

REDD: Scope and Implications for India's Forests

Dr G. S. Rawat, Director General, ICFRE, Dehradun¹

and

Dr Renu Singh, Head, Biodiversity and Climate Change Division, ICFRE, Dehradun²

Abstract

In recent years forestry issues have gained prominence in global climate change discourse. The United Nations Framework Convention on Climate Change (UNFCCC) refers to forests as both source and sink of GHG, and recognizes their vital role in global carbon cycle. Currently role of forests in mitigating climate change is actively being considered under the agenda of reducing emissions from deforestation in developing countries (REDD).

The concept of REDD is premised on the basic idea of financial compensation to developing countries for voluntary participation in forest related mitigation activities aiming at reduction in emissions from forestry sector. REDD provides an opportunity for collaboration and partnership between developed and developing countries to address the problem of climate change with forestry solutions, and achieve the ultimate objective of the Convention.

This paper examines the REDD debates and opportunities in the framework of UNFCCC and their implications for India's forests. It is suggested that a flexible REDD approach encompassing all mitigation options and activities in the light of diverse national circumstances is needed to ensure the participation of all Parties, and strengthen the global action to tackle the challenges of climate change.

The expansion of REDD to REDD+ with recognition and addition of conservation, sustainable management of forests, and increment of forest carbon stocks to two 'Ds', i.e., deforestation and forest degradation has created opportunities for rewarding forest conservation-based mitigation actions in developing countries, and India's forests have become a promising candidate for such rewards. While the actual shape, form, and amount of REDD rewards are still being negotiated along with complex technical issues, India may work towards developing a national REDD+ policy framework through multi-stakeholder dialogue.

Key words: REDD, REDD+, Forests, climate change, deforestation, mitigation

¹rawatgs@icfre.org

²renusingh@icfre.org

Introduction

The concentrations of green house gases (GHGs)- methane, carbon dioxide, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulphur hexafluoride- in the atmosphere have increased manifold since pre industrial era due to human interference with natural climate system. The concentration of atmospheric carbon dioxide (CO₂), the most important GHG, has increased from 280 parts per million (ppm) in 1750 to 379 ppm in 2005, registering an increase of about 30% (IPCC 2007a). It has been projected that global average temperature at the end of the 21st century will increase by 1.8° C to 4° C as a result of increase in GHG emissions, and 40-70% species will become extinct if temperature exceeds about 3.5° C (ibid).

To tackle the challenge of climate change, the United Nations Framework Convention on Climate Change (UNFCCC) was adopted by 154 countries at the Rio de Janeiro Earth Summit in 1992. The Convention entered into force in 1994. The ultimate objective of the Convention is to achieve stabilization of GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.

The UNFCCC refers to forests as both source and sink of GHG, and recognizes their vital role in global carbon cycle. Currently role of forests in mitigating climate change is actively being considered under the agenda of reducing emissions from deforestation in developing countries (REDD). This paper examines the REDD debates and opportunities in the framework of UNFCCC and their implications for India's forests. It is suggested that a flexible REDD approach encompassing all mitigation options and activities in the light of diverse national circumstances is needed to ensure the participation of all Parties and strengthen the global action.

Forests and Climate Change

In recent years forestry issues have gained prominence in global climate change discourse. The unique ability of forests to simultaneously reduce greenhouse gas (GHG)

emissions, capture and store carbon, and decrease the vulnerability of people and other ecosystems to climate change make them significant in changing climate regime.

Forests cover around 30% of the earth's land surface (nearly 4 billion hectares), and store 638 gigatonnes (Gt) of carbon in their ecosystem, which is more than the total amount of carbon in the atmosphere. Forest biomass alone stores 283 Gt of carbon (FAO 2005). Current deforestation rates and forest degradation, however, pose serious threats to the world's forests and undermine their ability to continue making contribution to climate change mitigation besides adding to GHG emissions. Global deforestation occurred at an alarmingly high rate of 13 million hectares per year during the period 1990-2005; and, net change in forest area in the period 2000-2005 was at – 7.3 million hectares per year (ibid). As a result of this continued deforestation and forest degradation, carbon stocks in forest biomass are lost by 1.1 Gt of carbon annually, and contribute to approximately 17.4% of annual GHG emissions, which is equal to 5.8 GtCO₂/yr (IPCC 2007b).

