through Clean Development Mechanism Reality or Rhetoric<sup>1</sup>**

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## **ABSTRACT**

*Clean development mechanism has been established as a strategy to curb the carbon dioxide emissions by the highly developed industrialized countries. The present study aims at analyzing the sustainability of this mechanism by comparing its benefits for developed and developing countries. It is seen that the developed countries earn about US \$ 865 by buying a certified emission reduction i.e. a ton of carbon dioxide for only US \$ 5-15. High carbon dioxide emitting countries, which are not included in the list of developed countries, such as China and India are benefited much more than other developing countries through this mechanism. So, in reality, the developing countries are benefiting very less as compared to the developed countries through this mechanism. It seems as if it is established for the further development of the developed countries at the cost of the poorer ones. Hence, the rhetoric issue of sustainable development appears deemed from the view point of overall development of poorer countries in reality.*

**Key Words:** Natural Resources, Sustainable Development, CDM, Carbon Trading

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## **Introduction**

Sustainable development is a hot issue in the current debate in the field of environmental politics. Natural resources are being exploited in such a way that people now fear for the

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possible scarcity of these resources for the future generations. After the Earth Summit in Rio de Janeiro in 1992 and adoption of the United Nation's Agenda 21, it has been recognized as a much significant issue (United Nations, 1993).

Massive industrialization in the world is exploiting natural resources and emitting a large extent of green house gases (GHGs) in the atmosphere. Due to the emission of GHGs in the atmosphere since a long time, a global change in the Earth's climate has occurred. Recent events have emphatically demonstrated growing vulnerability of humans to climate change. The impacts of climate change range from affecting agriculture, further endangering food security, sea-level rise and the accelerated erosion of coastal zones, increasing intensity of natural disasters, species extinction and the spread of vector-borne diseases. Hence, climate change is one of the most critical global challenges of the present time (UNEP, 2008).

Clean Development Mechanism (CDM) has been introduced as a strategy to curb the huge GHG emissions in the atmosphere through the adoption of Kyoto Protocol in 1997. CDM was expected to benefit both the developing and developed countries by trading carbon between these countries through practicing carbon efficient technologies in developing countries. But, the ratio of benefit to both the parties has yet to be calculated.

### **Objectives**

The objectives of this paper are as follows:

1. To analyze the sustainability of CDM
2. To compare the benefits of CDM for developed and developing countries

### **Conceptual Framework**

The framework shows an analysis of inter-relationship between natural resources and climate change in monetary terms. Over exploitation of natural resources over a long period of time by humans for their benefit has intensified climate change. As soon as the impacts of climate change were being perceived, though CDM was developed as a strategy to combat this global environmental change; it was rather to shut up the mouths of the developing countries for covering up their blunders. In CDM, carbon is traded between countries, where the sellers are developing countries and the buyers are the

developed countries. Though both the parties are believed to be benefitted through this mechanism, the benefit ratio to each party has never been quantified. So, the current study tries to analyze, though by using a basic analysis, the quantity of benefit each party gets from each transaction of a Certified Emission Reduction (CER). But, this framework does not portray the pictures on the amount of benefit each party get if carbon transaction does not occur. And, the way of utilizing the benefit obtained by the parties after transactions is not analyzed.

