Potential for Carbon Trading through the Raising of Host Plants of Tasar Silkworm

K. SATHYANARAYANA

Recognizing the growth potential of carbon trading, which is still in its initial days, this article explores more fully as to how the benefits of carbon trading can be linked to the tasar rearing activities that are being promoted by Pradan in the poorer regions.

Climate change is one of the most challenging environmental, economic and social issues facing the world today. Industrialization and deforestation have led to increased pollution and the emission of green house gases (GHGs), thereby bringing in change in the overall trend in climatic patterns. In the past decade (2000 to 2010), global carbon dioxide emissions have increased at an annual rate of 1.3%, equivalent to 300 MT. At the start of this decade in 2000, whereas carbon emissions were in the range of 300 to 500 million MT per year in the developing countries, it crossed the 1,600 million MT mark in the developed countries. Though GHGs can be reduced by reducing the consumption of fossil fuels, it is not practically feasible, in view of the increasing urbanization and industrialization.

India shares the global concern of climate change and is a party to various initiatives, namely, the Vienna Convention (1991), the Montreal Protocol (1992) and the United Nations Framework Convention on Climate Change—UNFCCC (1993). Besides, ratification of the Kyoto Protocol (1997) in 2002 imposes binding targets for reducing the combined GHG emission to 5.2% below the 1990 level, by 2012. This can be achieved through direct regulations, including incentives and/or obligations to reduce the net emissions of GHGs, or through indirect measures. The following three mechanisms were provided under the Kyoto Protocol to help countries or operators in developed countries to acquire GHG reduction credits or carbon emission reduction (CER) units, which are defined as the reduction of 1 MT of carbon dioxide emission into the atmosphere.

1. Joint Implementation (JI): Under this, a developed country with relatively high costs of domestic GHG reduction will set up a project in another developed country.
2. Clean Development Mechanism (CDM): Under this, a developed country can 'sponsor' a GHG-reduction project in a developing country, where the cost of the project activities is usually much lower but its atmospheric effect is globally equivalent. The developed country will be given credits

for meeting its emission reduction targets whereas the developing country will receive capital investment and clean technology or beneficial change in land use.

3. International Emissions Trading (IET): Under this, developing countries can trade in the international carbon credit market to cover their shortfall in allowances. Countries can sell surplus credit to countries with quantified emission limitation and reduction commitments under the Kyoto Protocol.

The CDM allows emission-reduction (or emission-removal) projects in developing countries to earn CER credits, each equivalent to one tonne of carbon dioxide. These CERs can be traded and sold, and used by industrialized countries to meet part of their emission-reduction targets under the Kyoto Protocol, which can stimulate sustainable development. Transactions under CDM include equity investment in projects and receiving CERs in return (bilateral), purchasing CERs through forward sale through sales agreement (weak unilateral) and purchasing CERs through on-the-spot market trade (unilateral).

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STATUS OF CDM PROJECTS

The CDM is seen by many as a trailblazer. It is the first global, environmental investment-and-credit scheme of its kind, providing a standardized emissions offset instrument, the CER. Operational since the beginning of 2006, the mechanism has already registered 1,769 projects; 4,200 CDM projects are in the pipeline through which over 290 crore CERs are expected in the first commitment period, that is, 2008–2012, of the Kyoto Protocol. Of these, India has over 400 projects to its credit.

CDM projects with over three years of operational experience have low global administration costs of below 1% and generate revenue of over $ 1.5 billion through sale of CER units at US$ 15 per unit. Whereas CDM projects are small and very often energy industries, it is estimated that those in the pipeline in 2006 would entail capital investment of US$ 25 billion. Similarly, renewable energy and energy efficiency projects registered in 2006 were expected to entail a capital investment of US$ 5.7 billion. Governments of developed countries, portfolio managers of carbon funds such as the World Bank PCF, corporate especially European companies under the EU-ETS scheme, and brokers/ speculators are the potential buyers of these CERs.

The CDM Executive Board is the regulating body that issues CERs, supported by validating and verifying bodies and national authorities. CDM projects include small-scale (less than 15 MW) and large-scale (more than 15MW) energy projects, and afforestation and reforestation projects. Not much action has been initiated as yet, however, under the CDM projects through afforestation and reforestation programmes.

Sericulture Industry and CDM: Two silk industries, namely, M/s Garden Silk Mills Ltd., Surat, Gujarat, and the Palsana industrial cluster, Gujarat, have been involved in the

small-scale (13.5 MW) natural gas-based package co-generation system for power generation and steam generation, using exhaust waste heat, CDM projects in India, with a crediting period of ten years and estimated credits of 5,86,124 units.

