Promoting Self Sufficiency Through Carbon Credits From Conservation and Management of Forests

Mukesh Kumar Gupta

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Professor Rob Goble, Chief Instructor

Abstract

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Forests of the world sequester and conserve more carbon than all other terrestrial ecosystems and account for 90% of the annual carbon flux between the atmosphere and the Earth's land surface. Two case studies from India and Bolivia have been studied to demonstrate the complexities of carbon forestry projects to generate carbon credits and for their role in the development of local communities and environment. This paper seeks to understand what benefits are made available to local communities through existing carbon sequestration schemes under carbon markets and what incentives there are for executors to involve local people as beneficiaries or partners. It also discusses the potential harmful effects which such integration between rural poor and carbon market could cause.

In the Clean Development Mechanism (CDM) of the Kyoto Protocol emphasis is placed on afforestation and reforestation programs and conservation and management of existing forests are not included. Traditionally local subsistence communities are involved in forest management practices in many parts of the developing world. One prominent example is *Van Panchayats* (Forest Management Committees) in Uttaranchal State of India. If forest management was included in the Kyoto Protocol, many communities of developing countries engaged in forest management would potentially benefit. In the absence of a mechanism with the Kyoto Protocol, voluntary carbon market can serve a similar purpose.

Rob Goble, Ph.D.

Chief Instructor

Jennie Stephens, Ph.D.

Assistant Professor

ACADEMIC HISTORY

Name : Mukesh Kumar Gupta **Date: March 2007**

Place of Birth: Beohari (M.P.), India **Date: July 1977**

Masters Degree: Environment Management

Source: Institute of Environment Manage -ment & Plant Sciences (IEMPS), Ujjain (M.P.) India **Date: June 2000**

Baccalaureate Degree: Bachelor of Science (Biology)

Source: Government Autonomous PG College, Satna (M.P.) India **Date: June 1998**

<u>Occupation and Academic Connection</u> since date of baccalaureate degree:

Project manager and Field organizer **Year: 2002 – 2005**

Organization: Consumer Unity and Trust Society – Center for Human -Development (CUTS-CHD), Chittorgarh, Rajasthan, India

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Introduction

Increasing concern over the impact on the atmosphere and the world's climate of anthropogenic GHG emissions has pressed the world community to deal with this urgent environmental problem. The atmospheric concentration of CO_2 has increased from 280 ppm in pre-industrial times to more than 380 ppm in 2005 (Earth System Research Laboratory 2006). The world climate has a large impact on plants and animals in the natural environment, on oceans, and on human beings and human activities, such as agriculture, water supplies, and heating and cooling. The severity and time span of the effects of climate change are still under debate. One thing is clear that if no measures are taken in the short term to reduce GHG emissions, some effects will be irreversible (Neeff et al, 2007).

Poverty endures around the world, and is worsening in many regions. Deforestation and biodiversity loss especially in tropical forests continues. The connection between environmental sustainability and poverty is becoming increasingly clear. These interrelated problems repeatedly reinforce one another, undermining the environment and sustainable community livelihoods. Whenever communities make unsustainable demands on ecosystems, the resulting ecological breakdown leads to impoverishment, social tension and conflict. Global markets for ecosystem services, of which carbon sequestration is one, could become part of the solution. (Geoffrey, 2005). Exemplary forest and land management projects can cost-effectively address multiple global problems all together.

Such projects will ideally help oppose climate change, promote sustainable development and conserve or restore biodiversity (CCBA, 2005).

Community based carbon forestry projects take carbon out the atmosphere and there are people willing to pay for that service, but how does one connect the carbon that will be sequestered with buyers? One of the most difficult challenges of carbon credit programs from community forestry is to find markets for the ecosystem services produced by communities or conservation projects. This is especially true in the case of markets for carbon sequestration in which the buyer and sellers are often half the globe apart.

Carbon forestry projects depend on the sustainability of the efforts to offset the carbon from the atmosphere, therefore it is very important to consider the role that rural communities might play in markets for carbon forestry due to these reasons: their geographical closeness to critical natural environments; their continuing involvement in resource management; and they are living in poverty.

This paper investigates two case studies of community forestry projects to highlight components essential to successfully implement them. The paper also explores the possible potential harmful effects and implications of integrating rural subsistence communities with highly volatile carbon market and seeks ways to minimize those threats.

Objectives

1. Study case studies of two community forestry projects in different geographic settings to highlight components which are essential to successfully implement community based forestry projects financed by the emerging carbon market.

2. Highlight the possible potential harmful effects and implications of integrating rural subsistence communities with highly volatile carbon market and seeking ways to minimize those threats.

The first objective is addressed in both chapters 1 and 2. The second objective is mostly addressed in chapter 3.

Background

Experiences from natural resource management projects suggest that to ensure sustainability of community forestry projects: all significant stakeholders, including local communities, must be meaningfully and transparently involved (Ostrom 1990); traditional or customary rights must be recognized and their loss compensated for (Ostrom 1990); there must be direct linkages between conservation and development objectives (Brandon et al. 1998).

Land-use, land-use change and forestry activities have the potential to reduce the growing increase in atmospheric carbon dioxide concentrations contributing to climate change by absorbing carbon dioxide. Forests have the potential to reduce the GHG effect by absorbing carbon dioxide, and the international trading of carbon dioxide credits provides a new and powerful justification and funding opportunities for forest management, afforestation and regeneration.