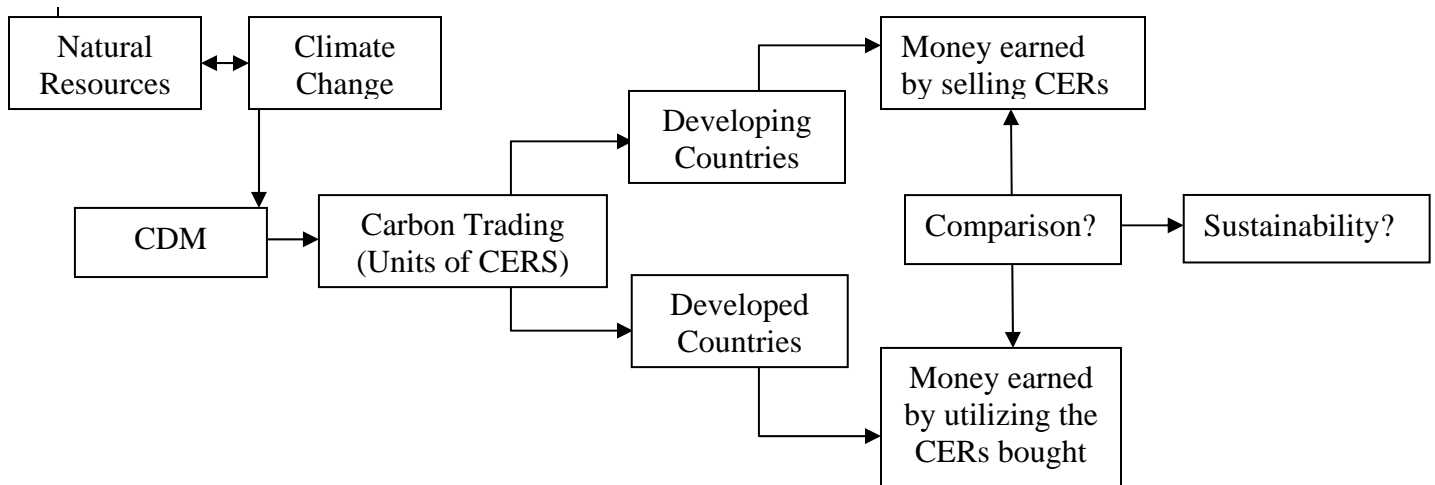


Fig 1: Conceptual Framework

## Literature Review

### Natural Resources and Sustainable Development

It is apparent that human well being depends on the services provided by natural ecosystems (Kursar et al., 2007). The high and increasing human population combined with the rapidly increasing standard of living in some parts of the world is making, and will make, ever more demands on natural resources and thus the exploitation of more natural resources (Myers and Kent, 2003). Hence, there will be severe loss or degradation of biodiversity in the future (Pauly et al., 2002; Rabalais et al., 2002 cited in Kursar et al., 2007).

Sustainable development has been given growing attention for meeting the future insufficiency of natural resources for the future developments of human beings (WCED, 1987). Following the 1992 Earth Summit in Rio de Janeiro and the adoption of the United

Nations' Agenda 21, the concept of sustainable development has become well accepted worldwide (United Nations, 1993). However, no practical definitions of sustainable development have been universally acceptable yet (Islam et al., 2003).

The Brundtland Commission first defined sustainable development as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (WCED, 1987). The other definition states that sustainable development is "a process for improving the range of opportunities that will enable individual human beings and communities to achieve their aspirations and full potential over a sustained period of time, while maintaining the resilience of economic, social and environmental systems" (Munasinghe, 1994).

### **Climate Change**

Climate change is one of the most critical global challenges of the present time. Recent events have emphatically demonstrated growing vulnerability of humans to climate change. Climate change is occurring due to uncontrolled high emission of GHGs. The impacts of climate change range from affecting agriculture, further endangering food security, sea-level rise and the accelerated erosion of coastal zones, increasing intensity of natural disasters, species extinction and the spread of vector-borne diseases (UNEP, 2008).

Studies have shown that over the last few decades, temperature of earth surface has been rising and this has caused changes in weather patterns, rise in sea level and melting of glaciers. Rapid industrialization, powered by fossil fuel over the past 200 years is the cause for dramatic rise in the amount of carbon dioxide in the atmosphere from 0.028 % to 0.036 %. Once released carbon dioxide remains in the atmosphere for about 100 years (UNEP, 2001).

In Nepal, the most prominent impact is seen on the glaciers in the Himalayas (Bajracharya et al., 2007). At present, several supra-glacial ponds are growing quickly and merging. These lakes pose a threat because in a worst-case glacial lake outburst flood (GLOF) scenario, they could cascade on to other lakes with catastrophic consequences. (Fushimi et al., 1985; Vuichard and Zimmerman, 1987 quoted in Bajracharya et al., 2007).