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Further, The Energy Resource Institute (TERI) developed a gasifier suitable for the silk reeling industry under Swiss Development Corporation (SDC)-funded SERI-2000 project, which is now commercially marketed by two manufactures. The main goal of the project was to improve productivity and profitability, and reduce the environmental impact of post-cocoon processing in the silk industry. Biomass gasifiers allow fuel savings of about 70%, representing 822 tonnes of fuel wood per year. This reduces the carbon dioxide emissions of the silk factory and decreases the pressure on the local forests. In addition, these systems also reduce the water consumption of the silk reelers. However, the above effort could not be sustained commercially for various practical reasons.

CDM and Afforestation Programmes: When agricultural land is no longer used for cultivation and allowed to revert to natural vegetation or replanted to perennial vegetation, organic carbon can accumulate in the soil. This carbon sequestration essentially reverses some of the effects responsible for the organic carbon losses from the soil when the land was converted to perennial vegetation. Though, there is a large variation in the length of time for and the rate at which carbon may accumulate in the soil, related to the productivity of the recovering vegetation, physical and biological conditions in the soil, and the past history of soil organic carbon inputs and physical disturbance, soil carbon sequestration rates will get enhanced with changes in land-use and soil management. Of the 1,769 CDM projects registered, 1,297 are energy industries and only six belong to the afforestation/reforestation category, indicating the unexplored opportunity in this sector.

Vegetation in the forests or in block plantations, raised under various developmental programmes, has the potential to earn substantially more from carbon trading, which could be a source for afforestation programmes. As result of the Bali Climate Summit, traders in the emerging European carbon market are buying carbon credits to meet new requirements for curbing GHGs. This attains national importance because the per capita availability of forest land in India is one of the lowest in the world—0.08 ha, against an average of 0.5 ha for developing countries and 0.64 ha for the world. The average annual rate of deforestation fell from about 1.3 million hectares in the 1970s to 3,39,000 ha in the 1980s and to about 1,29,000 ha during 1990–95; considering that the important objective of the National Forest Policy 1988 was to increase the forest/tree cover to 33% from the present level of 19.27%, increasing the green cover becomes priority.

The CDM project proposal should establish eligibility criterion, namely, the emission additionality (real, measurable and long-term GHG mitigation, calculated with reference to a baseline) and financial additionality (procurement of CERs should not be from the Official Development Assistance). The CDM

projects should also be oriented to improving the quality of life of the poor from the environmental standpoint. The following aspects should be considered when designing a CDM project activity:

a. **Social well being:** The 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, leading to improvement in the quality of life of people.
b. **Economic well being:** The CDM project activity should bring in additional investment, consistent with the needs of the people.
c. **Environmental well being:** A discussion must be held on the impact of the project activity on resource sustainability and resource degradation, if any, due to the proposed activity; its bio-diversity; its impact on human health; reduction of levels of pollution and so on.
d. **Technological well being:** The CDM project activity should lead to transfer of environmentally safe and sound technologies that are comparable to best practices in order to assist in upgradation of the technological base. The transfer of technology can be within the country as well from other developing countries.

Agro-forestry such as raising tasar host plants in private wastelands not only has the potential to store carbon but also addresses the need for alternative livelihoods for the tribal populations, who currently benefit from deforestation.

Scope of Afforestation through Tasar Host Plants in Private Wastelands: The parameters indicated make the raising of host plants of tasar silkworms more suitable for consideration under CDM. Although afforestation has the potential for earning revenue through carbon trading, the forest-based carbon market will be complicated, keeping in view the various Forest Acts in force. Agro-forestry such as raising tasar host plants in private wastelands not only has the potential to store carbon but also addresses the need for alternative livelihoods for the tribal populations, who currently benefit from deforestation.

Whereas afforestation projects can be carried out on lands that have not been forested for a period of at least 50 years, reforestation projects can be carried out on forested land that has been converted to non-forested land. The Indian criteria and requirements for these projects include a tree crown cover of 15%, a land area value of 0.05 ha and a tree height value of 2 m; this best fits the raising of tasar host plants in private lands.

