Promoting Sustainable Development Through Climate Change Mitigation Projects (CCMPs) In India

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1. Introduction

The Climate Change Mitigation Projects (CCMPs) have two common characteristics. One they provide carbon benefits like reducing greenhouse gas emissions and the second they provide non-carbon benefits like reducing local pollutions and improving air quality, environment and provide many other local benefits such as employment generation etc. The former benefit addresses to abatement of global warming and climate change and the later benefit addresses to sustainable development by improving the social, economic, environmental and technological well beings of the society.

2. The Climate Change Convention and the Protocol and their linkage to Sustainable Development

2.1 Climate change Convention

The **United Nations Framework Convention on Climate Change (UNFCCC)** was signed by many member nations of the UN during June 1992 at Rio during the UN Conference on Environment and Development (UNCED). The Agenda 21 was also adopted during the Conference. Although the objective of the UNFCCC as stated in the Article 2 of the Convention is to stabilise greenhouse gas (ghgs) concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, economic and social development and poverty eradication in developing countries are also central though implicit in the Convention. Since the UNCED popularly known as the Rio Summit and Agenda 21 many nations have set sustainability as the key goal of their development.

Activities Implemented Jointly (AIJ)

The first conference of the Parties (COP 1) held in April 1995 at Berlin, established a pilot phase Activities Implemented Jointly (AIJ) among developed country Parties and on a voluntary basis with developing country Parties. One of the criteria for AIJ projects that activities implemented jointly should be compatible with environment, development priorities and strategies, contribute to cost-effectiveness in achieving global benefits and could be conducted in a comprehensive manner" covering all relevant sources, sinks and reservoirs of greenhouse gases. Such a criteria clearly links sustainable development goals of the host country to the climate change mitigation projects (CCMPs).

Kyoto Protocol promotes sustainable development

In December 1997, the Third Conference of the Parties held in Kyoto, Japan (Parties refer to member nations who have ratified the Convention) adopted a Protocol to the Convention commonly referred to as the Kyoto Protocol (KP). The Kyoto Protocol includes a binding commitment on the part of the Annex I Parties (industrialized countries) to bring down their emissions of greenhouse gases (CO_2 equivalent) on an aggregate by 5.2% below their 1990 levels. This is to be achieved by the first commitment period 2008-2012. The Quantified Emissions Limitation and Reduction Commitments (QELRCs), however, are differentiated among countries. The US has committed to a 7% reduction, the European Union (EU) to 8%, Japan to 6% below their 1990 (base year) emissions.

The Kyoto Protocol also established four 'flexibility' mechanisms to enable the Annex I countries to supplement their domestic actions to fulfill their QELRC to make Climate Change mitigation actions cost effective. They are:

(i) Joint Implementation (among developed countries) (Article 6 of the Protocol).

(ii) The 'bubble' concept among the economic group such as the EU (Article 4).

(iii) Clean Development Mechanism (CDM) between Annex I and non- Annex I countries i.e. between developed and developing countries (Article 12).

(iv) Emission Trading among Annex B countries (as given in the Annex of the Protocol).

The purpose of climate change mitigation projects undertaken through the CDM is to assist developing countries in achieving - sustainable development and in contributing to the ultimate objective of the Convention and to assist industrialised countries (Annex I) in achieving compliance with their quantified emission limitation and reduction commitments under Article 3. Linking sustainable development goals with the CCMPs undertaken through CDM is mandatory and measuring progress towards sustainable development in CCMPs becomes important.

Of the four flexibility mechanisms and climate change mitigation projects outside the Kyoto Protocol, sustainable development is explicitly mentioned as a requirement only in regard to the CDM. The Protocol states"...The purpose of the clean development mechanism shall be to assist Parties not included in Annex I in achieving sustainable development.." (Article 12).

Even without language in the Kyoto Protocol relating to sustainability, however, the target sectors and technical characteristics of typical climate mitigation projects make them likely to stimulate progress toward sustainability. **The Intergovernmental Panel on Climate Change** (IPCC, 1995) examined a number of target sectors to mitigate climate change and also to promote sustainable development. For example, climate mitigation projects that improve energy efficiency are expected to provide local benefits beyond reduction of GHG emissions that include reduction of local pollution and reduced outlays for fuel that can be used for other purposes.

