Community-managed forests generate environmental and social benefits that should be cost out, and services paid for to communities managing them.

Forest recovery in the Tibet Autonomous Region, Southwest China, China's contribution to world carbon sequestration through tree plantation *(Xu Jianchu)*

The Kyoto Protocol and Community-managed Forests

3

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Introduction

Global climate has always been changing naturally. But the changes witnessed in the last 50 years have been dramatic, and scientists attribute the change to human-induced factors linked directly to increased levels of CO_2 and other greenhouse gases, emitted mostly after the Industrial Revolution from burning of fossil fuels, deforestation, and other human activities as a result of economic and population growth. According to Janzen (2004), the concentration of atmospheric CO_2 has increased by over 30% since pre-industrial levels and has crossed 380 ppmv (parts per million by volume) in 2005; it is expected to exceed 500 ppmv by 2100. Global temperatures increased by 0.6°C in the last century, and this increase could be far greater in the future (Figure 3.1). The Intergovernmental Panel on Climate Change (IPCC) states in its Third Assessment Report (IPCC 2001b) that most of the global warming observed over the last half century is attributed to human activities, and the IPCC predicts that anthropogenic emission of GHGs will raise the global mean surface temperature between 1.4 and 5.8°C over the next the century (UNFCCC 2003).

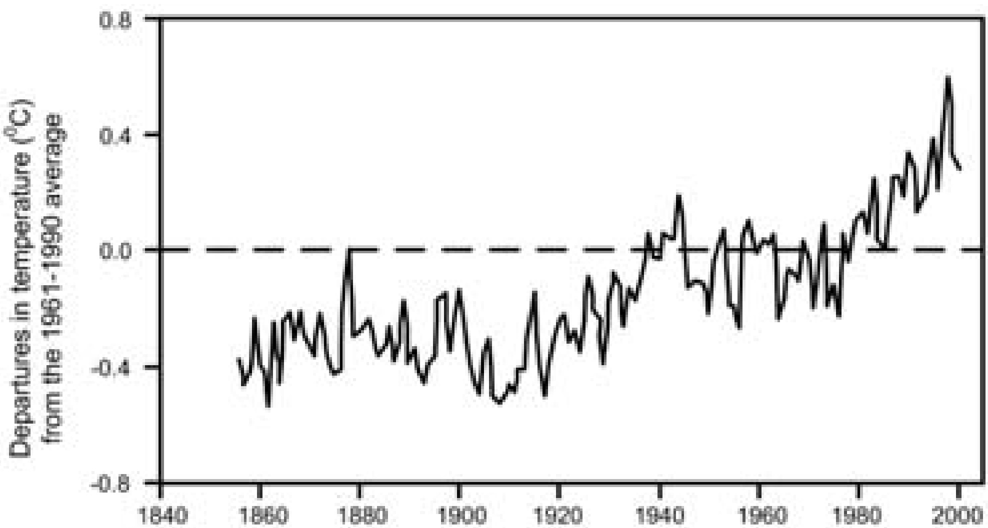

Figure 3.1: Estimates of global temperature over 144 years

Source: Janzen (2004)

GHGs are necessary to regulate the earth's temperature, but their excess concentrations in the atmosphere trap heat and raise the earth's temperature. Signs of global warming are evident from receding mountain snowlines and glaciers, melting polar sea-ice, shrinking ice cover on lakes and rivers in winter, changes in agriculture seasons and in migration patterns of birds and animals, and in the migration of lowland ecosystems to higher altitudes, as explained in the previous chapter. This Chapter will explain community-managed forests from a climatic perspective in the context of the Kyoto Protocol.

Genesis of the Kyoto Protocol

Concerns over climate change due to anthropogenic interference first emerged in 1979 at the First World Climate Conference. Following this in 1988, IPCC, was established as a global body to assess climate change scientifically. The IPCC in its First Assessment Report published in 1990, confirmed that the threat from climate change is real, and in its Second World Climate Conference held later that year concluded that a global treaty was necessary to mitigate the dangers resulting from it . This conclusion paved the way for the establishment of the United Nations Framework Convention on Climate Change (UNFCCC).

The text of the UNFCCC was adopted at the United Nations Conference on Environment and Development (or the Earth Summit) in Rio de Janeiro in 1992. The objective of the Framework Convention was to stabilise greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system through the adoption of a global protocol called the Kyoto Protocol. The KP is a binding commitment that would assist in implementing the UNFCCC goals. The text of the KP to the UNFCCC was adopted at the Third Session of the Conference of the Parties (CoP) to the UNFCCC in Kyoto, Japan in 1997. With Russia having ratified the KP in November 2004, this global protocol has come into force in February 2005. For this, it was necessary that at least 55 countries that encompass at least 55% of global emissions from Annex 1 countries (industrialised countries) ratify it. By December 2006, 169 countries responsible for 61.6% of global emissions have ratified the Protocol. India and Nepal are both signatories of the UNFCCC and have also ratified the KP.