According to the Food and Agriculture Organization of the United Nations (FAO) 2005 Global Forest Resources Assessment, some 13 million hectares of the world's forests are lost each year, including 6 million hectares of primary forests. Primary forests are considered the most biologically diverse ecosystems on the planet (Davis, 2006). Cutting forests at this rate causes all sorts of problems for biodiversity, water quality and human livelihood; it also destabilizes the climate. CO_2 from deforestation comprises 20-25% of all

human-caused emissions. According to the International Panel on Climate Change, the largest potential source of Greenhouse Gas (GHG) emissions reduction is fossil fuel substitution, but the very next category is reducing the rate of deforestation (IPCC, 2001). In a context of increasing fossil fuel consumption and increasing pressure to minimize the green house gas level, avoiding deforestation reduces atmospheric CO_2 concentrations just as replacing coal by nuclear or renewable energy.

Preliminary estimates indicate that forest and agro forest management practices throughout the world can enhance the capability of forests to sequester carbon and reduce accumulation of greenhouse gases in the atmosphere (Winjum, 1993). Avoiding deforestation is not at present eligible for financial compensation under the Kyoto protocol whereas emission reduction from coal is eligible for financial compensation. This gap throws doubt on the efficacy of the entire framework. To fill this gap the rules must be revised in the next round of Kyoto Protocol to make carbon credits from reduced deforestation tradable in carbon market similar to other offsets. Recognizing carbon credits from avoiding deforestation will make standing forest an income-earning asset and worthy of conservation.

There are a few challenges in considering in the design of sound institutional frameworks for financing carbon credits from forest management. Some of them are: understanding the consequences of integrating local communities with carbon market from the standpoints of conservation, local livelihoods, and economic optimization; developing

active trading markets for carbon credits from forest conservation and management; figuring out whether payments for avoided deforestation and reduced carbon emissions are feasible.

Conservation of forests, including those under the control of local communities in developing countries, is an important component of a comprehensive climate mitigation strategy (Adger, 1994). Climate change is a global environmental problem but it has widespread impacts on local environments throughout the world especially poor and developing countries, which are not responsible for creating this problem. Community based small scale carbon sequestration and forest management projects can contribute to the solution of global climate change. Four points are discussed below to build better understanding of community forestry and their linkages with carbon markets.

1.1 Protection and conservation of forests

Protection and conservation of forests are a prime aspect of sustainable forest management and have vast importance for the global carbon cycle. Globally, forests store around 1200 gigatonnes of carbon. This is more than the total amount of carbon in the form of carbon dioxide in the atmosphere. When forests are cleared, or burned, the carbon is emitted to the atmosphere as carbon dioxide, the primary greenhouse gas. In addition to the damage deforestation does through intensifying climate change, biodiversity is also lost in forests, their productivity, beauty and the way of life for people who depend on them.

Around 70% of the entire world's biodiversity is found in forests (Forestry Commission, Great Britain)[1].

Protection of woodlands against such hazards as pests, diseases, browsing animals, storms and fire is one of the basics of sustainable forestry. Some of these require ongoing traditional practices such as fencing and choice of species suited to the site and climate. Others are less easily tackled and events like fires and storms can cause considerable destruction. Even this is usually reversible. Trees grow back again but they need little care. In well-managed forests, felling trees is also part of a sustainable cycle. The felled trees are replaced by planting young tree, by natural seeding or coppice regrowth. Across the world there are forests that have been managed for timber and other products for hundreds of years and are at no risk of losing their carbon, their biodiversity or their value to society.

At present, it is protection from clearance by people that is the highest priority. Destruction of tropical rainforests for agriculture or through illegal logging is estimated to account for almost 20% of global carbon emissions – more than the whole of the transport sector. The damage may be complete clearance or logging at such unsustainably high levels that the system cannot recuperate. Most countries give legislative protection to forests. In the developing world where the pressures are greatest, the problem of

[1]Forestry Commission, Great Britain, http://www.forestry.gov.uk/forestry/infd-6vjhrz, last accessed July 07, 2006

deforestation is huge and forests are shrinking. The international community is considering a number of initiatives to help developing countries reduce deforestation.

1.2 Co-benefits of community forestry based carbon sequestration projects

While the main quantified benefit from community forestry based carbon sequestration projects is measured in tonnes of carbon, the non-carbon benefits of project activities are often just as important (Bass et al. 2000). Benefits from forestry offset projects are:

a) Rural livelihood: Forestry offset projects may provide rural livelihood benefits. These can include: timber trees can help provide financial security and savings for future retirement or education; fruit trees, providing improved nutrition and more varied diets; fodder trees, providing extra nutrition and shade for livestock; sustainable fuel wood – essential for cooking and heating.

b) Protection from the impacts of climate change: Even if industries and urban societies make dramatic cuts in their greenhouse gas emissions over the next few years, there is likely to be significant climate change over the next 50-100 years that will have negative impacts on rural people in developing countries. Trees and forests can provide important buffers against such changes – helping to stabilize soils to reduce frequent landslide occurrences, providing a source of income when crop failures occur.

c) Restoration of degraded ecosystems: Forest ecosystems on which villagers depend for water, fuel, fiber or food are becoming degraded, as a result of over extraction combined

with grazing by livestock. If these processes continue the land can become severely eroded and a natural asset wasted. With additional revenue or incentives received from carbon credits can be used as initial investment to reverse these trends and restore a productive and bio diverse ecosystem for local use (Smith, 2002).

1.3 CDM versus voluntary carbon market

The CDM is a mechanism where Annex I countries[2] with a specific obligation to reduce a set amount of greenhouse gas (GHG) emissions by 2012 under the Kyoto Protocol assist non-Annex I[3] countries to implement project activities to reduce or absorb (sequester) at least one of six GHGs (see box 3.1 and figure 3.1). Non-Annex I countries are signatories and ratifiers to the Kyoto Protocol; however, they do not adhere to reduction targets stipulated under the protocol. The reduced amount of GHGs become credits called certified emission reductions (CERs), which Annex I countries can use to help meet their emission reduction targets under the protocol (UNFCCC 1997).

