

Can Carbon better contribute to poverty reduction? Prospects of community-based leasehold forestry in Nepal

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Abstract

Clean Development Mechanism (CDM) has been glorified as a win-win strategy for mitigating green house gases at global level and reducing poverty in developing countries. In forestry sector, the afforestation and reforestation scheme has been approved for CDM for the first commitment period. Despite substantial plantation activities, no forestry-based CDM has been initiated in Nepal yet. Although the projects can be established anywhere meeting eligibility criteria of CDM, community-based leasehold forestry is one of the most potential areas. It aims at poverty reduction and reforestation of degraded hills providing access for the groups of poor households to the resources with exclusive user rights. However, studies show that poverty reduction impact has not been significant despite significant improvement in environmental restoration (reforestation). As the leasehold forest can be handed over only in the area where the crown cover is less than 20 percent, the area below 10 percent crown cover could be used for CDM plantations. This paper examines if the existing forage-based practices of leasehold forestry can be switched to carbon sequestration practices for better livelihood opportunity to the lessee households. While so doing, the opportunities and constraints of establishing CDM projects in leasehold forestry have been explored. A preliminary estimation of plantation areas shows that there is enormous potential in claiming for carbon dollars from leasehold forestry. Taking only 50 percent of potential leasehold forest for carbon trading, gross annual income ranging from US\$ 1.2 million to 2.4 million can be earned, which is substantially higher than the overall income they are reaping from existing practices. However, high transaction costs, lack of enabling policies, lack of carbon-related technical capacity and global scope of forestry-based CDM are the restraining factors. The paper concludes to advocate for bringing leasehold forestry and avoided deforestation as well under carbon trading for poverty reduction.

Key words: *Clean Development Mechanism, poverty reduction, leasehold forestry, Nepal*

Introduction

In addition to customary benefits, such as timber and fuel-wood, forest commons are the valuable sources of environmental services including watershed functions, carbon sequestration, biodiversity and landscape beauty. Efforts are being made to estimate and value such services in economic terms in order that mechanism of the Payment for Environmental Services (PES) could be well established to reward the people directly contributing to producing such services (Hall 2008; Krieger 2001; Swallow *et al.* 2005).

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Unlike in other forms of PES, such as biodiversity and watershed functions, various complicated factors such as cost of excluding free riders, transaction costs associated with market function, thresholds and increasing returns to effort in the supply of environmental services have been simpler to identify and estimate in carbon sequestration services (Swallow *et al.* 2005). Clean Development Mechanism (CDM) under the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC) is one of the mechanisms to recognize and reward people contributing (through plantations) to carbon sequestration services.

CDM has often been lauded as a win-win strategy for both the industrialized countries (Annex-1 countries) and the developing world (non-Annex-1 countries). At one hand it targets at reducing green house gases, especially carbon dioxide at global level, on the other, it contributes to poverty reduction in developing countries from carbon dollars in lieu of the carbon they sink. Besides the local benefits in developing countries, the economic analysis of carbon trading needs to be viewed from global perspectives as it has impact on global carbon cycle. It is assumed that both parties, i.e. the industrialized countries (carbon credit buyers) and developing countries (carbon credit sellers) would be better off if carbon trading through CDM took place. Afforestation and reforestation projects can only be claimed under forest-based CDM for the first commitment period lasting between 2008 and 2012 (CDM-EB 2007). The inclusion of existing or natural forests that prevent carbon emission would have been better option under the CDM for developing countries which often lack adequate technical and financial capacities for massive plantation. However, the decision of CDM Executive Board to exclude such carbon conservation projects labeling as 'avoided deforestation' for the first commitment period has officially ceased the likelihood that developing countries can benefit from their carbon credits stored in their natural or existing forests at least until the year 2012. Although the 13th Conference of the Parties (COP 13) to UNFCCC has recently put forward a concept of 'Reduce Emission from Deforestation in Developing Countries' (REDD), it is still in the phase of feasibility analysis (Hall 2008). Therefore, the desirability of CDM still holds appropriate for the developing countries in carbon regime as long as the area for plantation is available and the concept of REDD has not been fully enforced. Using the example of community-based leasehold forestry in Nepal, I seek to explore if CDM could be a feasible and better option for poverty reduction from forest commons over the existing practices.