3. What is sustainable development ?

The concept of sustainable development was first introduced by the International Union for Conservation of Nature and Natural Resources (IUCN) in 1980. A definition of sustainable development was first given by the World Commission on Environment and Development (popularly known as Brundtland Commission) in 1987 as a development process that "meets the needs of the present without compromising the ability of the future generations to meet their own needs". The Brundtland Commission considered population control, food security and energy supply as critical components of sustainability. Since the Rio Summit in June 1992 and the adoption of Agenda 21 by the global community, many nations have set sustainability as a key goal of their development.

The concept of sustainable development is quite distinct from economic growth and recognizes the limitation of economic indicators like GNP in measuring the true well-being of nations. Instead, sustainable development accepts wider perspectives like poverty alleviation, health-care and education, and more, broadly, the social, economic, environmental and technological well-being of the society.

There have been many views on how to operationalize the definition of sustainable development. Some practitioners have defined sustainable development in terms of outcomes such as:

- alleviation of poverty
- stabilization of population
- reduction in consumption
- climate stabilization

Others view it in terms of inputs, such as development that provides for basic health care facilities. Still others see it in terms of process characteristics such as participation by stakeholders. Finally others see sustainable development as a change in the inputs to production such as transformation of the technological base to one that is cleaner and more efficient, and that conserves natural resources, reduces pollution and helps in stabilizing the climate.

According to the World Resources Institute, the four dimensions of sustainable development are social, economic, environmental technological well beings. These dimensions provide a framework in which to specify details for countries at a given stage of development.[1]

In India, development cannot be considered sustainable unless it reduces poverty. Out of India's almost one billion population, more than 360 million people are below even the most modestly reckoned poverty line. To tackle the challenges of eradicating poverty, India needs rapid economic growth. But the economic growth must not focus just on short-term gains. Destroying the natural resource base would jeopardise potential for the alleviation of poverty. For example, preserving land resources is necessary for future generations to grow food.

Measuring progress toward sustainability

Several organizations have established approaches to operationalize the term "sustainable development". Efforts to operationalize it have followed one of two approaches. One is to set goals based on realistic possibilities and then evaluate the performance of a country or community against the goal. The other is to design methodologies to assess progress toward sustainability. Measuring sustainability is not an easy task. Therefore a concept of sustainable development indicator (SDI) has been introduced to assess, measure and monitor sustainability of a process.

For measuring sustainability of a development process, a useful way is to select and organise indicators in a pressure (cause), state (linking effects), response (policy action) framework. The UN Commission on Sustainable Development identified indicators of sustainable development using a pressure-state-response framework. The resulting indicators are intended for use at the national level. The Commission brought out a list of about 130 indicators from which countries could choose a smaller set to reflect national priorities, goals and strategies. See Table 1 for an example of the pressure-state-response framework. Indian climate change mitigation projects including CDM may adopt the similar p-s-r framework for selecting / identifying SDIs.

[1] World Resources Institute. 1992. World Resources Report, 1992-93. Washington, DC.

Table 1 : Example of Pressure-State-Response Framework

Sustainability Dimension	Goal	Driving Force /Pressure Indicators	State Indicators	Response Indicators
Economic	Poverty alleviation	Inadequate means of livelihood	Poverty index	Employment generation
Social	Access to basic	Inadequate public infrastructure	Electricity consumption per capita	Off-grid electricity services
Environmental	Reduction in health effects from indoor air pollution	Inadequate access to clean cooking fuel	Morbidity from particulate concentrations	Provision of fuel with lower emissions and efficient chullas
Technological	Capacity to improve technological base	Inefficient production technologies	Energy use per unit of output	Training and investment to adopt improved technologies

The International Union for the Conservation of Nature (IUCN) assesses sustainability through a process of diagnosis, monitoring and evaluation to inform future actions. Diagnosis explains why the action is necessary; monitoring follows the progress of action; evaluation draws conclusions about both process and outcomes. IUCN has developed a tool kit to assess progress toward sustainability includes methods for assessing systems and identifying community-based indicators.[1]

In one report, WRI grouped a set of case studies and used the groupings to compare trends among them. The exercise adopted the pressure-state-response framework.[2]

Using indicators to assess progress toward sustainability

To make the term "sustainable development" more useful, practitioners and analysts have developed tools for identifying a set of measurable characteristics that can indicate a country or company's relative position with respect to sustainability at a point in time. These characteristics, called "sustainable development indicators" (SDIs), can be measured at multiple points in time to track progress toward sustainability. To use SDIs, it is necessary to select appropriate indicators, parameters, time period to collect data, and procedure for measuring overall progress. An important advantage of SDIs is that they can be aggregated or otherwise combined to measure goals that are not directly measurable.