The CDM was thought to be a mechanism that would link the carbon market and sustainable development objectives in developing countries. Developed countries can

[2] Annex I Parties include the industrialized countries that were members of the OECD (Organisation for Economic Co-operation and Development) in 1992, plus countries with economies in transition (the EIT Parties), including the Russian Federation, the Baltic States, and several Central and Eastern European States.

[3] Non-Annex I Parties are mostly developing countries.

generate carbon credits from carbon offset projects in developing countries from CDM, given those projects are in line with host countries sustainable development priorities. The CDM has not lived up to its expectations to help host countries achieve sustainable development benefits. It invariably favors low cost, high volume projects, such as several energy and HFC (hydrofluorocarbon) avoidance projects, which have very few benefits to local livelihoods. Community based carbon saving projects are commonly not economically viable due to high transaction costs and lengthy bureaucratic procedures. (Taiyab, 2006)

A voluntary market for carbon offsets has emerged parallel with CDM. This has primarily consisted of individuals, companies, organizations, organizers of international and national events, taking responsibility of their carbon emissions from their activities by voluntarily purchasing carbon offsets. One benefit of the voluntary carbon market is that here projects do not need to follow the CDM process, hence they are free of stringent guidelines, lengthy paper work, and high transaction costs. Project developers also have more freedom to invest in small-scale community based projects. These projects also help to boost local economic development and biodiversity; therefore they fulfill host countries sustainable development criteria. (Taiyab., 2006)

The carbon market continues to evolve rapidly. The shift to carbon credit exchanges that enable regular and high-volume trading has already begun. By bringing multiple buyers and sellers together in a central trading platform, exchanges offer a transparent and efficient system for determining a fair price for both buyers and sellers

(Landell-Mills et al, 2002). One example is the Chicago Climate Exchange (CCX), a voluntary cap-and-trade program for reducing and trading greenhouse gas emissions in North America. Confidence in the market continues to expand. As policy progress is made, the number of market service providers such as investment funds and exchanges is growing, increasing the trade in credits. Ahead of the regulatory curve, some companies are already developing in-house carbon reduction plans, and purchasing carbon offsets.

The Voluntary market is bound to grow, due to increased awareness of the global warming issue among citizens. According to recent polling by the Oak Ridge Center for Advanced Studies, more than 70 percent of Americans believe that they will see the effects of global warming in their lifetime. Organizations like Carbonfund.org have launched a program that allows customers to direct their contribution between funding renewable energy, energy efficiency, or afforestation and reforestation programs (Gupta, 2006).

1.4 Accounting for carbon benefits

A key aspect of implementing forest management projects for trading carbon credits is to accurately quantify the project-level GHG benefits to known levels of precision (MacDicken 1997a). To calculate the incremental effects of the project, we have to compare with and without project scenarios.

Table 1: With and Without -project scenarios in community based carbon forestry projects (What would have happened, if the project had not taken place scenario)

With carbon forestry project case	**Without carbon forestry project case**
- Prevent deforestation and improve agriculture	Clearing and slash-and-burn for cultivation or pasture
- Prevent forest degradation	High rates of timber and/or fuel wood extraction
- Reduced impact logging	Traditional logging with high damage
- Improved forest management	Traditional forest management
- Plantation establishment	Degraded or marginal non forested lands
- Agroforestry: trees and crops	Annual crops
- Biofuel tree plantations	Marginal lands and fossil fuel use

The carbon credits from a project for all pools measured (pools 1 to n) are:

$= \Sigma 1^{n}$ (carbon in pool 1 for with-project case – carbon in pool 1 for without-project case)

(MacDicken 1997a)

Chapter 1: Van Panchayats in Uttaranchal –A case study

This case study will explore the potential and obstacles of integrating community based forest management institutions with the carbon market. It attempts to examine one such democratic and autonomous local institution, which has been existence for 70 years, and has successfully managed legally demarcated village forests - the *'Van Panchayats'* or Forest Councils in Uttranchal, India. The *Van Panchayats* represent one of the largest and most diverse experiments in devolved common property management ever developed in collaboration with the State (Arnold and Stewart, 1991)

India has had a long history of a decentralized form of government. The traditional form of rural government is called the *Panchayat*. *Van Panchayat* is a democratically elected village level Institution set up in Uttaranchal state for the management of forests. It is responsible for the management of grazing, collection of fuel wood, fodder and timber, and protection of community forests. A *Van Panchayat* can be formed if one-third of the inhabitants of a village resolve to form one. At the village level, it is the sole arbitrator for the management of the *Van Panchayat* forests. It has linkages with the Forest Department for technical assistance and for the preparation of developmental plans[4]. *Van Panchayats* are unique institutions, characteristic of the state of Uttaranchal, for organized utilization and protection of forests and related natural resources by local communities that are

[4] Guha, 2006 personal communication

dependent on them. In other words *Van Panchayats* are a localized form of community forestry. They are locally elected bodies or voluntary groups of local people that govern the local forests with a view to fulfill the needs of local people for forest produce, in a sustainable and equitable manner (Mishra, 2004). Thus *Van Panchayats* in a way are a form of Local Government. At present there are 6,777 V*an Panchayats* in Uttaranchal covering an area of 5,241.08 square kilometers. Uttaranchal is one of the most forested states of India as more than 64% land area is covered by forest (Forest Department, Uttaranchal, May 2001).