Asia and Europe, however, reported net gain in forest area from 2000 to 2005. Asia, which had a net loss of some 800,000 hectares per year in the 1990s, showed a net gain of 1 million hectares per year from 2000 to 2005 (FAO 2007). India along with China is one of the few developing countries that reflect net positive change in forest area during the period (ibid). Forest cover in India has increased from 64.08 million hectares in 1983 (FSI 1987) to 67.71 million hectares in 2003 (FSI 2005) as a result of progressive conservation-based policy and practice.

REDD under the UNFCCC

Realizing the important role of forests in regulating the earth's climate, the international community is engaged in discussions under the United Nations Framework Convention on Climate Change (UNFCCC) for strengthening the forest-based mitigation options through reduced emissions from deforestation and forest degradation (REDD) in developing countries.

The concept of REDD is premised on the basic idea of financial compensation to developing countries for voluntary participation in forest related mitigation activities aiming at reduction in emissions from forestry sector. REDD provides an opportunity for collaboration and partnership between developed and developing countries to address the problem of climate change with forestry solutions, and achieve the ultimate objective of the UNFCCC. According to the UNFCCC's "common but differentiated responsibilities" of all Parties to combat climate change (UNFCCC 2002), developed countries are expected to bear the costs, and provide for compensation money to developing countries willing to undertake the REDD actions.

Since 2005, when the Papua New Guinea and Costa Rica mooted a proposal into the Conference of the Parties (COP) agenda at its eleventh session in Montreal on 'Reducing emissions from deforestation in developing countries and approaches to stimulate action (RED)', the agenda of 'Reducing emissions from deforestation and degradation (REDD)' in developing countries has occupied the center stage in the international climate negotiations under the UNFCCC.

Scope of the REDD

Under the framework of REDD, following two broad policy approaches representing diverse national circumstances aiming at reduction of emissions in forestry sector have emerged:

1. Compensation for reducing deforestation
2. Compensation for conservation, sustainable management of forests, and increasing forest cover

In the UNFCCC forums, nations with heavy deforestation rates like Brazil have strongly advocated the policy approach of positive incentives and compensation in return of their commitment to reducing current deforestation rates. On the other hand, countries like India and China who have effected increment in forest carbon stocks following conservation oriented policy framework resulting in increase in forest cover and sustainable management of forests have been putting forth the case of getting

compensation for conservation efforts. Also, countries like Cameroon and Gabon with low rate of deforestation have been arguing for financial incentives for stabilizing their forest cover as a result of protection and sustainable management measures.

India is of the view that efforts to reduce emissions from deforestation in developing countries should accommodate diverse national circumstances while developing a framework for positive incentives comprising technological, methodological, monitoring, validation, and disbursement issues. India's submissions to the UNFCCC have consistently reiterated its position to get recognition and encouragement for conservation, sustainable management of forests, and increase in forest cover as a potential policy approach under REDD. India has maintained that all countries engaged in efforts to maintain and increase forest carbon stocks in their broader national policy framework of conservation and sustainable management of forests should also be rewarded. This policy advocacy of India seeking rewards for conservation, i.e., 'Compensated Conservation' is in accordance with the UNFCCC's commitments under Article 4 [Para 1(d)], which, inter-alia, states that "*All parties, taking into account their common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances, shall ... **Promote sustainable management, and promote and cooperate in the conservation and enhancement, as appropriate, of sinks and reservoirs of all greenhouse gases ... including biomass, forests*** (emphasis added)" (UNFCCC 2002).

The discussions in COP 13 of the UNFCCC, which was held in 2007 at Bali, focused on inclusion of conservation and enhancement of forest carbon stocks as potential policy approach under the umbrella of REDD. The concept of 'compensated conservation' was strongly put forward by India and supported by China, Columbia, Bhutan, Pakistan, Bangladesh, Congo Basin countries, and Philippines. This proposal of India was, however, opposed by Brazil, Japan, the EU, and some of the Latin American countries experiencing high deforestation rate.