The UNFCCC and the KP have become globally high profile policies of political importance, as GHGs are embedded in every economic and development activity of any country. The enforcement of the KP from 2005 has paved the way for the following:

- Industrialised nations (Annex 1) that ratified the KP have to comply meeting emission reduction targets for six GHGs during the first commitment period, 2008-2012.
- A global carbon trading market, which earlier was a voluntary market, must be established.
- Non-industrialised nations (non-Annex 1) will participate in emissions reduction by hosting Clean Development Mechanism (CDM) projects.
- The establishment of an Adaptation Fund in 2001 under the KP to start assisting developing countries to cope with the adverse effects of climate change.

According to the Protocol, all industrialised countries or Annex 1 countries party to the UNFCCC are legally committed to reduce their emissions of GHGs by an average of 5.2% from the 1990 levels by 2008-2012. This can be achieved by domestic and by international action. The Protocol has devised three flexible mechanisms to enable compliance with the commitment: Joint Implementation (JI), Clean Development Mechanism (CDM), and Emissions Trading (ET). CDM is the only activity in which developing countries like India and Nepal can participate in collective action for emissions reduction. Hosting of CDM projects is limited to non-Annex I countries, and Certified Emission Reduction (CER) credits are purchased by Annex 1 countries. Non-Annex 1 members cannot participate in JI and ET mechanisms.

The KP's rules focus on:

- Commitments to legally binding emissions targets,
- Implementing the three mechanisms,
- Reducing adverse impacts in non-industrialised countries, including use of the Adaptation Fund to do so, and
- Complying with the commitments.

These rules are confined to six anthropogenic GHGs namely, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6). As CO_2 is the major GHG, the term 'carbon trading' is used as an umbrella, and all emissions are conventionally expressed as carbon dioxide equivalents (CO_2e). Hence, the certified emissions reduction (CER) credits in CDM are calculated in tonnes of CO_2e and, for the remaining GHGs, are converted to equivalent carbon in terms of their global warming potential (GWP) based on their ability to retain heat in the atmosphere.

CDM is set out in Article 12 of the KP and has the twin objectives of:

- Assisting non-Annex I (non-industrialised) countries in achieving sustainable development, and
- Assisting Annex I (industrialised) countries in achieving compliance with their quantified emissions limitation and reduction commitments (UN 1997; Aukland et al. 2002).

Institutional capacity building and technology transfer are the means of encouraging sustainable development in non-Annex I countries. Abatement projects in non-Annex I countries are the means of enabling these countries to meet part of their commitment for fulfilling the second objective in a cost-effective way. Because developing countries have no commitments under the KP to reduce their GHG emissions, they may implement activities for reducing GHGs by hosting CDM-compatible projects in two main sectors: 1) energy, and 2) land use and land use change and forestry (LULUCF). Activities related to agriculture and forestry fall under the LULUCF sector. There are different guidelines for quantifying and certifying credits between the energy and LULUCF sectors.

Potential Benefits of the Clean Development Mechanism

CDM has several benefits owing to its innovativeness and the inclusion of developing countries in collectively mitigating GHG emissions. By creating markets for CER credits, CDM can generate private sector investments from Annex I parties towards climate-friendly projects that would not otherwise take place, or that are accorded a low priority in the development agenda of developing or non-Annex I countries. Market-based CDM can be used to accrue economic incentives for conservation-related activities in non-industrialised countries. Given that public sector spending on conservation is experiencing global cutbacks, CDM could be viewed as a promotional agent for conservation activities, especially in the resource-scarce developing world. This unique market linkage has given the KP added weight and higher profile globally than the Convention on Biological Diversity (CBD), which has not garnered the same level of interest in the political and private sectors (Koziell and Swingland 2003). CDM can also be regarded as a catalyst in bridging the gap between industrialised and developing countries. In addition to deriving payments from CER credits, developing countries gain from the technology transferred, including knowledge and experience transferred from the industrialised to non-industrialised countries.

Another innovative aspect of the CDM is that it sets aside a portion (2%) of the proceeds from CER trading, which is deposited in the CDM registry. This fund is to be utilised to assist adaptation projects in non-industrialised countries vulnerable to adverse climate change effects and to cover CDM-associated administrative expenses.

Conditions for CDM

Just as the CDM has numerous potential benefits, there are also strict criteria for CER credits, to ensure that they are real and additional. If CER credits are exaggerated there will be a transfer of exaggerated CER credits to Annex 1 countries, which would increase the global GHG emission levels to above the KP threshold, rendering the whole mechanism counter-productive. Projects are scrutinised very closely and stringent criteria are set for projects to qualify, including a timeframe for emission reduction activities within the budget period of 2008-2012 – known as the first commitment period – so that emission reduction credits are authentic and credible. The GHG emission reduction achieved can also be banked from the beginning of 2000 until the budgeted period for CDM activities. Box 3.1 highlights the conditions to be fulfilled for a qualifying CDM.