4. Sustainable Development Indicators (SDIs) to assess progress toward sustainability

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SDIs are currently being used in several ways to measure progress toward sustainability by different types of organizations: national governments, international NGOs, industry groups, individual firms, and local NGOs.[3] In most cases, the use and reporting of SDIs is voluntary.

Private corporations

Private corporations such as Shell, Bristol-Myers and Ontario Hydro have established SDIs to assess the performance of their business units and enterprises. In some cases, the assessment is conducted for internal managers, in other cases for external audiences such shareholders, consumers, or government. Companies have sometimes initiated individual approaches for using indicators and sometimes internationally-approved approaches. Although ISO 14000 certification is not about sustainability per se, it requires a similar internal process.

National governments

[1] An Approach to Assessing Progress Towards Sustainability : Tools and Training Series, IUCN 1997.

[2] World Resources Institute. 1992. World Resources Report 1992-93 : Dimensions of Sustainable Development.

[3] For a listing of such initiatives, see Janet Ranganathan, "Sustainability Rules : Measuring Corporate Environmental and Social Performance" which can be found at the following website :
<http://www.igc.org/wri/meb/sei/state.html>

Several developing country governments, such as the Philippines, have adopted SDIs, often as part of national planning exercises. These activities have been supported by a unit of the UN through workshops and technical assistance. The United Nations Division for Sustainable Development has conducted regional and national meetings on SDIs in Bangkok and Manila, respectively. Out of these activities has emerged a source book on SDIs and a working list of indicators.[4] Some industrialized country governments have also implemented SDI initiatives. In the US, an interagency group has developed a list of SDIs.[5]

5. What are the benefits that accrue from Climate Change Mitigation Projects (CCMPs) ?

Job creation is a major local benefit from CCMPs. As a part of its poverty alleviation programme, India needs to create 65 million new jobs over the next ten years, in addition to finding jobs for the millions currently under-employed. For example, CCMPs can generate employment by increasing the availability of energy for productive uses in rural areas in addition to direct employment in providing new energy services.

Pollution reduction constitutes another key set of local benefits from CCMPs. In Delhi, for instance average concentrations of sulphur dioxide (SO_2) in the air are 15 % higher than WHO guidelines, while the suspended particulate matter is almost six times the recommended limit. The impact on human health of such a highly polluted environment is huge. World Bank[6] has brought out the air pollution health impacts for India based on study in 36 cities in India and is given in Table 2.

Annual Health Incidence and Health Costs due to Ambient Air Pollution Levels Exceeding WHO Guidelines in 36 cities (using data from 1991-92)

Health Incidence	Physical Impacts	Cost Valuation (US$ millions)	
Premature Death	40,351	$170 - 1615	Remarks
Hospital Admission, Sickness, Requiring Medical Treatment	19.800,000	$25 -30	Estimate based on $4,208 / life
Minor Sickness	1,201,300,000	$322 - 437	
Total		**$517 - 2,102**	

Resource conservation is another local benefit. If carbon sink projects are allowed under the CDM, they will have benefits beyond carbon sequestration. In particular, they will help combat land degradation, deforestation, and biodiversity loss.

Another local benefit is to free up productive resources by improving the efficiency of key sectors. In the power sector, outdated and inefficient technology, poor maintenance and some of the highest transmission and distribution losses in the world have caused huge electricity deficits in India. The peak deficit for power reached 17% in 1994 with an overall energy deficit of 7%. The economic and environmental costs of unreliable and inefficient power generation are enormous. Power shortages cost Indian industries an estimated $ 2.7 billion a year or 1.5 % of the GDP. Moreover to avoid expensive power failures, business sectors purchase expensive and highly polluting diesel back-up generators. CCMPs can help the power sector in attracting additional investment and state-of-the-art technologies.