After a series of lengthy discussions and negotiations, the Bali conference adopted Decision 2/CP.13: “Reducing emissions from deforestation in developing countries: approaches to stimulate action” (UNFCCC 2007a). “Acknowledging the contribution of the emissions from deforestation to global anthropogenic greenhouse gas emissions,” the Decision 2/CP.13 recognized the “efforts and actions to reduce deforestation and *to maintain and conserve forest carbon stocks in developing countries...* in helping to meet the ultimate objective of the Convention (emphasis added)”.

The Decision 2/CP.13 also initiated a programme of work on “methodological issues including, inter alia, *assessments of changes in forest cover and associated carbon stocks and greenhouse gas emissions, incremental changes due to sustainable management of the forest*, demonstration of reductions in emissions from deforestation, [and] forest degradation (emphasis added)”. Thus, the conservation policy approach of India was finally recognized, and given a place in the Bali Decision 2/CP.13 along with deforestation and forest degradation.

COP 13 also focused on long term cooperative action and post-2012 issues in order to enhance implementation of the Convention; and, Parties agreed on initiating a two year process, popularly known as ‘Bali Action Plan’, to finalize a post-2012 regime by COP 15 which is scheduled to be held in December 2009 at Copenhagen, Denmark. The Bali Action Plan (UNFCCC 2007b) identified the scope of REDD instrument, and launched a comprehensive process to address “Policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries; and *the role of conservation, sustainable management of forests and enhancement of forest carbon stocks* in developing countries (emphasis added)”.

In 2008 and 2009, Parties to the UNFCCC have extensively discussed, through a series of workshops and meetings, the scope of REDD, financial arrangements, and various technical and methodological issues. And, the umbrella of REDD has expanded to REDD+ with recognition and addition of conservation, sustainable management of forests, and increment of forest carbon stocks to two ‘Ds’, i.e., deforestation and forest

degradation. REDD+ is now largely acknowledged as an integral part of the international mitigation portfolio to combat anthropogenic climate change.

Finance

The successful implementation of REDD+ will need substantial amounts of money. According to Ebeling (2006 cited in CPF 2008), developing countries could earn a gross annual income (excluding opportunity cost) of about € 1.5 billion by reducing deforestation by 10%, and € 8.7 billion by reducing it by 50% at a carbon price of € 18 per tonne of carbon. The UNFCCC (2007c) says that the estimated cost in 2030 of reducing deforestation and forest degradation in developing country Parties to zero would be US \$ 12 billion. Whiteman (2006) suggests that the cost of achieving sustainable forest management leading to reduced emissions from production forests in developing countries would be US \$ 8 billion annually.

Developing countries are demanding financial incentives for undertaking forest-based mitigation activities under REDD+. Countries are agreeing that a combination of market-based and non market-based funds will be required to generate the necessary financing. Non market-based financial resources may include overseas development assistance, voluntary contributions from Annex I Parties, and taxes on carbon intensive goods and services. Special fund under UNFCCC and Kyoto Protocol may also be created for compensating range of activities under the overall umbrella of REDD+.

India is seeking incentives not only for incremental stocks (carbon stocks available due to increase in existing stocks) but also for baseline stocks (carbon stocks as a result of the maintenance of existing stocks) as insurance cover against any loss of baseline stocks (UNFCCC 2008). Further, incentives for incremental carbon stocks may be linked to carbon markets while maintenance of baseline carbon stocks may be incentivized through non-market based funds.

Technical and Methodological Issues

Important issues related to methodological aspects of forest related mitigation measures and associated carbon stock changes as a result of forest conservation and sustainable management of forests, and reducing deforestation approaches are required to be addressed adequately under a strong and robust monitoring, reporting, and verification (MRV) system taking into account the national circumstances. Further, monitoring of forests remaining as forests involving conservation, sustainable management of forests, and degradation is far more challenging than monitoring deforestation. Countries are assessing the cost effectiveness and capacities to develop and use satellite-based MRV system along with minimum ground verification.