The Role of Forests in Altering Atmospheric Concentrations of Carbon Dioxide

Forests as sinks

Depending upon the succession stage, specific disturbance, or management intervention, the forest can act as a source and as a sink (Masera et al 2003). Forests act as sinks by increasing aboveground biomass through increased forest cover and by increased levels of soil organic carbon (SOC) content. By converting shrub/pasture lands and agricultural fields, or degraded forests into forests, the rate of respiration from plants, soil, and dead

Box 3.1 Conditions for CDM Afforestation and Reforestation

1. Only areas that were not forests on 31st December 1989 will meet the CDM definitions of afforestation or reforestation.
2. Projects must result in real, measurable, and long-term emissions reduction, as certified by a third-party agency ('operational entities' in the language of the Convention). The carbon stocks generated by the project need to be secured over the long term (a point referred to as 'permanence'), and any future emissions that might arise from these stocks need to be accounted for.
3. Emissions reduction or sequestration must be additional to any that would occur without the project. They must result in a net storage of carbon and, therefore, a net removal of carbon dioxide from the atmosphere. This is called 'additionality' and is assessed by comparing the carbon stocks and flows of project activities with those that would have occurred without the project (its 'baseline'). For example, the project may be proposing to afforest farmland with native tree species, increasing its stocks of carbon. By comparing the carbon stored in the 'project' plantations (high carbon) with the carbon that would have been stored in the 'baseline' abandoned farmland (low carbon) it is possible to calculate the net carbon benefit. There are ongoing technical discussions regarding the interpretation of the 'additionality' requirement for specific contexts.
4. Projects must be in line with sustainable development objectives, as defined by the government that is hosting them.
5. Projects must contribute to biodiversity conservation and sustainable use of natural resources.
6. Only projects starting from the year 2000 onwards will be eligible.
7. Two percent of the carbon credits awarded to a CDM project will be allocated to a fund to help cover the costs of adaptation in countries severely affected by climate change (the 'adaptation levy'). This adaptation fund may provide support for land use activities that are not presently eligible under the CDM, for example, conservation of existing forest resources.
8. Some of the proceeds from carbon credit sales from all CDM projects will be used to cover administrative expenses of the CDM, a proportion still to be decided.
9. Projects need to select a crediting period for activities, either a maximum of seven years that can be renewed at most two times, or a maximum of ten years with no renewal option.
10. The funding for CDM projects must not come from a diversion of official development assistance (ODA) funds.
11. Each CDM project's management plan must address and account for potential leakage. Leakage is the unplanned, indirect emissions of CO_2 resulting from the project activities. For example, if the project involves the establishment of plantations on agricultural land, leakage could occur if people who were farming on this land migrated to a clear forest elsewhere.

Source: Bass et al (2000)

organic matter is exceeded by Net Primary Production (NPP). This leads to sequestration of CO_2 from the atmosphere to the terrestrial ecosystem. On average, 50% of the biomass is estimated as the carbon content for all species of trees (MacDicken 1997).

According to Upadhyay et al. (2005), revitalising degraded forest land and their soils in the global terrestrial ecosystem can sequester 50-70% of the historic losses. Degraded forests have emitted their carbon pool and now have the potential capacity to sequester greater volumes. Managed forests sequester more carbon than unmanaged forests nearing their climax stage as decay, burning, and die-back are balanced by the growth of plants (Upadhyay et al 2005).

Forests play a profound role in reducing ambient CO_2 levels as they sequester 20 to 100 times more carbon per unit area than croplands (Brown and Pearce 1994). Trees absorb atmospheric CO_2 for the growth of woody biomass and increase the SOC content in the soil as well. Of the different land uses globally, forest vegetation including tropical, temperate, boreal, and savanna forests accounts for over 90% of carbon in plants and about 52% in the soil, from only 43% of the land as depicted in Table 3.1. The CDM recognises forests as sinks by permitting afforestation and reforestation projects to be developed in non-industrialised countries.

Table 3.1: Summary of global carbon stock in plants, soil, and atmosphere

Biome	**Area** (10^9 ha)	**Global carbon stock** (Pg C)			**NPP** (Pg C per year)
		Plants	**Soil**	**Total**	
Tropical forests	1.76	212	216	428	13.7
Temperate forests	1.04	59	100	159	6.5
Boreal forests	1.37	88	471	559	3.2
Tropical savannas and grasslands	2.25	66	264	330	17.7
Temperate grasslands and shrub lands	1.25	9	295	304	5.3
Deserts and semi-deserts	4.55	8	191	199	1.4
Tundra	0.95	6	121	127	1.0
Croplands	1.60	3	128	131	6.8
Wetlands	0.35	15	225	240	4.3
Total	**15.12**	**466**	**2011**	**2477**	**59.9**

Source: Janzen (2004)

Of the total global terrestrial carbon, about two-thirds, excluding those sequestered from rocks and sediments, are stored in forested areas in the form of standing biomass, under-storey biomass, leaf and forest debris, and soil (Sedjo et al. 1998, cited in Upadhyay et al. 2005). The Forest Resources Assessment estimates the total carbon content in forest ecosystems to be 638 Gt for 2005, half of which are coming from biomass and deadwood, and half from soil and litter, which together amounts to more carbon than is in the atmosphere (FRA 2005).