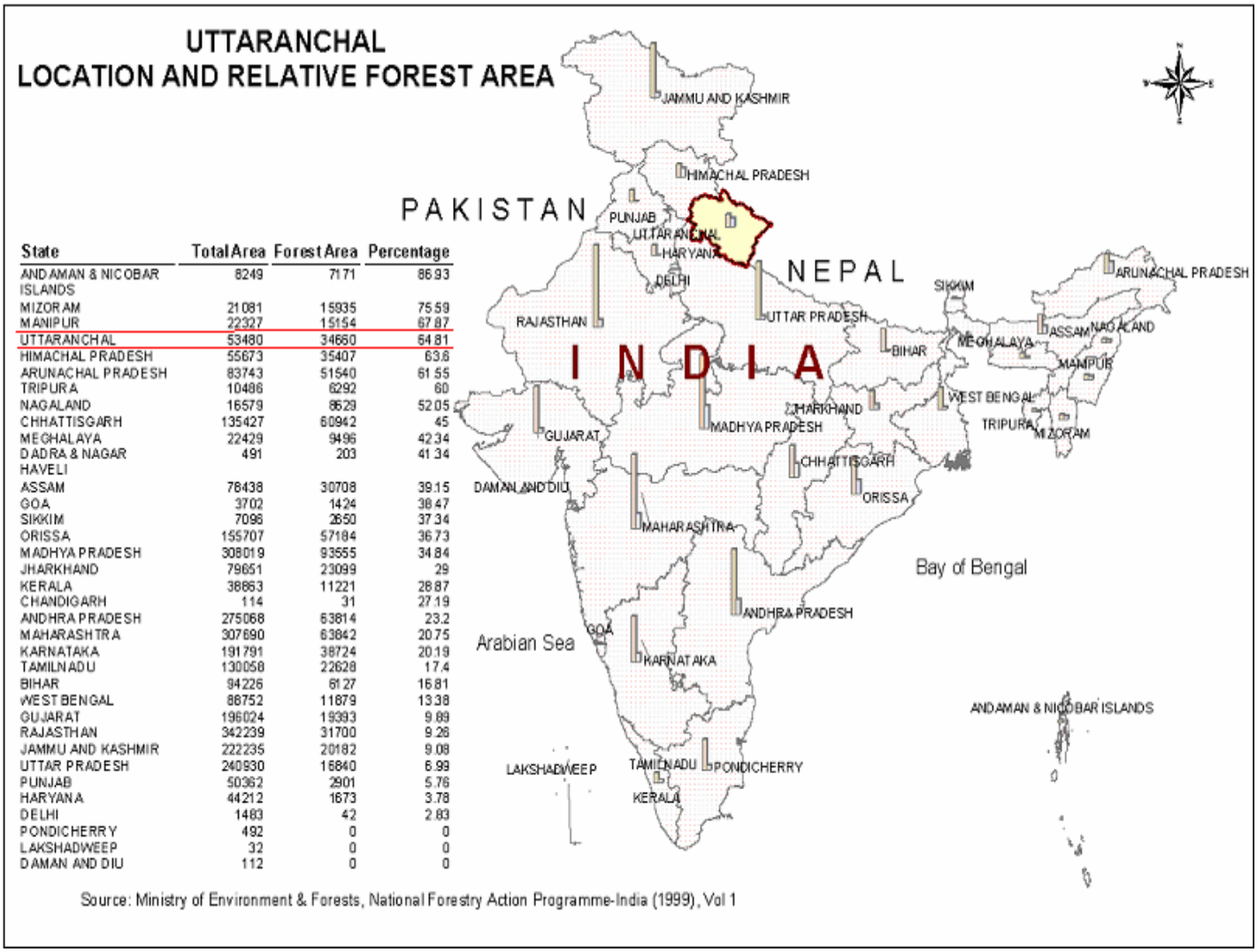
2.1 About Uttaranchal

Uttaranchal State lies in the Northern part of India amidst the magnificent Himalayas and dense forests. It has international borders with Nepal and China. The state of Uttaranchal has tremendous potential for developing its tourism industry due to the beautiful landscape, religious places, trekking trails, national parks, mountain peaks and historical and archeological sites. Apart from tourism, the rural population is engaged in agriculture and producing large quantities of food grains. The state has immense potential for the development of horticulture crops-apple, orange, malta, pear, grapes peach, plum appricot, litchi, mango, guava etc are widely produced fruits. The region has good scope for developing a herbal pharmaceutical industry because of abundant medicinal plants. The industrial sector of the state is not very significant. By development and proper

exploitation of its natural resources, Uttaranchal can overcome its economic backwardness[5].

Table 2 shows some basic statistics of the Van Panchayats in the state. It may be observed that Van Panchayats are present only in the hill-districts; Haridwar and Udhamsingh Nagar districts located in the foothills and *Terai* region do not have any Van Panchayats.

[5] Uttaranchal State Guide, http://www.indnav.com/servlet/Browse?mt=goToName&name=Uttaranchal, last accessed July, 15 2006



State	Total Area	Forest Area	Percentage
ANDAMAN & NICOBAR ISLANDS	8249	7171	86.93
MIZORAM	21081	15935	75.59
MANIPUR	22327	15154	67.87
UTTARANCHAL	53480	34660	64.81
HIMACHAL PRADESH	55673	35407	63.6
ARUNACHAL PRADESH	83743	51540	61.55
TRIPURA	10486	6292	60
NAGALAND	16579	8629	52.05
CHHATTISGARH	135427	60942	45
MEGHALAYA	22429	9496	42.34
DADRA & NAGAR HAVELI	491	203	41.34
ASSAM	78438	30708	39.15
GOA	3702	1424	38.47
SIKKIM	7096	2650	37.34
ORISSA	155707	57184	36.73
MADHYA PRADESH	308019	93555	34.84
JHARKHAND	79651	23099	29
KERALA	38863	11221	28.87
CHANDIGARH	114	31	27.19
ANDHRA PRADESH	275068	63814	23.2
MAHARASHTRA	307690	63842	20.75
KARNATAKA	191791	38724	20.19
TAMILNADU	130058	22628	17.4
BIHAR	94226	6127	16.81
WEST BENGAL	88752	11879	13.38
GUJARAT	196024	19393	9.89
RAJASTHAN	342239	31700	9.26
JAMMU AND KASHMIR	222235	20182	9.08
UTTAR PRADESH	240930	16840	6.99
PUNJAB	50362	2901	5.76
HARYANA	44212	1673	3.78
DELHI	1483	42	2.83
PONDICHERRY	492	0	0
LAKSHADWEEP	32	0	0
DAMAN AND DIU	112	0	0