In view of the problems encountered in the maintenance of over 7,500 ha of arjun/asan plantations raised in revenue/forest lands under Inter State Tasar Project (ISTP) in different traditional and non-traditional tasar producing states—most of which could not be utilized for tasar silkworm rearing—the successful raising and utilization of host plants of tasar silkworm in over 1600 ha. of private lands of tribals under SGSY Special Projects in Bihar and Jharkhand, have given new opportunities in this field. This attains significance in view of the huge demand-and-supply gap in tropical tasar silk in the country and the fact that land resources are better managed and utilized under private ownership to avoid conflicts that may arise

with respect to ownership and income sharing. Such initiatives and activities such as agro-forestry extension, environmental education, micro-credit, marketing assistance, active stakeholder participation and group approach make them more sustainable besides paving the way for social inclusion and empowerment of tribals. The management of soil health is priority for the rearers because plantations on such land will help them rear tasar silkworms, ensuring profitable and sustainable economic returns for over fifty years and allowing for expansion, through minimum maintenance and better management practices.

CDM PROJECT SUBMISSION, PROCESSING AND APPROVAL PROCESS

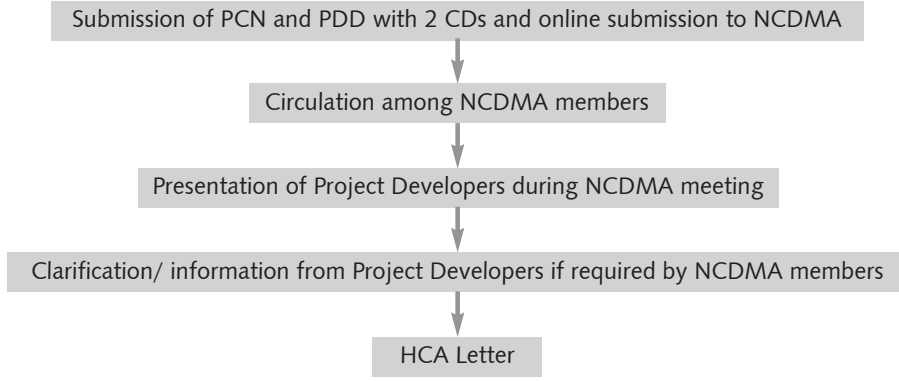
The National Clean Development Mechanisms Authority (NCDMA) is a single window clearance for CDM projects in the country. The project proponents are required to submit one copy of the Project Concept Note (PCN) and Project Design Document (PDD) online, as well as hard copies for examination by NCDMA. This is to be followed by a presentation. Once the members of the Authority are satisfied and after necessary clarifications/modifications, the Host Country Approval (HCA) is issued by the Member-Secretary of the NCDMA, that is, the Secretary (Environment and Forests), Government of India.

In order to be considered for registration, a project must first be approved by the Designated National Authorities (DNA). The NCDMA has the powers to invite officials and experts from the government, financial institutions, consultancy organizations, non-governmental organizations, civil society, the legal profession, industry and commerce, as it may deem necessary for technical and professional inputs, and may co-opt other members depending upon the need to interact with the concerned authorities, for matters relating to CDM. It also can take up any environmental issues pertaining to CDM or sustainable development projects as may be referred to it by the central government, and can recommend guidelines for consideration of projects and principles to be followed, for according HCA.

METHODOLOGY FOR CARBON ASSESSMENT

The methodology adopted for assessing forest and tree carbon stocks uses primary data of the soil carbon pool and secondary data of the growing stock from various

Diagram 1: Pradan's Model of a Community Owned CSP System



sources for estimating the biomass carbon by adopting conversion factors from various studies by the Indian Council of Forestry Research and Education (ICFRE).

It is established that highest carbon sequestration rates (0.1–0.25 MT/ha) are associated with trees rather than with herbaceous crops and, consequently, growing trees can cause marked increases in the level of soil carbon. Furthermore, in case of afforestation programmes, the inclusion of litter reverses the decrease in soil carbon so that the amount of carbon in the soil and litter layer is greater than it was under the preceding pasture. This attains importance with respect to tasar host plants, the biomass of which will be consumed only once a year but compensated by the silkworm litter because the rearing is carried out on the trees.

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Issues to be addressed: The demarcation of the project boundaries, the quantification of CERs, validation and verification, and environmental and social sustainability are some of the major issues to be addressed in these projects.

The demonstration of land eligibility is a very important criterion. In the afforestation projects, the proposed land should have been in the non-forest category for fifty years before the project begins, and the land use change from non-forest to forest must be defined through tree crown cover, tree height and land area. Further, the complex methodology involved, the difficulty in proving land eligibility and establishing a baseline, the expensive and limited data and maps, and the limited expertise available in this field are the some of the areas that need to be looked into for bringing in additional and recurring income avenues to these poor tribals. This can best be achieved by involving some professional NGOs for the purpose.