In response to the mitigation of alarming level of GHG emissions, the Kyoto Protocol was adopted in December 1997, and limits each Annex I country to an ‘assigned amount’ representing its target for emissions reductions, at an average of 5.2% below 1990 levels (Boyd et al., 2008). The Kyoto Protocol marks a significant recognition by the world’s political leaders of impending climate change and the role played by GHGs emitted from the burning of fossil fuels as well as from other sources. The Protocol has taken a more aggressive stance with the aim of reducing emissions below 1990 levels by 2008–2012, which requires serious efforts by developed nations to meet agreed upon targets. The Protocol enables flexible economic mechanisms: international emissions trading (IET), joint implementation (JI) and the CDM (Baranzini et al., 1998).

### **Clean Development Mechanism**

CDM is the only mechanism related to developing countries and the main objective is to help Annex I<sup>2</sup> countries to meet their quantified emission reductions obligations at lower cost while helping Non-Annex I<sup>3</sup> countries in achieving sustainable development (UNFCCC, 1997). The CDM is a market-based mechanism that induces initiatives in the developing countries to meet the challenges faced by the impending threat of climate change. The CDM became fully operational after the Kyoto Protocol entered into force on 16 February 2005 (UNFCCC, 2005).

By the same principle, under the CDM, public and private project developers can generate and sell certified emission reductions (CERs) from projects that reduce emissions in developing countries (Maraseni et al., 2007). CERs are measured in terms of CO<sub>2</sub> equivalent, 1 CER = 1 ton of CO<sub>2</sub> reduced by the CDM project activity. In February 2007, prices for CERs ranged from €5 to €12 depending on a project’s implementation status and various other factors such as project technology and project/country risks (FMENN, 2007).

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<sup>2</sup> High Carbon emitting industrialized countries

<sup>3</sup> Developing countries

## **Results and Discussion**

### **Sustainable Development and Poverty Reduction**

Yap's case study (2005) in the Philippines found CDM better in terms of their potential in alleviating poverty and in reducing carbon emissions. The case study shows the installation of 200 watts to 2 kilowatts pico-hydro systems in far-flung rural villages, which are not served by the electricity grid, is able to provide lighting for homes and village centers, and to power simple tools for livelihood activities.

Brown and Steve (2003) see that equity in the context of the new carbon economy comprises three elements: equity in access, equity and legitimacy in institutions and decision-making at all scales, and equity in outcome. But, these are much far from reality. The poorer countries, which do not have financial and human resources for dealing with CDM, do not have access to it in reality as financial investments in carbon emission reduction projects are essential to enter into the transaction. These three elements need to be addressed if instruments such as the Kyoto flexibility mechanisms can make any claim to sustainability.

Huge profits are made by the brokers in developed countries for arranging emissions-cutting projects in developing countries, which sharply contrasts with little benefit for the world's poorest nations. So, it is raising questions over whether Kyoto is fulfilling its social as well as environmental goals (Cozijnsen, 2008). Lack of technical and human resources for project identification, bundling and processing for CDM benefits in these poorer countries are major problems, which delay in getting the CDM benefits. It shows that the developed countries are helping themselves in stabilizing their economic development in the name of sustainable development of the poorer countries.

### **CDM Benefits in Nepal**

Like other developing countries, the projects in hand for Nepal are limited in number and volume. Only bio-gas and micro-hydro projects were eligible till July 2008. Biogas CDM Project is the first project of Nepal under Kyoto Protocol receiving money for reducing GHG emission, which promotes the use of biogas as a commercially viable industry in Nepal by expanding its use for cooking and lighting in rural households. It is expected that under Nepal's Biogas Support Program, about 200,000 of these plants will be

installed over 8 years. And, Nepal targets to generate revenues up to US \$ 677,500 annually till 2012 from biogas projects. Recently, Nepal environmental development has been paid the amount of US \$ 514,786 from the World Bank for Nepal's role in reducing emission of greenhouse gases through bio-gas projects (WB, 2006).