Source: Ministry of Environment & Forests, National Forestry Action Programme-India (1999), Vol 1

Figure 1: Location and relative forest area of Uttarnachal

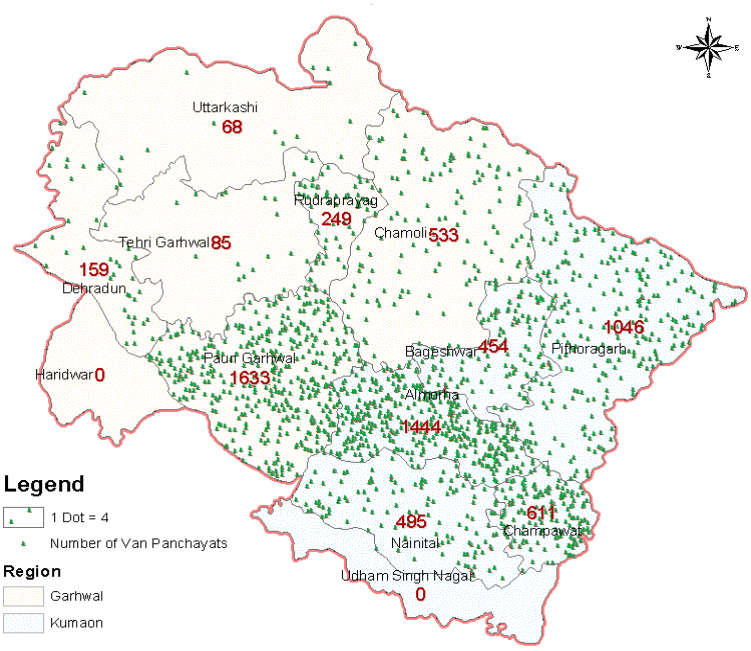


Figure 2: Distribution of *Van Panchayats* in Uttaranchal

Districts	District Area (Sq Km)	Population (1991)	Area Under Van Panchayats (Sq Km)	Total Forest Area (Sq Km)	Forest Area (Ha) Per Person	Panchayati Forest Area (Ha) Per Person	Number of Van Panchayats	Area (Ha) per Van Panchayat
Pauri Garhwal	5440	683000	651.53	4507.14	0.660	0.095	1633	39.90
Chamoli & Rudraprayag	9125	455000	618.02	5210.40	1.145	0.136	782	79.03
Uttarkashi	8016	240000	77.80	6948.30	2.895	0.032	68	114.41
Tihri Garhwal	4421	580000	16.38	4058.90	0.700	0.003	85	19.27
Dehradun	3088	1026000	98.28	2276.89	0.222	0.010	159	61.81
Haridwar	2360	1124000	0.00	375.19	0.033	0.000	0	
Garhwal	**32450**	**4108000**	**1462.01**	**23376.82**	**0.57**	**0.04**	**2727**	**53.61**
Almora & Bageshwar	5385	837000	1204.75	3944.26	0.471	0.144	1898	63.47
Pithoragarh & Champawat	8856	566000	1092.98	3302.43	0.583	0.193	1657	65.96
Nainital	6794	1540000	286.84	3026.90	0.262	0.019	495	57.95
Udhamsingh Nagar			0.00	1011.11			0	
Kumaon	**21035**	**2943000**	**2584.57**	**11284.70**	**0.38**	**0.09**	**4050**	**63.82**
Grand Total	**53485**	**7051000**	**4046.58**	**34661.52**	**0.49**	**0.06**	**6777**	**59.71**

Source: Uttaranchal State Forest Statistics (2000), Forest Department, Nainital

Table 2: Basic *Van Panchayat* Statistics in Uttaranchal

Figure 2 shows distribution of *Van Panchayats* across the state of Uttaranchal. The maximum number of *Van Panchayats* is observed in the erstwhile Almorha district (now divided into Almorha and Bageshwar districts) numbering about 1900. The average area of forest under a *Van Panchayat* is about 60 hectares. Uttarkashi has the largest average size of *Van Panchayat* forest, but it has a very small number of them and also the total area of forests under them is fairly small. Tihri District has more than 90% of its geographical area under forests but has the least area under *Van Panchayats*. The average size of a *Van Panchayat* is also the smallest in Tihri district. It may also be observed that in general Kumaon region has both larger number and size of *Van Panchayats*. This may be due to the fact that the *Van Panchayat* movement actually started in the Kumaon region. The original *Van Panchayat* rules were initially applicable to Kumaon region only (Uttaranchal State Forest Statistics, 2000)

2.3 Forest management in Uttaranchal

As mentioned earlier Uttaranchal is one of the most forested states of India. Since it covers the ecological sensitive zone of the Himalayas, it appears prominently in the National Forest Policy. As per the policy at least 60% of the Himalayan zone should be covered with forest. Forests are also ecological entities directly and indirectly supporting and sustaining life in varied forms, including humans. In Uttaranchal a large number of indigenous communities live in densely forested areas and depend on them for their life and livelihood. Their dependence on forest is such and association so long that forest is now an integral part of their life and culture. For the same reason they seem to have deep

understanding of even complex ecological issues and have developed indigenous methods of protecting and utilizing the forest in a sustainable manner.