Country specific emission reference levels will be an important determinant for distribution of REDD/REDD+ funds among countries. There is strong consensus that reference levels should be at the national scale rather than at sub-national level. Some countries like Colombia are, however, arguing for sub-national reference levels on account of lack of capacity to develop national carbon accounting system, and providing an incentive at project level as well. Some countries are supporting the inclusion of both approaches of carbon accounting, and considering the sub-national accounting as a transitional mechanism allowing all eligible countries to participate in REDD+ mechanism. Countries are giving preference to historic emissions in developing the reference levels than projected reference level. Some countries are also considering the use of a ‘development adjustment factor’ with historic reference period.

In UNFCCC negotiations and country submissions on REDD, India has been supporting the development of a common methodology based on application of remote sensing, and minimum ground verification to cover following elements of monitoring and verification of forest carbon stocks: i) assessment of baseline stocks; ii) assessment of incremental stocks due to conservation, sustainable management of forest and increase in forest cover; and, iii) assessment of reduction in deforestation and degradation and thereby emissions. To ensure robust reporting of changes (positive/negative) in forest carbon

stocks, India is supporting national level accounting mechanism to prevent double accounting and leakages.

Capacity Building

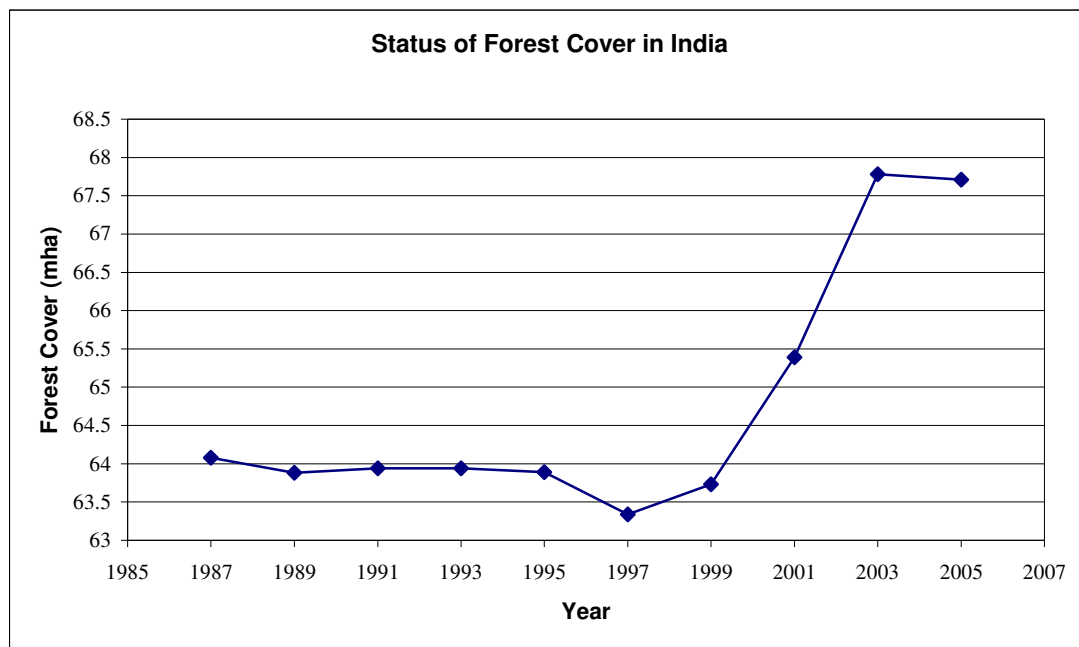
Developing countries have put forward a strong case for capacity building as most of the countries lack financial and technical resources to develop strategies and implement the REDD+ mechanism. In current international climate negotiations, technology transfer is a major issue. There is increasing consensus regarding the unavailability of existing knowledge and technologies to developing countries in the field of forest-based mitigation.

Implications for India's Forests

Forest Cover, Carbon Stocks, and Incentives

The REDD+ mechanism has opened the possibilities for compensation for India's pro conservation approach and sustainable management of forests resulting in the increase of forest cover. Due to a strong policy framework for conservation and protection of forests practically no deforestation is occurring in India, and forest cover has almost stabilized (Figure 1).