The purpose of this paper is to contribute to the discussions made on forest-based poverty reduction in Nepal by examining how community-based leasehold forestry practices could scale up economic benefits to the ultra-poor and augment environmental rehabilitation. While so doing, the existing forage-based practices in leasehold forests (studied at case study sites and project documents) are compared and contrasted with the proposed carbon-based practices (derived using benefit transfer method) in terms of production and equitable distribution of both economic and ecological benefits.

A few works have been done in Nepal on the advocacy in carbon trading regime for the inclusion of community forestry, another form of forest commons usually with pre-

existing dense forests (e.g. Karki 2005; Karki and Baskota 2006; Marasini *et al.* 2005; Skutsch 2003). However, the inclusion of such community forests has not been feasible at least until 2012, given ineligibility of existing forests for the CDM. A preliminary review hinted that Nepal could maximize benefits from carbon trading if CDM on afforestation and reforestation were established while simultaneously advocating for including community forests as well in the mechanism (Dhungana *et al* 2007a). In this paper I would argue that CDM could be the immediate alternative in the case of community-based leasehold forestry for the three major reasons. First, CDM is an approved mechanism for UNFCCC, while REDD is still in feasibility study phase implying a far-off journey to go. Second, CDM has come a long way with market, institution and policy experiences having both success and failure stories elsewhere that can be learned to run new projects effectively and efficiently in Nepal. Last but not least, the potential or many existing forage-based leasehold forests are barren lands or *de facto* 'non-forests', that are eligible only for CDM and have nothing to do with REDD until dense forest is established so far as carbon regime is concerned.

Community-based leasehold forestry in Nepal

Nepal is one of the least developed countries suffering from extreme poverty with the Gross Domestic Product per capita below US \$270. The country had 44 percent of people below poverty line in 1994 but the figure dropped to 31 percent (of 25 million) in 2004. However, the Gini coefficient measuring the gap between the rich and the poor increased from 0.31 to 0.42 during the same period of time (NPC 2007). Therefore, the three consecutive five year plans of the country since 1997 have had poverty reduction as the major objective (NPC 1997; 2002; 2007). The poverty is more severe in rural areas where people highly depend on forests than urban sites. Unlike in urban centers, about half of the population lives below poverty line in the rural areas (IFAD 2005). Targeting households as the beneficiary as opposed to community at large has been an emerging approach for poverty reduction in the rural parts (Dhungana *et al* 2007b). The forest-based poverty reduction is a major strategy of the country for which Nepal' Poverty Reduction Strategy Paper (PRSP) acknowledged community-based leasehold forestry (CBLF) as one of the programmes with highest priority to be continued (NPC 2002; IFAD 2005).

Started in 1993, CBLF in Nepal aims at twin objectives of poverty reduction and environmental rehabilitation. Conceptually, it has to contribute to reducing poverty of forest dependent poor vis-à-vis reclaiming vegetation on degraded forest lands. The program targets the poorest of the poor as the beneficiaries of leasehold forests that are sparse and degraded below 20 percent crown cover during their handover. Although the land is legally called a 'forest', it is only a potential forest taking crown cover into account. CBLF has been funded by The International Fund for Agricultural Development (IFAD) since 1993. The current phase of project, which is called Leasehold Forestry and Livestock Programme (LFLP) started in 2005 and will last till 2012 covering 22 districts out of 75 in the country. However, the programme can be implemented in degraded forest land in any other districts under the Department of Forests provided fund is available.

The staff members of District Forest Office under the Department of Forests principally facilitate the leasing process in the respective districts. The poor households below national poverty line thresholds (household income below US\$100 per year or having private land below 0.5 hectare) are identified using well-being ranking. It is followed by the formation of groups each comprising of five to 15 households, which are the poorest among the poor. The membership of the group remains with the household. A patch of approximately 10 hectares of degraded land is leased to each group for 40 years, subject to the renewal for another 40 years. Each group is supposed to work complying with the management plan prepared for five years and to be renewed at the end of each five years over the lease period. After handover, project supports are provided to the group and lessee households to practice forage-based activities on the land. Planting fodder seedlings and grasses followed by the protection of the land from grazing has been the common practices, which are supposed to generate livestock-based income to the poor households and rehabilitate the environment of the degraded land. By November 2007, altogether 17,244 ha of degraded forests have been leased to 3417 user groups covering 28,112 households (DOF 2007). Although the current project, namely Leasehold Forest and Livestock Programme (LFLP) under the Department of Forests targets to lease approximately 35,000 hectares of degraded forest land to 44,000 poor households for eight years beginning in 2005 (IFAD 2005); the potential community-based leasehold forest is approximately half a million hectare taking the area of degraded forests into account (Singh 2004).