Van Panchayats are the key drivers of forest management practices in villages of Uttaranchal. The levels of urbanization are extremely low in most districts of the state, thus ruling out significant industrial or service activities. Directly involving and educating rural communities of Uttaranchal in carbon credit process could be a new engine for sustainable and equitable development of the region by improving their standard of living and provide an alternative source of income to environmentally unsustainable agriculture or unplanned urban migration. Earned revenue through carbon credits could be invested in development of alternative energy sources in the region, sustainable agriculture, organic farming and water & sanitation projects and to reduce increasing workload on women and children.

There are several environmental co-benefits that could be associated with integrating *Van Panchayats* with existing carbon markets: these are conservation of biological diversity, increased forest productivity, reduced erosion, improved soil and hydrological benefits and ecotourism potential in this newly born state of northern India. These co-benefits could be the basis for other conservation finance mechanisms. Carbon offset projects assign economic value to one of the key environmental services provided by standing forests, thereby recognizing the value of natural ecosystems beyond timber. Carbon offset projects can also increase local communities access to forest goods and services, and diversify income. Improved forest management can have positive impacts on

human health through improved water and air quality and diversified diet, if there is improved access to non-timber forest products NTFPs (Byron et al 1999). Stable income streams can reduce vulnerability to seasonal shifts in land-based activities for local communities.

Well-designed projects should therefore benefit local communities, for example, by supplementing and diversifying income, increasing forest access to goods and services and transferring skills and knowledge of Uttaranchal where due to lack of employment opportunities people already have migrated to urban areas. The international trading of carbon credits provides a new and powerful justification and funding opportunity for afforestation. Engaging and educating rural communities in these projects could become a new source for sustainable and equitable development by improving their standard of living.

2.4 Obstacles to integrate *Van Panchayats* with the carbon market

Although there could be huge potential associated by linking *Van Panchayats* with existing carbon markets, a few things could make this linkage gradually ineffective -

At the village level:

There is not much knowledge currently among villagers to support the operation of this institution. In many instances villagers lack the knowledge about duties and rights on the part of *Van Panchayats*, and this leads to absence of practicable experiments on account of

this lack of knowledge. It has also come out that there is lack of internal coordination in the *Van Panchayat* committees and appropriate coordination between *gramsabha*[6] and *Van Panchayats*. Sometimes inappropriate distribution of the forest produce leads to discontent. If that is the case, it could severely affect the benefit sharing from carbon credit benefits. Transgression of limits by right holders also minimizes common resources. Members of *Van Panchaytas* that do not stick with the rules sometimes provide a bad example to the rest of the villagers and for immediate benefits they forget the overarching long term benefits. It has been widely seen that illegal felling is overlooked by the *panchayat* committee. Lack of proper utilization of the available resources in the *Panchayat forests*, make villages dependent on other parts of the region.

In forest management practices it is very important to have knowledge of development of forests, community forestry, different silviculture and horticulture methods and fodder development. In many instances in has been felt that villagers still need these kinds of knowledge in order to accomplish better forest management practices to make forests more efficient as a carbon sink (based on my field visit to Uttaranchal in summer, 2006).

There is a provision of a fine if villagers do not abide by the rules set by *Van Panchayats*, but enforcement of this fine is not consistent making the institution weak. Local government has given very limited rights to the *Van Panchayats*, which limits to the

[6] Gramsabha is a meeting of elected representatives and villagers on the regular basis in order to propose and discuss development projects of the village to the district government.

authority of the institution. Women are a very important part of society in Uttaranchal, since they are responsible for utilizing forest resources and taking care of the home as most of the male members migrate to the cities in order to work but there is lack of awareness about *Van Panchayats* among the women. There is ignorance in delineation of boundaries of *Van Panchayats*. There are also incidences of mishandling and misuse of the funds by the *Van Panchayats* or its members. No proper maintenance of account books and other records of the *Van Panchayats* have been seen in few occasions (Hiralal, 2006, personal communication).

At the government level:

In some instances local ad state government has shown no entrustment to the *Van Panchayat* committees of development work. Financial assistance has not been given directly to the *Van Panchayats*. Government has not succeeded to vacate illegal habitation in the *Van Panchayats* in many instances. There is also no provision of adequate punishment from government's side to those doing illegal felling in the forests. Also there is no assistance from the revenue department in the collection of fines. There is lack of proper training in the government to support the *Van Panchayat* forests (based on my field visit to Uttaranchal in summer, 2006).

Apart from these problems at the village level there are some obstacles present at macro level: Currently the CDM and European Union -Emission Trading Scheme (the largest carbon market) of the Kyoto Protocol do not accept small community based forestry projects due to associated risks and uncertainty about additionality and permanence of

carbon being trapped by these forests[7], therefore voluntary carbon market is the only avenue for the forest management practices where these carbon credits could be sold. Currently, there is no mechanism in place for community forestry in the Kyoto Protocol, the main policy instrument to fight with global climate change. Methodology for measuring carbon credits is still under development.

A study was taken place by Community Forestry International (CFI) in India which shows that the emerging protocols for carbon offset projects are not being designed to facilitate the engagement of poor, rural communities; one of the most potential beneficiaries of these projects. There are additional complications in Uttaranchal that communities have no legal authority to enter into environment service management contracts since state government holds jurisdictional authority over forests (Poffenberger, 2006).

Despite being an excellent example of state-people partnership which has been relatively successful in managing forest resources in the region, the institutions are facing challenges from unrealistic and target driven policies which would affect its democratic functioning. Non Governmental Organizations need to play more active role in keeping these institutions alive by bringing the communities to the centre stage of decision making (Mukherjee, 2003**).** Generation of carbon credits from *Van Panchayats* activities will give them an incentive to continue their forest conservation and management work in a

[7] there are much discussion going on to develop methodologies for carbon forestry and possibly to include them in the Kyoto Protocol

sustainable way. Community forestry by *Van Panchayats* in Uttaranchal State offers a good opportunity for integrating carbon trading, local institutions, people's participation, environmental improvement and livelihood issues. The project is financially viable though not highly attractive but the carbon mitigation potential in this 'restoration of degraded lands' type of project is immense provided challenges in the initial phase are adequately overcome (Hooda, 2004).