Due to the implementation of the Nepal Micro Hydro Project, more than 142,000 households in Nepal are getting long-awaited access to electricity as a result of carbon trade. It is anticipated that by 2011, 15 MW will have been installed, which will reduce GHG emissions by replacing diesel fuel used for lighting and milling (WB, 2007). This is a good indication of sustainable development.

Along with other 13 developing countries, Nepal is among the first developing countries which have been selected by the World Bank as a member of the Forest Carbon Partnership Facility (FCPF), an innovative approach to financing efforts to combat climate change, which otherwise was not considered for its importance in combating climate change. The FCPF aims at reducing deforestation and forest degradation by compensating developing countries for greenhouse gas emission reductions. The grant, which they get will help them in preparing future systems of positive incentives for Reduction in Emissions from Deforestation and Forest Degradation (REDD), in particular by establishing emissions reference levels, adopting REDD strategies, and designing monitoring systems. The partnership, approved by the World Bank Board of Executive Directors on September 25, 2007, became functionally operational on June 25, 2008 (WB, 2008).

### **Economics of Carbon Trading**

From table 1 below, it is seen in 2006-07 that the total and per capita carbon dioxide emission is highest in the case of USA, which is almost 2 and 3 times more than the developing giants China and India respectively. The main aim of the tabular analysis is to find out the earnings in US \$ per ton of CO<sub>2</sub> traded under CDM. For this, it was assumed that the total emissions are only due to the industrial sector. So, the contribution of industry sectors in GDP is calculated and the contribution of 1 CER is calculated accordingly by dividing the amount by total emissions for a country. From this method, the contribution of 1 CER for the USA is equivalent to US \$ 447, which is low as

compared to other countries. It may be due to the consumption of about 71 % fossil fuels for electricity and more use of fossil fuel in household purposes as well. And, the highest earner per CER emission among the countries taken into consideration is France, which is about US \$ 1255. The average per CER earning calculated came out to be US \$ 865.

From the economic point of view, CDM is very difficult to be called a tool of sustainable development as 1 CER is sold at the rate of US \$ 5-15 by the developing countries for making the developed countries earn about US \$ 865, almost 57 times more, from that particular CER. It means the developing countries are losing about US \$ 850 per CER. Had their industrial sector strong and efficient, they would not have to nourish such huge amount to the developed countries. It is good to make the developing countries reliant on traditional and renewable energy technologies from the view point of environment but this practice will never make them economically sound and have to stay poor for ever. So, it really seems that the North is limiting the development of the South by luring with small incentive mechanisms like CDM.

In 2001-2005, electricity generation from fossil fuel was also dominant in most of the countries. The USA led here by generating about 2.9 trillion kWh of electricity from fossil fuel. The second was China, which generated about 2.61 trillion kWh of electricity. Japan and India followed them in this race. So, it is seen that huge amount of fossil fuel is used in generating electricity, which not only exploit huge natural resource base but also results into massive CO<sub>2</sub> emission into the atmosphere. CDM alone can not control this situation as electricity generation is essential in all the countries. But, other methods such as use of alternative energy technologies, which are environment friendly, can be used for this purpose. Hence, a strong policy should globally be introduced for generating electricity from the resources other than fossil fuels. If this trend moves ahead in the similar way, it is certain that fossil fuel will vanish one day and human have to wander for searching other energy sources in a hurry.