Case study site: leasehold forestry in Chitawan district

The leasehold forestry in Chitawan district was chosen a case study site in central region of Nepal for this paper. The total area of the district is 0.2 million hectares covering plain area, Siwalik hills and Mahabharata ranges of the Himalaya. The altitude of the district ranges from 141 to 1945 meters above mean sea level. Therefore, the average climate of the district ranges from tropical to sub-tropical, the mean temperature ranging between seven and 37 degree Celsius. The total population of the district is approximately 0.5 million. Regarding land-use pattern of the district, agriculture and settlements cover about 41 percent, whereas the area under forest category covers 59 percent (0.13 million hectares) of the total land of the district. Out of the total forests, only 1060 hectares have been handed over as community-based leasehold forests so far, whereas the rest of the forest area is either community forests (10,000 hectares) or under government control including protected area and potential leasehold forests.

By October 2007, only 235 leasehold forest user groups comprising of 1,741 households have been formed and 1060 hectares of degraded forest land have been leased to these groups. The leasehold forests are distributed in five range post areas under Chitawan District Forest Office. The leaseholders in Chitawan district have planted improved and local varieties of grasses and tree seedlings whereas scattered bushes were already in the land. The following table 1 shows the percentage of ground cover in the average leasehold forests in different range post areas. It suggests that the average leasehold forest area is still covered by mostly bush or is open although some of the leasehold forests were handed over during 1994. The average leasehold forests

of only one range post, i.e. Haripur has 12 percent crown cover, whereas rest of the range posts have leasehold forests with crown cover below 10 percent.

Table 1: Current status of ground cover in percentage in average leasehold forests in each range posts

SN	Range posts	No. of groups	Stylo grass (%)	Mollases grass (%)	Local grass (%)	Tree seedlings (%)	Bushes (%)	Open land (%)
1	Mungling	59	1.6	39.57	13.74	5.19	16.87	23.03
2	Haripur	70	2.33	1.73	22.58	12.67	14.57	20.86
3	Korak	41	1.59	60.73	0	4.17	0.37	1.10
4	Shaktikhor	60	1.67	2.42	10.17	5.67	2.79	2.3
5	Amilepani	5	0	0	0	2	70	28

Source: DFOC 2007 verified by author

Most of the leasehold forests in Haripur were leased before the year 2000 and therefore it has relatively denser crown cover than the rest of the leasehold forests. If we use the examples of the leasehold forests in Chitawan, they are virtually 'non-forests' if we consider 10 percent crown cover as the minimum criteria for the land to be forests complying with Nepal's annual reports to FAO.

Poverty reduction target versus reality

The leasehold forestry programme has ambitious objectives that include a sustained reduction in poverty of at least 44, 300 poor households in 22 programme districts through increased production of forest products and livestock (IFAD 2005). The leasehold plots would be managed to meet household subsistence and income needs (economic objective) along with a positive environmental impact through the conversion of degraded forest land into productive forest land (ecological objective). The programme anticipates that the level of annual income of each participating household would rise by a range from US\$ 87 to 216 (almost per hectare) in a way that these households would start coming out of poverty trap after five years of lease and attain complete alleviation after about 10 years. The overall economic internal rate of return of leasehold forestry over 20 years is expected to be 16 percent on an average, which is highly substantial. When looked at the achievement side, the leasing process is satisfactory or even higher than the annual targets (DOF 2007); but the impact on poverty reduction has been a challenge.

Various studies note that the lands have been substantially reclaimed in terms of woody biomass and species diversity in leasehold forests (IFRI 1998; NPC 2005; Ohler 2000). However, no significant improvement in livelihood status of the lessee households has been observed (NFRI 1998; Nagendra *et al.* 2005; NPC 2005; Ohler 2000; Thoms *et al.* 2006). Therefore, the poverty reduction side of the two objectives of the program has been a contested issue. Thoms *et al.* (2006) even contend that the programme has simply redistributed the poverty by not raising the incomes of all the households in a group simultaneously. The case study in this paper also substantiates the arguments that poverty reduction target has not been attained to the extent that the project document stipulates (i.e. increase in household income from US\$ 87 to 216 per year).