Forests as sources

The global forestry data shown in the Table 3.2 (FAO 2001) reveals that deforestation occurred in the tropical region of non-industrialised countries at the rate of 12.3 million ha of forest per year between 1990 and 2000. Forests in Asia are sources or net emitters of CO_2 (Dixon et al. 1994, cited in Upadhyay et al. 2005). But in the non-tropical region there is a net increase of 2.9 million ha of forest area per year. The increment mainly comes from boreal forests in temperate regions of North America and Europe (Kauppi and Sedjo 2001). These regions are becoming moderate sinks through plantation of forests, avoidance of deforestation, and natural expansion of forests and plantations on abandoned agricultural lands.

Deforestation occurring in tropical areas ultimately translates to CO_2 emissions. Globally, CO_2 emissions from land use change have increased greatly over the last century, approaching 2 Pg C (Peta gram of carbon) per year, as reflected in Figure 3.2, and is mainly attributed to tropical deforestation (Janzen 2004).

Table 3.2: Annual change in global forest cover from 1990 - 2000 (million ha)									
Domain	**Natural forests**					**Forest plantation**			**Total Forest Net Change**
	Loss due to		**Total Loss**	**Gain**	**Net Change**	**Gain**		**Net Change**	
	Deforest -ation	**Convers-ion to forest plantation**				**Convers-ion from natural forest**	**Afforest-ation**		
Tropical areas	-14.2	-1.0	-15.2	1.0	-14.2	1.0	0.9	1.9	-12.3
Non-tropical areas	-0.4	-0.5	-0.9	2.6	1.7	0.5	0.7	1.2	2.9
World	-14.6	-1.5	-16.1	3.6	-12.6	1.5	1.6	3.1	-9.4

Source: FAO, 2001

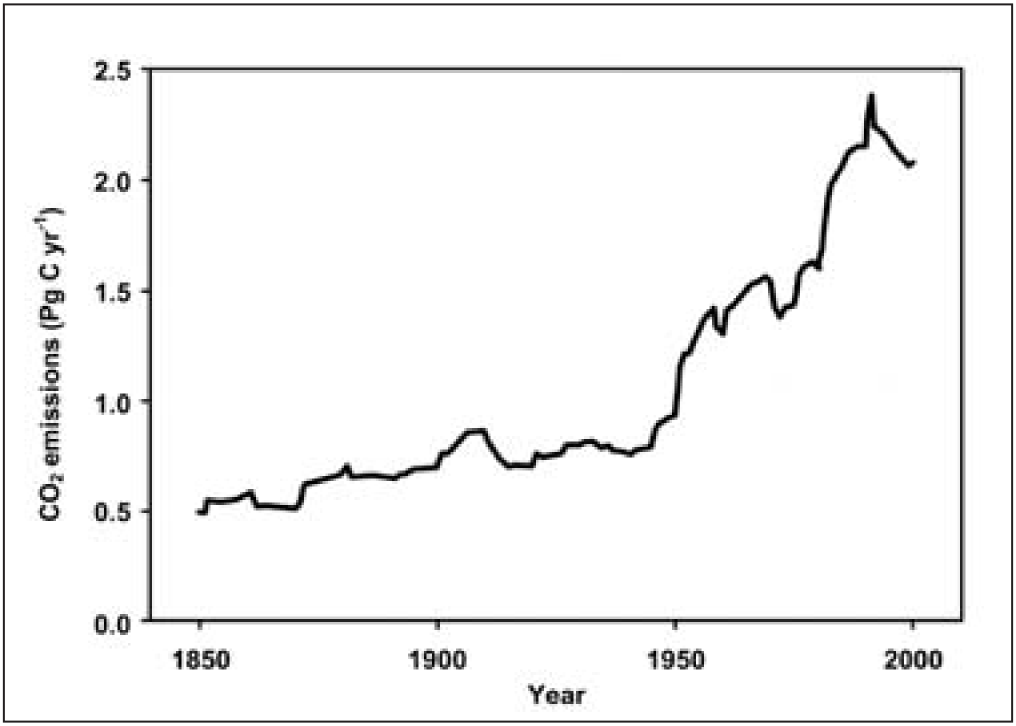

Figure 3.2: CO_2 emissions from land use changes (1850-2000)

Deforestation in tropical countries is the main concern with regards to CO_2 emissions from the terrestrial ecosystem. Estimates show a quarter of global CO_2 emissions (IPCC 2000) to 18% (Stern 2007) being emitted from deforested in tropical regions. This needs to be addressed urgently by the UNFCCC as, currently, the KP is ineffective in controlling these emissions. CDM does not recognise avoiding deforestation as a strategy for reducing CO_2 emissions from non-industrialised countries.

Recent Findings on the Carbon Pool

The latest forest inventory data comes from the Global Forest Resource Assessment (FRA 2005), where countries were asked to provide forestry-related data for the period 1990, 2000, and 2005. Based on the FRA 2005 estimate, carbon in forest biomass decreased in Africa, Asia, and South America between 1990-2005 from deforestation and forest degradation, as reflected in the Figure 3.3. These regions are responsible for unabated emissions from the terrestrial ecosystem, and these are the areas that the concerted effort to combat climate change must start to address.