Finally, implementation of CCMPs in India will also increase the economic viability and profitability of the business sector. The opening up of the Indian economy has brought in a lot of opportunities as well as challenges for the Indian Industry. To stay competitive in the market, industry has to concentrate on better technology, higher efficiency etc., to bring down its production cost. Indian industry could benefit from CCMPs through the transfer of environment-friendly technologies with higher efficiencies. Industrial sectors which could gain the most from the CCMPs are those with the highest GHG emissions per unit of output. These sectors are power, paper and pulp, cement, chemicals, steel, transport, agriculture and the building materials industry (brick industry). In respect of technologies, a broad array of options like :

- New projects / new technologies
- New projects / renewable technologies
- Curative projects / existing technologies

could be used

For successful implementation of these partnership projects, global experiences gained so far (from AIJ etc.) have demonstrated the key to successful partnerships is capacity building of host countries.

Project developers have incentives to make projects viable over the life of the project in order to generate CERs for them. The Climate Change Convention in the Article 4.5 has brought out that the developed country Parties shall support the

[4] See <<http://www.un.org/esa/sustdev/program.htm>>

[5] "Sustainable Development in the United States". A Progress Report Prepared by the U.S. Interagency Working Group on Sustainable Development Indicators, Washington, DC, 1998

[6] Brandon Carter and Kristen Hommann, Asia Environment Division, World Bank. "The Cost of Inaction : Valuing the Economy - Wide Cost of Environmental Degradation in India", October 1995

development and enhancement of indigenous capacities and technologies of developing country Parties. Adoption of new technologies by host countries will need **human resource development**, organisational development and institutional and legal framework development. This, in turn, is bound to promote capacity building in host country.

6. Decisions necessary for incorporating SDIs in CCMPs

In order to use SDIs for evaluating and monitoring the progress of CCMPs, several decisions will have to be made regarding how to integrate SDIs into project cycles.

Using SDIs for decision-making

SDIs are merely a tool that can be used to improve decision-making. In the context of climate mitigation projects, information about the sustainability performance of the projects would be used to make decisions regarding their design, replication, modification, or discontinuation. Such information can also be used by the Government of India to rank CDM projects and select among competing projects. The Government should decide on how to use SDIs in the CDM process, and then select the set of SDIs and establish a procedure for their application.

Selecting a set of SDIs

Lists of possible SDIs that have been created by practitioners can easily run over 100. With respect to selecting SDIs, practitioners have found the following to be desirable attributes:

- user-friendly
- simple
- robust
- a few in number

Identifying appropriate metrics

In assessing progress in achieving sustainability, a metric must be chosen to measure the status of each indicator at a given point in time. Each metric should have the following characteristics :

- It is a reliable statistical measure (e.g. fuel input requirements per unit of output)
- It can be measured in a comparable manner over time and space (e.g. concentration of surface ozone at a place - its measurement process is the same all over the world)
- Its changes can be assessed against a valid norm or standard (e.g. level of NOx against the national standard set by the Central Pollution Control Board in India)
- It is thought to have a causal relationship with identifiable social goals

In addition a concept of an environmental balance sheet may also be introduced in the SDI measurement system which can be refined from time to time. This can be used as a source of measurements of most of the indicators. This will help in reducing transaction cost for individual projects.

Incorporating SDIs into the overall CCMP cycle

The manner in which SDIs are incorporated into the project cycle depends on the nature of the cycle. For CDM projects, SDIs might become involved with this cycle at several steps including project development, review by GOI, monitoring and verification. For other CCMPs, there is more flexibility for developers to decide how to incorporate SDIs in a manner that is most useful to them. For example, the time period and frequency over which SDI metrics data are collected may be different for CDM and non-CDM projects.

Assignment of responsibility

Each organization must decide which unit should have responsibility for implementing the system of SDIs including selecting, measuring, and reporting. Functional options include the planning , accounting, public and regulatory affairs. However, top level leadership is also required for vertical and horizontal coordination.

7. Conclusion[1]

The incentives to adopt SDIs to measure sustainability in CCMPs include :

- opportunity to attract foreign investment
- prospect of low transaction costs
- ensures integrity of overall climate change mitigation process

[1] This article is based on the research paper titled “Measuring Progress Towards Sustainable Development in Indian Climate Change Mitigation projects : by Kalipada Chatterjee, Development Alternatives and Hagler Bailly Services (October, 1999)