Given in Table 2 below is the average gross income per hectare in leasehold forests disaggregated into different range-posts.

Table 2: Average gross income of leasehold forests per hectare (per households) in FY 2006/07

SN	Range-posts	No. of leasehold groups	Average income (NRs) per hectare	Major income sources
1	Mungling	59	2300	grasses, grass seeds, fuel-wood, fodder, fruits, dairy product
2	Haripur	70	2500	grasses, grass seeds, fuel-wood, fodder, small timber, dairy product
3	Korak	41	1800	grasses, fuel-wood, fodder, dairy product
4	Shaktikhor	60	2100	grasses, fuel-wood, fodder, dairy product
5	Amilepani	5	1200	fuel-wood, fodder, dairy product

NRs (Nepalese Rupees): US\$ ≈NRs 65 in average 2007 rate.

Despite substantial input from both the programme side and the participating households, the average income in a fiscal year (2006/07) is approximately US\$ 30 per hectare or per household. As compared to the project impact target or national poverty reduction strategy, the amount is not significant. The existing forage-based practices could be explained as the limitation for higher benefits from the same patch of leasehold forest land.

Discussing carbon trading option

The misappropriation of economic benefits from leasehold forests by non-poor section of the society has been pointed seriously by various researchers (e.g. Nagendra *et al.* 2005; Thoms *et al.* 2006). Agreeing with their findings on inequitable distribution of economic benefits, my contention is that there is misappropriation of ecological benefits as well. The input the lessee households invest in the leasehold forests would have produced both the livelihood and environmental impacts equally. Nonetheless, the environmental outcomes being heavier than the livelihood outcomes can result in exacerbating poverty as non-lessee households have chances to free ride on the environmental services produced at a cost of the poor. A mechanism to convert environmental benefits to sustainable livelihood benefits without degenerating environmental capital would better contribute to poverty reduction from the program resulting in win-win outcomes. One of such options would be the management of the land for carbon trading with afforestation and reforestation under Clean Development Mechanism (CDM) of Kyoto Protocol.

The leasehold forests with less than ten percent crown cover can be brought under CDM for carbon sequestration projects. Plantation is carried out in the area below 10 percent crown cover to meet the eligibility criteria of CDM. Once the plantation is established complying with the criteria of CDM, the forest area can be used for carbon as non-timber forest product, as Skutsch (2003) names, to be sold under CDM. So far, no studies have been undertaken for estimating the rate of carbon sequestration in leasehold forests. However, a benefit-transfer approach, in which the value of economic benefits estimated elsewhere, is 'transferred' to the site of policy interest (leasehold

forests in this case). Empirical studies carried out in Madhya Pradesh and Andhra Pradesh of India estimated that dry deciduous forests under community management could sequester up to seven metric tons of carbon annually and the average value was six metric tons per hectare per year in Andhra Pradesh (Skutch 2003). Satyanarayana (2003) observed the variation of prices from US\$ 3 to 57 per metric ton of carbon but according to Skutch (2003), US\$ 10 to 20 per metric ton of carbon is the common spread. Using these studies for preliminary estimation, US\$ 60 to 120 per hectare per year could be earned under CDM from leasehold forest in Nepal. If only half of the degraded forest land (i.e. about 20,000 hectare) targeted by LFLP were brought under CDM, the gross annual income would be from US\$ 1.2 million to 2.4 million in 22 project districts.

Despite the enticing estimates for poverty reduction from leasehold forest under carbon trading, switching traditional practices to CDM would require both opportunity and resource costs including significant transaction costs. The following are some major restraining factors to be resolved in association with carbon trading option in leasehold forestry as distinguished from prevailing practices.

Transaction costs

Carbon trading being a component of international market usually requires higher transaction costs than the traditional options. Organization of a number of leasehold forests into cooperatives, involvement of national and international broker institutions and staff, baseline study of carbon forests and regular monitoring of sink and leakage all require extra costs to prepare for real buying and selling of carbon credits to occur. The project costs incurred for the existing forage-based practices have been calculated to be US\$ 1,400 per hectare of lease land over the project period (IFAD 2003). The transaction cost of carbon project would go even higher although actual estimation is yet to be determined.