Table 1: Contribution of CERs in GDPs in different Countries

Country	GDP (2007) (trillion US \$)*	Electricity Production (kWh) (2005)*	% of Fossil Fuel used for Electricity (2001)*	Electricity Produced from Fossil Fuel*	CO <sub>2</sub> Emissions (MT of CO <sub>2</sub> and per capita) (2006)	Contribution of Industry Sector in GDP (2007)*		Contributio n of 1 tCO <sub>2</sub> (1 CER) (US \$)	Average contribution of 1 t CO <sub>2</sub> (1 CER) (US \$)
						%	Million US \$		
USA	13.84	4.062 trillion	71.4%	2.9 trillion	6049440/20.40	20.5 %	2704419.45	447	865
Japan	4.29	1.025 trillion	60%	615 billion	1257960/9.800	26.5%	1175273.14	934	
Germany	2.81	579.4 billion	61.8%	358.07 billion	808767/9.800	29.0%	837722.71	1036	
UK	2.137	372.6 billion	73.8%	274.98 billion	587261/9.800	23.4%	555165.94	945	
France	2.047	543.6 billion	8.2%	44.58 billion	373693/6.200	21.0%	469221.48	1255	
Canada	1.266	609.6 billion	28%	170.69 billion	639000/20.0**	28.8%	364608.00	571	
China	6.991	3.256 trillion	80.2%	2.61 trillion	3523500/2.700	48.6%	3397626.00	307	
India	2.989	661.6 billion	81.7%	540.53 billion	1342000/1.20**	29.4%	878766.00	655	
Nepal	29.04 billion	2.511 billion	8.5%	0.21 billion	2400/0.2***	20%	5808.00	244	

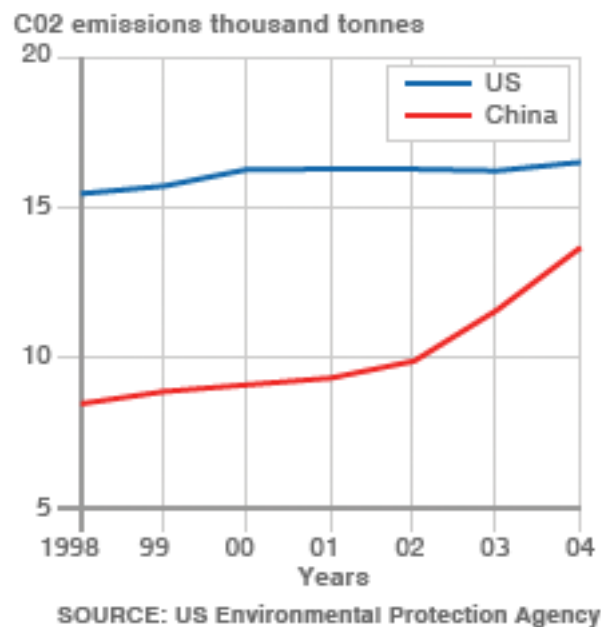
Sources: Analysis, 2008

\* The World Factbook <https://www.cia.gov/library/publications/the-world-factbook/>

\*\* Human Development Report (HDR) 2007/2008

\*\*\* World Development Report (WDR) 2007

One of the emerging nations, often called as an Asian giant, China has now been listed in the top CO<sub>2</sub> emitting countries. The trend below shows that China has massively increased its industrial growth for maintaining its double digit growth since seven years. Though it is in the level of developed nations now in terms of its economy i.e. one of the highest GDPs in the world, it is getting benefits from CDM as a developing country. Often CDM is also called the China Development Mechanism as it got almost 50% benefits from carbon trading in 2004. If such countries get most of the benefits of CDM and other least developed countries get benefits only like the spray drops, the main aim of CDM in contributing to sustainable development and poverty reduction may remain just rhetoric.



## Conclusion

Developing countries are really getting lower benefits from the carbon emission reduction strategies such as CDM. It seems that the issues that directly influence the CDM procedure in case of developing countries are not properly dealt with. Although it is established and popularized for sustainable development of poorer countries; it seems that CDM favoring highly developed countries at the cost of those poorer countries. The inferior priority of the development of the poorer countries through CDM is just the result of the vested interest of the developed countries. Instead of making a provision of selling

the carbon credits, the developing countries should be helped with necessary supports such as establishing industries, updated technology transfer, training human resources etc. so that they could use these CERs in their own country and uplift their economy and livelihoods of people. Hence, rhetoric of the issue of sustainable development appears deemed from the view point of overall development of poorer countries in reality. Now, it is the time to get all the underdeveloped countries united for equity in access, equity and legitimacy in institutions and decision making at all scales, and equity in outcome for equity in carbon economy. Then only, sustainable development as envisaged at the time of introducing Kyoto Protocol can be fully achieved with the satisfaction of all parties.

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