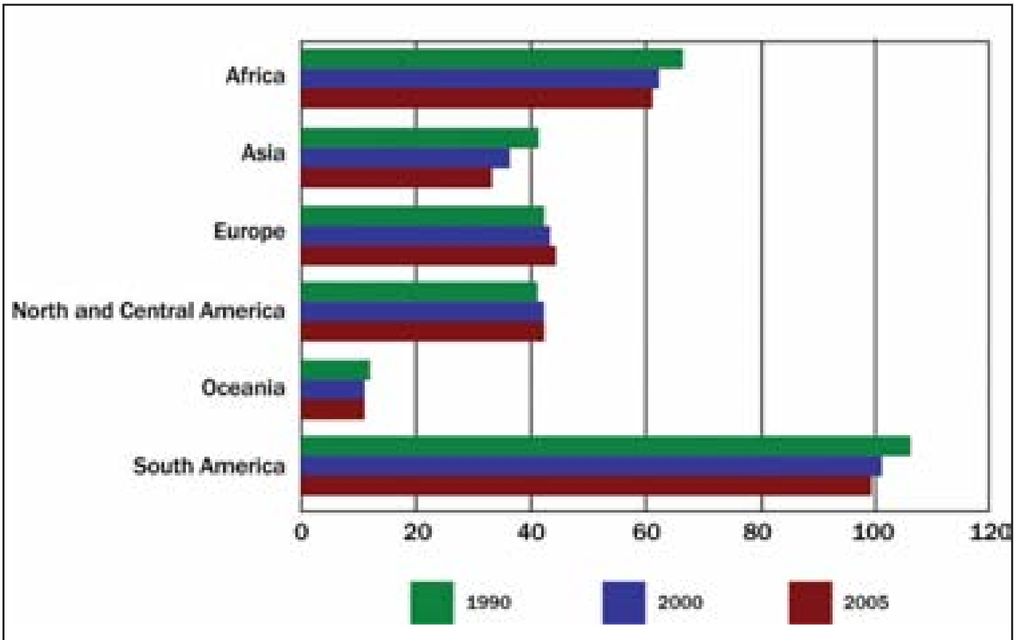

Figure 3.3: Changes in global carbon stock in forest biomass from (1990-2005) (in Gt)

The FRA shows that carbon stock in forest biomass between 1990-2005 declined from 32.3 to 21.8 Gt in South and Southeast Asia, making these regions one of the most severe cases globally, not only because their figures are huge but also that the figures are even suppressed as large-scale reforestation is offsetting real biomass loss. China witnessed a forest area growth of 2.2% annually between 2000 and 2005, making the country one with the largest annual gain in forest area of about 4.1 million ha per annum. China also ranks 5th, and India 10th in the world with the largest forest areas in 2005, and both countries report significant total carbon stock increases between this period, mainly from afforestation programmes. This shows that though the forested areas in these countries are increasing through afforestation, huge biomass loss is occurring at the regional levels through deforestation and devegetation in old forests. The figures in FRA 2005 are reported by the countries themselves but their reliability could vary.

One element missing from the statistics on deforestation is density of forests. Deforestation is measured in terms of loss of canopy cover (i.e., when canopy cover drops below 30%, as defined by UNFCCC). In many cases there are human processes going on which result in the thinning out of the forests, but these processes may not result in complete deforestation. This is considered to be forest degradation. Most countries do not collect statistics on degradation, nevertheless it is a major source of CO_2 emissions.

The Role of the Forestry Sector in the Kyoto Protocol

Initially, emissions trading was only for the energy sector; it was only later that the forestry sector was included. The carbon dynamics of forests have now become an integral part of the KP. There are important reasons for the inclusion of forests in the Kyoto Protocol. Biological sequestration of CO_2 by the forest is considered to:

- Be more cost-effective than other carbon sequestration methods (Schlamadinger et al. 2007, Stern 2007, Kauppi and Sedjo 2001, and van Kooten et al. 2004);
- Reduce carbon emissions as it is estimated that global deforestation accounts for more than 18% of the global GHGs emissions (Stern 2007) to about 25% (IPCC 2000);
- Bear the potential to store large volumes of carbon as huge historic losses have occurred from terrestrial ecosystems (Upadhya et al. 2005, Kauppi and Sedjo 2001);
- Open up of a 'virtual market' for carbon as a non-timber forest product (NTFP), where previously, forest products had no linkages with markets (Skutsch, 2005), thereby assisting in the development of a Payment System for Environmental Services (PES);
- Replenish carbon in the terrestrial ecosystem with a multitude of benefits in improving soil fertility, ecosystem and biodiversity, which in turn has a series of other benefits attached (Janzen 2004);
- Enhance livelihood options for poor communities dependent on forest resources; and
- Be an adaptive strategy to cope with the adverse effects of climate change.

In spite of the importance of the forestry sector, the Kyoto Protocol views activities permitted under this sector differently for industrialised and non-industrialised countries. Article 3.3 of the KP requires industrialised countries to take into account in their national inventory of GHGs human-induced afforestation, reforestation, and deforestation activities and, under Article 3.4, puts additional measures in the land-use sector that contribute to the national accounts. These include management of forests that were there before 1990. This allows industrialised countries to generate carbon credits and meet part of their KP commitments. Consequently for many industrialised countries where forest biomass is increasing, (for example, the boreal forests), inclusion of forest management in national GHG accounting enables these countries to gain carbon credits in a relatively low-cost manner. This is the reason countries like Switzerland have expressed interest in including forest management in their national GHG inventory.