Lack of enabling policie

The government of Nepal has set up the Designated National Authority (DNA) for Clean Development Mechanism under the Ministry of Environment, Science and Technology, which is also the focal point of UNFCCC and the Kyoto Protocol. Thus all CDM-related programmes should come under the 'environment, science and technology' sector in the national policy documents including periodic development plans of the country. However, all the forestry-related activities including afforestation and reforestation come under 'forestry sector', for which the Ministry of Forests and Soil Conservation is responsible. Not a single word has been mentioned about CDM in the programmes assigned for Environment, Science and Technology sector in the government's latest Three Years' Interim Plan (2007/08-2009/10). The forestry sector programmes, on the other hand, in the same Plan include claiming in international forums for payment for environmental services Nepal has provided through community forestry and biodiversity conservation. It can not be considered only the lack of inter-ministerial coordination. The term CDM has been mentioned in forestry sector programme of the Plan but CDM related policies, programmes or action plans are completely lacking.

Lack of technical capacities

CDM is a relatively new concept both theoretically and empirically. It is a mechanism requiring multi-disciplinary knowledge and skill transcending the traditional forest management practices. Foresters have little knowledge and skill in CDM, while the professionalism of people from other disciplines on forest management is unlikely. In Nepal, CDM has been initiated in biogas and micro-hydro-electricity projects both of which are non-forestry CDM. Individuals who are interested in forest-based carbon trading or even in carbon sequestration working in the country were found limited during this study.

Global scope of forest-based CDM

The scope of forest-based CDM during the first commitment period is very restricted. Satyanarayana (2003) estimated that only approximately 50Mtc would be transacted annually at the rate of US \$10 per ton of carbon during the first commitment period. Capoor and Ambrosi (2006) noted that afforestation and reforestation projects accounted the share of only one percent globally and three percent regionally in Asia of the total volume of carbon trading under CDM. The figures suggest substantial challenge and risk to take initiative for forestry CDM. Given the global statistics, the proponents of CDM anywhere have been reluctant to invest in forestry CDM. As a result, only biogas projects and micro-hydro projects have been operated under CDM in Nepal but no forest-based CDM has been initiated yet.

Conclusion and way forward

Forest-based poverty reduction is the primary focus of the country given the magnitude of mass poverty in the rural population heavily accounting on forest land for their basic needs and income. Community-based leasehold forestry has been an innovative programme in principle but its impacts on poverty reduction has not been properly attained against the stipulated objectives of the programme. The issues not only involve the cases of underproduction from the lease land but also the inequitable distribution of economic and ecological outcomes from leasehold forest commons resulting in injustice for the poor. Although some scholarship argue that the problems lie in the implementation rather than the design of leasehold forestry (e.g. Thoms et al. 2006), the empirical information at case study level in Chitawan district indicates some faults in pre-designed forage-based practices as well. The unexpected low level of income from grasses, fodder and livestock production is one of the factors that need to be reviewed if better poverty reduction is anticipated. One of the options would be the management of leasehold forests for carbon trading under CDM. But changing current practices to CDM-based management is not an uncomplicated task, given the policy, institution, technical, human and financial capabilities of the country. In this scenario, whether the net benefits of carbon trading under various constraints exceed the net benefits of existing practices is unknown. The comparison of various decision making criteria of the two options under discounted value of money would contribute to providing a basis for selecting if the program could be switched to carbon trading for better livelihood outcomes to the poor. Equally important is the limitation of forest-based CDM globally, taking the scope and current trend of marketing into account. In this connection, the country should also lobby for the implementation of Reduce Emission from

Deforestation in Developing Countries (REDD) for the time beyond 2012. If REDD came into force with Nepal's participation in both CDM before 2012 and REDD after it, poverty reduction could be accelerated by three major ways after 2012. First, the results, institutional set up and lessons of proposed CDM could be applied to easily design and implement REDD. Second, the existing mainstream dense forests which account for about four million hectares could be managed for carbon trading with less input than does CDM require. Last but not least, the leasehold forests under proposed CDM before 2012 would become denser enough for bringing under REDD programme during the time beyond 2012 when CDM has terminated.

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