Chapter 2: Noel Kempff Mercado Climate Action project, Bolivia – A case study

The Kyoto Protocol and its flexibility mechanisms started a global debate on the valuation of forests as source of environmental services important to economic growth and development. This case study seeks to understand what benefits are made available to local communities through existing carbon market and what incentives there are for executors to involve local people more fully as partners or beneficiaries.

Noel Kempff Mercado Climate Action Project (NKMCAP) was established in the Noel Kempff Mercado National Park, in northeastern Bolivia, bounded by the Paragua, Tarvo and Itenez rivers to the west and north, and Bolivia's border with Brazil to the east. It is one of the most biologically diverse areas in the world. Through a unique partnership, the Government of Bolivia, the Friends of Nature Foundation (FAN), The Nature Conservancy and three energy companies (American Electric Power, PacifiCorp and BP Amoco) have teamed up to jointly implement the US $11 million Noel Kempff Mercado Climate Action Project (NKMCAP) in 1997. This partnership is aimed to protect nearly four million acres of threatened tropical forests in the Department of Santa Cruz, Bolivia for at least 30 years. The primary purpose of the project is to sequester (capture) carbon dioxide and store carbon that would have been released as a result of logging activities in the area. At the same time, the project preserves one of the richest and most biologically

diverse ecosystems in the world and fosters sustainable development in local communities (May et al, 2004)

The NKMCAP is projected to avoid emissions of 7-10 millions tons of carbon or 25-36 million tons of carbon dioxide during its 30-year life. The project has been approved by the governments of the United States and Bolivia. Prior to the project, the Park was under imminent and demonstrable threat from logging and conversion to agriculture. The project consists of numerous components: park expansion and protection activities; ecotourism; sustainable development for local communities; a for-profit venture to generate revenues for the Park (Canopy Botanicals); monitoring & verification activities; and support to the Government of Bolivia's climate change program[8]. In 2006 the NKMCAP completed its second five year project cycle. The project advocated for the inclusion of land-use activities in international climate agreements and was designed to explore whether these schemes could provide livelihood benefits.

The NKMCAP was established as part of the United State Initiative on Joint Implementation pilot phase[9]. The project developed an offset sharing system that provides 49 per cent of the offset credits to the government of Bolivia of which 20 per cent are

[8] Noel Kempff Mercado Climate Action Project, http://www.noelkempff.com/English/ProjectSummary.htm Last accessed 03/05/2007.

[9] The US Initiative on Joint Implementation was established in 1993 and further supported by 1995 with the adoption of Activities Implemented Jointly (AIJ) at the first Conference of Parties (COP) in Berlin.

shared with the project implementers a national NGO Fundación Amigos de la Naturaleza (FAN), 49 per cent to the industry contributors and 2 per cent to American Electric Power (AEP), the lead investor, as a project development 'bonus'. The government of Bolivia is required by contract to spend the proceeds from the sale of offset credits on park-management activities in Noel Kempff and throughout Bolivia, and on other biodiversity-preservation activities (May et al, 2004).

The project was designed to fulfill three main objectives: promotion of carbon benefits; biodiversity benefits; and local sustainable development benefits. The carbon benefits would result primarily through two leakage-compensation activities at project level: prevention of carbon-dioxide emissions and forest harvesting. First, they would avert logging which includes halting the removal of commercial timber and elimination of damage to un-harvested trees; and second, averted conversion of forested lands to agricultural uses, which includes halting the loss of carbon in forest biomass and from soil (Powell, 1999). The project's primary investment was to indemnify logging companies, which had obtained concessions to the timber in the park area. This enabled the Bolivian government to then increase park area to its current 1.5m hectares (May et al, 2004).

Figure 3: Map of Bolivia in South America

(Source:http://www.noelkempff.com/English/MapsOfPark.htm)