But permitted forestry activities for non-industrialised countries are limited to afforestation and reforestation and do not include avoiding deforestation and other forest management activities under the CDM. Forest management through avoiding deforestation is not credited under this mechanism for non-industrialised developing countries.

Forestry activities for carbon management

As mentioned in the previous section, only two categories of forestry activity qualify forests as sink projects under CDM: afforestation, and reforestation. According to the CDM definition, afforestation is the direct human-induced conversion of land that has not been forested for a period of at least 50 years through planting, seeding, and/or the human-induced promotion of natural seed sources. While reforestation is the direct human-induced conversion of non-forested land to forested land through planting, seeding, or human-induced promotion of natural seed sources on land that was forested but has been converted to non-forested land. For the first commitment period (2008–2012), reforestation activities will be limited to reforestation occurring on those lands that did not contain forests on 31 December 1989.

Afforestation activities qualify for sink projects on lands that did not have forests before 1990. Much of the CFM that we see in India and Nepal are on land that did have forests before 1990, as they were common lands with some form of degraded forests. Hence, community-managed forests, such as those found in Nepal and India, cannot qualify for carbon sink projects for Afforestation. CFM is about avoided deforestation as community intervention has stopped deforestation in common lands through the deployment of strict protective measures. Avoiding deforestation for controlling emissions is not a recognised activity under the CDM.

In reality, however, carbon emission reduction strategies can be developed by managing forests. Bass et al. (2000) have identified three carbon management strategies in forests, which are also compatible with community-managed forests. These are carbon sequestration, carbon conservation, and carbon substitution. The strategies are described in Table 3.3 with an illustration of activities and forest management types. Given that community-managed forests also have livelihood options embedded in them, carbon management strategies can accommodate the complex relationship between livelihoods and forest management, as reflected in the third column, which can be used to develop carbon offset projects aimed at a specific carbon management strategy.

Table 3.3: Carbon management strategies under different forest management activities

Strategy	Land use type and forestry activity	Forestry/rural development project type
Carbon sequestration	• Silviculture in increased growth rates • Agroforestry • Afforestation, reforestation and restoration of degraded lands • Soil carbon enhancement (e.g., through alternative tillage practices)	• Community/farm/outgrower plantations • Forest rehabilitation or restoration • Agroforestry
Carbon conservation	• Conservation of biomass and soil carbon in protected areas • Change forest management practices (e.g., reduced impact logging) • Fire protection and more effective use of prescribed burning in both forest and agricultural systems	• 'People and Protected Areas' projects • Agriculture intensification • Rotational shifting cultivation • Community fire control schemes • Home gardens • NTFP production • Eco-tourism
Carbon substitution	• Increased movement of forest biomass into durable wood products, used in place of energy-intensive materials • Increased use of biofuels (e.g., introduction of bioenergy plantations) • Enhanced utilisation of harvesting waste as a biofuel feedstock (e.g., sawdust)	• Community fuelwood • Community farm fuelwood • Charcoal production

Source: Bass et al. (2000)

The important role played by forests in sequestering CO_2 from the atmosphere, and the livelihoods and environmental benefits that will be accruing to the local communities enable CF to meet the dual objectives of CDM of sustainable development and emissions reduction. Hence, the growing interest in linking community-managed forests to climate change.

The History of Community Forestry

Community-managed forests in the Himalayan region

Community-based forest management as a mainstream forestry policy started around the late 1970s as an approach to mitigate increasing deforestation and forest degradation and address the negative impacts on rural livelihoods. In Asia, this management approach quickly became widespread, and as shown in Table 3.4, different forms of community involvement in forest management and protection have evolved.

Table 3.4: Status of community forestry in Asian countries

Country	Management Approach	Forest (million ha)	User group	Population
China	Collective Forest	153	NA	NA
India	Joint Forest	14	62,000	75 million
Philippines	Community-based Forest	5.7	2,182	NA
Nepal	Community Forest	1.1	14,000	7.8 million

Source: Karky (2005)

CFM plays a prominent role in the Himalayan region, where agriculture, livestock rearing, and the forest are strongly interlinked. Joint Forest Management (JFM) in India is the product of severe forest exploitation and conflict between the users and management authorities more than a century ago. The formal forestry sector in India is much older and has undergone four stages in policy changes from colonialism, commercialism, conservation, to collaboration; while in Nepal, it has evolved from privatisation to nationalisation, to populism, according to Hobley's 1996 classifications. The Van Panchayats (VPs) or Forest Councils of Uttarakhand are democratic and autonomous local institutions which have been managing legally demarcated village forests for over 70 years. The VP can also be regarded as one of the earliest forms of devolution in common property management in collaboration with the state (Arnold and Stewart, 1991). The community forest user group (CFUG), a democratic autonomous grassroots level institution in Nepal, is much younger and started only in the late '80s, but the pace of its promotion has grown rapidly in Nepal, as shown in Table 3.4.