Figure 1: Trends of Forest Cover in India



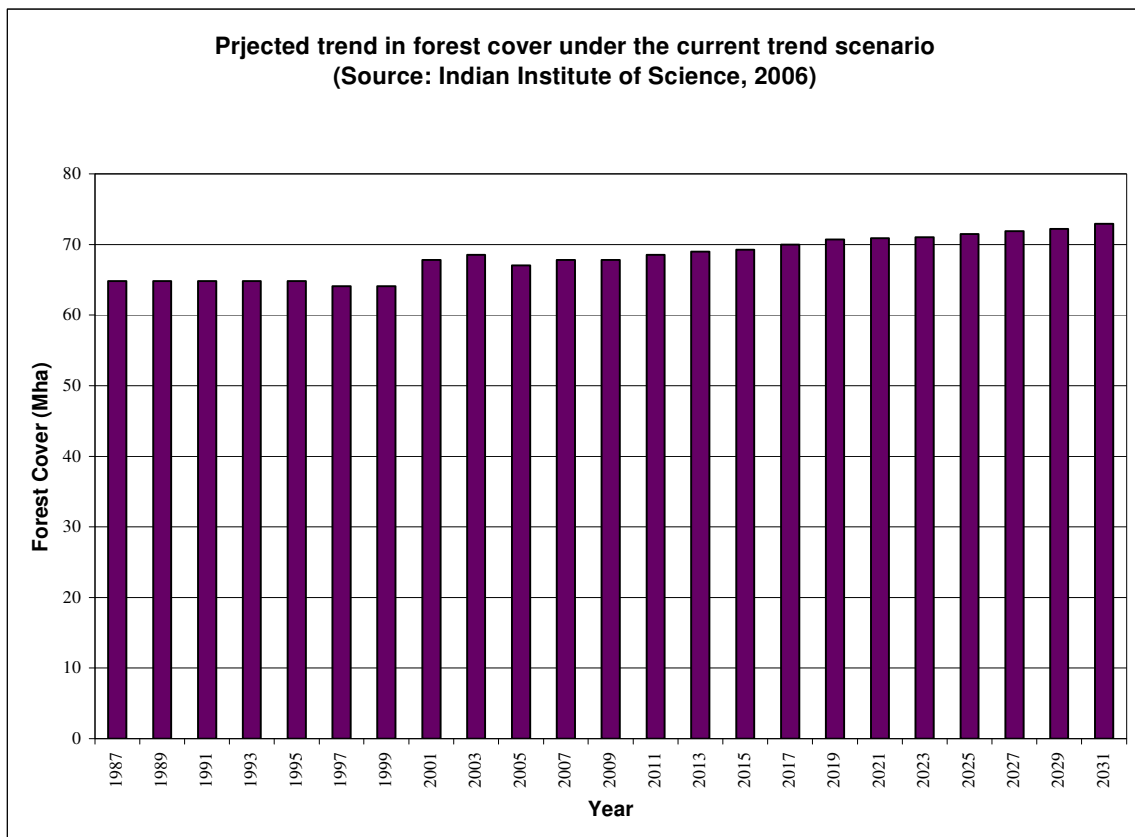
(Source: FSI 2005)

The forest cover of the country has increased from 64.08 m ha (FSI 1987 based on 1981-83 satellite data) to 67.71 m ha ((FSI 2005 based on 2002-04 satellite data) constituting 20.60 % of the total geographical area. If tree cover (small patches of trees less than 1 hectare) of 9.16 m ha (2.79% of the geographical area) is considered, the total area under forest and tree cover becomes 76.87 m ha, which is 23.38% of the total geographical area of the country (FSI 2005).

According to GoI (2009), India's forests are a major sink of CO₂, and serving an important role in GHG mitigation for India. From 1995 to 2005, the carbon stocks stored in forests and trees have increased from 6245 million tonnes (mt) to 6662 mt with an annual increment of 38 mt of carbon.