Community involvement in forest protection, management, and utilisation of resources became a government policy in the forestry sector in the Himalayan region as a result of earlier failures of the states to mitigate escalating deforestation and forest degradation taking place. It was thus realised that without the inclusion and collaboration of the local people, forest protection and management efforts of the state alone would be futile. Together, the VP and the CFUG are really about decentralised resource management.

Under state management in Nepal, unregulated livestock grazing and fodder collection were the major causes of forest degradation, preventing natural regeneration, while unrestricted fuelwood and timber collection were the major causes for deforestation. This was a classical case of the tragedy of open access: anyone and everyone had unlimited access anytime because the state owned the resources and it was managed by that state's staff.

Community-based management of forests is about avoiding deforestation, and also about avoiding forest degradation by implementing protective measures. Forest degradation has been checked and forest regeneration, which is mainly dominated by natural regeneration, has taken place after stringent protective measures were deployed by local people through CFUG interventions. By means of locally enforced strict forest protection measures, forests were recuperating ecologically and already becoming important habitat for wildlife outside protected areas. Communities have easier access to firewood, timber, fodder, forest litter, and grass from the forest's conservation and better management. Soil erosion has been mitigated and water sources have been conserved in such areas.

An example of a community-managed forest in Nepal

Community forests play a prominent role in the hills of Nepal, where agriculture and livestock rearing and the forest are strongly interlinked (Gilmour and Fisher 1991). To mitigate the growing deforestation and the deteriorating state of forests all over the country, the Government of Nepal made a policy, based on the 1976 National Forestry Plan, to involve local communities in forest management. As of 2004, about 25% of the total national forests covering around 1.1 million ha are being managed by 13,000 CFUGs distributed across 1.4 million households – i.e., 35% of the population (Kanel 2004). The bulk of this population lives in the hilly areas. The Federation of Community Forest Users Nepal (FECOFUN) has, over the years, become one of the largest organisations in the country, with eight million forest users as members.

The impact of CFM policy in the forestry sector has been positive. Where communities are managing their forests, the degradation trend in the hills has been checked. Forest conditions have improved in most places, with positive impacts on biodiversity conservation (Mikkola 2002; Springate-Baginski et al. 1998, as cited in Acharya and Sharma 2004). Numerous degraded forest ecosystems have improved due to decentralised and participatory development strategies (Banskota 2000). Communities have had easier access to firewood, timber, fodder, forest litter, and grass (Kanel 2004; Acharya and Sharma 2004). Soil erosion has been mitigated and water sources conserved in previously degraded forest areas where communities have been able to regenerate forest cover.

While members of the CFUGs pay a nominal fee for the various forest products they consume, these products have been able to fetch much higher prices when marketed. The estimated monetary value of timber extracted by the communities (NRs. 1.27 billion ≅ US$ 18 million) is higher than the value of fuelwood (NRs. 0.39 billion ≅ US$ 5.5 million, at the exchange rate of Rs 70.9=1US$), although in terms of volume, fuelwood extracted is about three times more than the harvested timber. Kanel (2004), in his study on community-managed forests, found that revenues collected by CFUGs were often invested in social infrastructure selected by the community members, such as for school maintenance, the construction of a drinking water facility, amongst others. Part of the revenues (about 28%) are also used for forest protection and management. More financial revenues from carbon could enable greater spending on rural development and better forest conservation and management.

CFM in the Himalayan region is a major source of energy for the rural population. Fuelwood is by far the largest source of energy in Nepal, accounting for 76% of the total consumption for 2002 (MoPE 2003), decreasing from 81% in 1995-1996 (Amatya and Shrestha 1998).

If cutting for fuelwood exceeds forest regeneration rate, the forest becomes a net carbon source. At the same time, sustainable harvesting of fuelwood makes it a net CO_2 sink by replacing fossil fuel or unsustainable harvested fuelwood (Watson et al. 1996). The figures from the Himalayan region on fuelwood use, by itself, mean little in terms of carbon emission, so each case must be analysed individually, taking into account the forest regeneration capacity and the extraction rate of fuelwood from the forest. Leakage must also be accounted for, althrough this is outside the scope of this research.

Why CFM is not Recognised under the Kyoto Protocol

CFM is about avoiding deforestation by including local communities in managing and protecting the forests in common lands. Avoiding deforestation in non-industrialised countries was not included in the CDM because leakage from avoided deforestation was considered to be a significant hazard difficult to estimate and monitor (Schlamadinger, et al. 2007). Leakage is the endogenous increase in carbon emissions as a result of emissions reduction elsewhere. Each CDM project has to address and account for potential leakage, and there are no clear ways to address leakage from avoided deforestation. An example would be from Uttarakhand in India, where it can easily be argued that a Van Panchayat (VP) may be protected at the cost of a rapidly degrading state forest. It takes detailed analysis to prove that a VP, managing a forest in one area, is not contributing to deforestation in another forest. (Refer to Chapter 5 for more details on VP management in Uttarakhand.) This research does not address the issue of leakage.

Another reason for its exclusion, as stated by Skutsch et al. (2007), was that at the time of policy negotiations in 2001 at Marrakesh, there was a strong opposition from many sectors to including large-scale land use change management because this would reduce the efforts in the energy sector. It was thought that by permitting avoided deforestation there could be a market glut of carbon credits (due to excess supply of carbon), bringing the price down so low that eventually CDM would be counterproductive (Trexler 2003). Hence, for the first commitment period, LULUCF options have been restricted to afforestation under CDM.

This is unfortunate since, in essence, the present CDM criteria permit large-scale monoculture plantations and ignore biodiversity-abundant and sustainable management practices, despite one of the twin objective of CDM being, to assist non-Annex 1, non-industrialised countries in achieving sustainable development. Sustainable development goals are better addressed in small-scale community-managed sustainable forests than in large-scale commercial monoculture plantations.

The Way Forward: Reduced Emissions through Deforestation Policy

Between 18-25% of global emissions remain unabated and outside the purview of the UNFCCC and the KP. There is now a growing interest to include these emissions in the second commitment period after 2012. As CDM fails to reduce emissions from deforestation in non-industrialised countries, there is a strong move to find ways to reduce CO_2 emissions from the terrestrial ecosystems by reducing the deforestation rates. Under a policy called 'Reduced Emissions from Deforestation' (RED) several approaches have been developed and are being discussed by the Parties. This is quite different from the existing CDM approach. CDM operates at project levels, whereas the proposed new approaches under RED are country-wide and use past deforestation rates as the baseline so that leakages are also accounted for. For the second commitment period, such mechanisms could be included under the KP, or directly under the UNFCCC, depending on future negotiations.

In 2003, at a side event in the CoP 9, 'compensated reduction' was introduced as a possible approach to account for deforestation. The idea behind this is that addressing emissions from deforestation is distinct from sequestering it by a sink project (AR). Under this mechanism, non-Annex 1, non-industrialised countries can reduce their national deforestation rates under a historical baseline and be allowed to acquire carbon offset credits by demonstrating reduced deforestation (Santilli, et al. 2005). In 2006, at CoP 11, this concept of compensated reduction was further refined by the Institute for Environment and Sustainability for the European Commission Joint Research Centre (Skutsch et.al. 2007). It uses the same baseline approach, taking the historical deforestation rate as compensated reduction, except that it starts from the global average rate of deforestation. A nation with a baseline deforestation rate above half the global average deforestation rate would be able to receive credits for the commitment period.

Under the proposed RED mechanism, the two approaches mentioned have several advantages as described by Skutsch et al. (2007). First, if accepted, they will account for a major source of emission from deforestation in tropical regions and enable market mechanisms to be used for mitigation measures. Second, they will address leakage since baselines at national levels would mean detecting and accounting for losses as well as gains. Third, transaction costs would be reduced significantly compared to individual projects. Finally, both approaches give much more authority and responsibility to the countries themselves in reducing emissions from deforestation.

At the CoP 11, a two-year process was started to explore this new option of RED, and the debate is ongoing. In May 2006, the UNFCCC Subsidiary Bodies (SB 24) met, where this option was further discussed. A side event titled, 'Reducing Emissions from Deforestation in Developing Countries: Methodology and Policy Issues' presented how this could be achieved. Discussions are ongoing to find the most effective and practical emissions reduction strategy for the second commitment period. At the CoP 12 in Nairobi in December 2006, the Subsidiary Body for Scientific and Technological Advice (SBSTA), at its 25th session, invited Parties to submit their views on RED to the secretariat by 23 February 2007. The secretariat has received 19 submissions from Parties including from India and Nepal. Hopefully, the global community will be able to agree on and implement a RED policy soon that will more effectively account for emissions outside of the coverage of the UNFCCC and the KP, and at the same time provide incentives for those that conserve and manage forests in non-industrialised countries.

Conclusion

The Kyoto Protocol is a commitment to reduce human-induced emissions of GHGs to the atmosphere, and was created with the objective to implement the UNFCCC after it had been scientifically proven that climate change was occurring. However, deforestation in tropical countries, which is a major source of CO_2 emissions, remains outside the UNFCCC.

Forests play a significant role in stabilising the concentrations of atmospheric CO_2 as they switch between becoming a source and a sink. Permanent loss of CO_2 from the terrestrial ecosystem by conversion of land use and loss of biomass can be reduced by avoiding deforestation. Community forest management, as undertaken in the Himalayan region, is becoming an important strategy for increasing carbon pool levels in the region from a climatic perspective, as these forests are beginning to show signs of regeneration in previously deforested areas.

The Clean Development Mechanism of the KP does not, at present, bring benefits to marginal communities living in the Himalayan region, vulnerable to the adverse impacts of climate change. However, as the scientific community has gained new insights into more effective ways to reduce global emissions, there is now a growing interest in finding ways to include reducing deforestation in non-industrialised countries in the post 2012 era. Therefore, it is important for authorities in the regions concerned with CFM to take early cognisance of the potentials and possibilities that CFM offers and be able to lobby for a mechanism that brings benefits to the locals that conserve forest locally, while extending the benefits globally.

The recent policy developments are concerned with innovative ways to tackle reduction of emissions from deforestation in non-industrialised countries. Mechanisms like the RED, that will have a global benefit of reducing emissions from deforestation and at the same time reward those in the non-industrialised world that clean up the pollution, will be welcomed by many.