On the basis of analysis of forest cover, afforestation and reforestation, and other conservation measures, IISc. (2006) has projected an increase in Indian forests during the period 2006-2030, and occupation of 72.19 m ha of land under forests (22% of the

Figure 2: Model-based Projections for India's Forests



geographical area) by 2030 under the current trend scenario (Figure 2). The model based projection of carbon stocks in India's forests and tree cover reflects an increase in the carbon stocks from 8.79 GtC in 2005 to 9.75 GtC in 2030 (ibid). Under this scenario, the REDD+ mechanism may provide incentives not only for the incremental stocks of 0.96 GtC between 2006-2030 but also for the baseline stocks of 8.79 GtC as on 2006.

Methodological Issues

Recently considerable technological advancement has been made in India related to forest resource mapping. It is now possible to measure increase/decrease in forest cover with a fair degree of accuracy at national level and hence GHG capture or emissions respectively. India has the capacity to develop a national level 'Forest Carbon Accounts' every five years on the basis of the assessment of forest cover in three categories of crown density (10-40%, 40-70%, >70%), above and below ground biomass in different forest types, and soil organic carbon (SOC) in different forest types (UNFCCC 2009).

Under Second National Communication (SNC) of India to UNFCCC project, an estimation of biomass carbon and SOC of the country's forests is already underway. The procedure followed under the SNC for estimation of biomass carbon and SOC has the potential of being developed and adopted as a REDD+ methodology for assessing changes in forest carbon stocks over a stipulated period.

Forest Survey of India (FSI) is carrying out a national project for forest type mapping to map forest types of India according to Champion and Seth classification that divides India's forests into 16 forest groups/major types and 221 sub-group types. The project will result into a series of forest maps showing different sub group types of the country on 1: 50,000 scale. An overlay analysis of spatial layers of forest type mapping and forest cover mapping (regularly done by FSI biennially on 1:50,000 scale) under three classes of canopy density (10-40%, 40-70%, >70%) in GIS would give strata of homogeneous floral composition and canopy density. Total biomass (above ground + below ground) per hectare of forest area for each of these strata can be estimated by making use of inventory data, volume factor, and extrapolation of growing stock. In this

way, national inventories of growing stock of forest biomass can be developed at an interval of 5 years using the latest forest cover maps (UNFCCC 2007d).

Under SNC, estimation of SOC in India's forests has been taken up by Indian Council of Forestry Research and Education (ICFRE). As per Champion and Seth classification, all 16 forest groups divided into forest sub-group types have been identified on ground as basic unit for soil sampling; and, standard method of Walkley and Black (Jackson, 1973) has been used for SOC estimation. SOC has been aggregated for each major forest type, and finally at country level. ICFRE (2009) study on SOC showed that due to increase in forest cover during 1995-2005, soil in Indian forests acted as a net sink of 203.3 mt of carbon.

Once forest type maps prepared by FSI are available, ground-based soil sampling areas used by ICFRE can be matched and related to satellite maps of forest sub-group types to enable regular and more accurate assessment of forest carbon stocks of the country.

Community Participation

Finance and technology are not the only important factors when implementation of REDD+ actions is considered. As livelihood of communities living in and around forests is highly influenced by the availability of a number of forest products and ecosystem services of forests, REDD+ actions are required to integrate local communities' concerns and participation as well. Although the international architecture for REDD+ will provide the framework for implementation, several issues related to social implications will be linked to national implementation strategy and policy. Since 1990, the policy framework and institution of 'Joint Forest Management' (JFM) encouraging participation of local communities in forest management and protection can be linked to the implementation of REDD+ action in India.

Conclusions

The expansion of REDD to REDD+ has created opportunities for rewarding forest conservation-based mitigation actions in developing countries, and India's forests have

become a promising candidate for such rewards. While the actual shape, form, and amount of REDD rewards are still being negotiated along with complex technical issues, India may work towards developing a national REDD+ policy framework through multi-stakeholder dialogue. Identification of relevant institutions and agencies, research to fill the gaps in current knowledge, and enhancing national capacity to meet the challenges of REDD+ implementation are the urgent need of the hour.

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