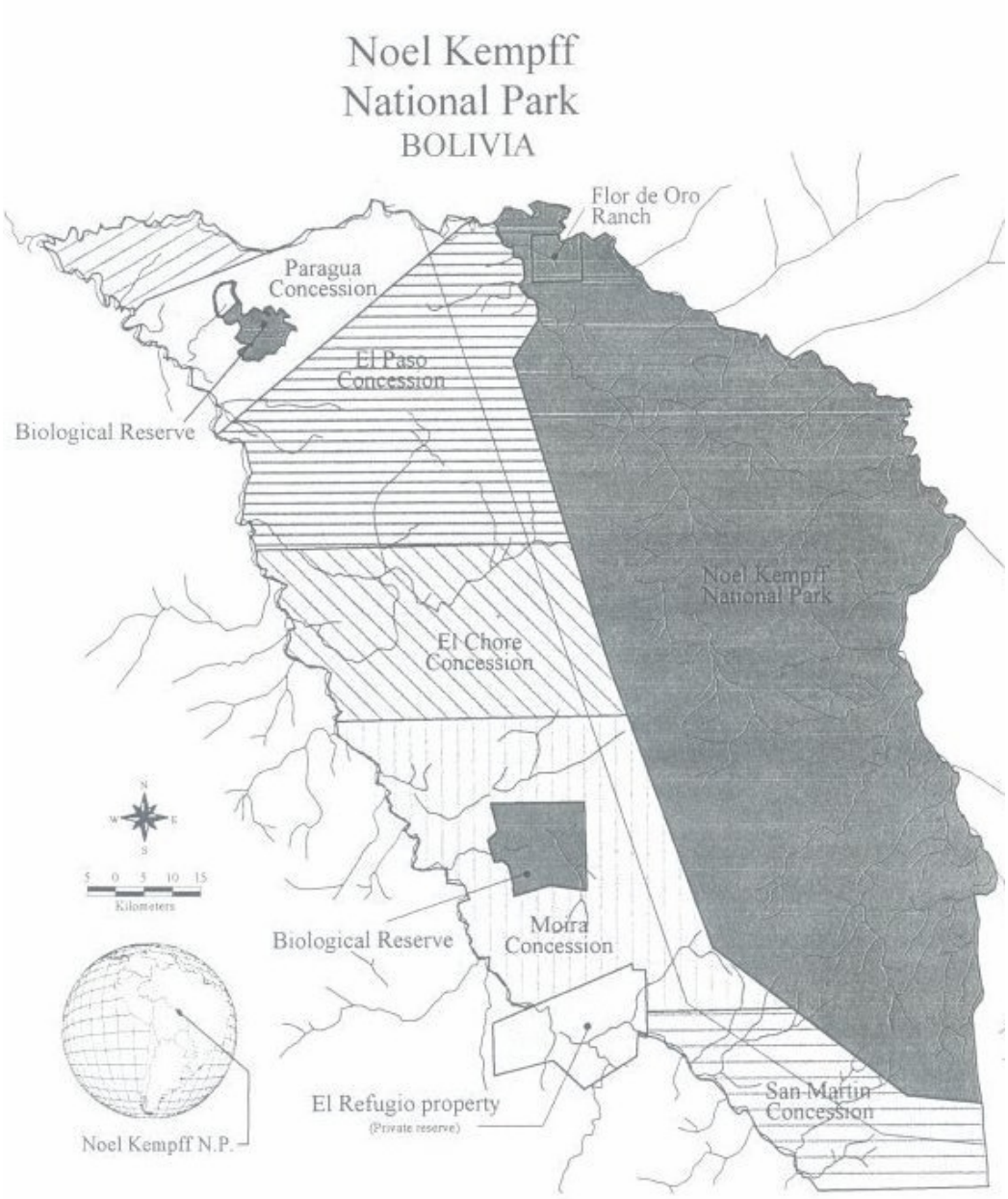


Figure 4: The original park (solid gray) had an imaginary line through the forest as its western border. For biodiversity conservation purposes, and to enhance ability to patrol park borders, the Government of Bolivia and Fundaci´on Amigos de la Naturaleza (contracted to manage the park) wanted to expand the park to Paragu´a River to the west. Through the Climate Action Project, former logging concessions and reserves to the west (hatched gray, 817,846 hectares) were incorporated into the park that now spans about 1.5 million hectares (Source: Brown, 1999).

3.1 Key Stakeholders

The NKMCAP in Bolivia is one of the largest pilot projects ever undertaken globally. It is an emissions avoidance (avoided deforestation) project where The Nature Conservancy, and a consortium of companies including AEP, BP and Pacificorp together with the Bolivian government, have indemnified logging concessions.

Among the private sector investors are American Electric Power (AEP), the top power generator in the US and a leading marketer of power, natural gas, and related products and services[10]; BP, the holding company of one of the world's largest petroleum and petro-chemical groups (BP became part of the Climate Action Project in NKMNP in Bolivia in 1997); and Pacificorp, one of the lowest-cost electricity producers in the US[11].

The National Climate Change Programme (PNCC) was created in 1995 to undertake the first national communication to the UNFCCC with the assistance of the US Country Study Management Team from the Bolivian government. The National Service for Protected Areas (SERNAP) was also created by the government in 1999 to coordinate the functioning of the National System of Protected Areas (SNAP), and guarantee the management of protected areas in the national interest to conserve biodiversity, within its ability (FAN, 1999).

[10] American Electric Power, http://www.aep.com/about/default.htm last accessed 03/05/2007

[11] PacifiCorp, http://www.pacificorp.com/ last accessed 03/05/2007

Among International and local NGOs The Nature Conservancy (TNC) and Fundación Amigos de la Naturaleza (FAN) are important stakeholders of the project. TNC is a US conservation organization and the broker in the indemnification of logging concessions and raised donor interest in the project[12]. FAN is a Bolivian conservation NGO and serves as project administrator (FAN, 1999).

Municipality of San Ignacio de Velasco is responsible for some project activities and the park management. Municipal officials have an interest in the devolution of the management of the national park to the region (May, 2004).

Central Indigena de Bajo Paragua (CIBAPA) is a group that represents the local communities, created during the project process. CIBAPA was created to represent four key communities, Floride, Porvenir, Piso Firme, and Cachuela and among its objectives is using the land-title process to ensure that earnings from future forestry activities are distributed at the community level. It consists of a president and a vice-president elected by the communities every five years (May et al, 2004).

[12] The Nature Conservancy, http://www.nature.org/ Last accessed 03/06/2007

3.2 Local communities and NKMCAP

Prior to the park expansion the communities did not have legal access to its territory but accessed the forest concessions through informal usufruct rights. These are the legal rights to use the advantages or profits of another's property. The population in this region is estimated at approximately 2,000 people, divided between three main indigenous communities Porvenir, Piso Firme and Florida. Cachuela and Bella Vista communities have only a few families. Aspects of Noel Kempff Mercado Climate Action Project (NKMCAP) directly related to the local communities include primarily the forestry programme and a community development programme called Community Assistance (Apoyo Comunitario, or APOCOM[13]), which was re-named Programa del Desarrollo Comunitario del Parque (PRODECOM) in March 2002. In addition, the NKMCAP also oversees the carbon-monitoring programme, including measuring and monitoring of carbon at the ground level (inventories and establishment of plots) and tracking of logging activities of the indemnified companies.

The forestry programme is supportive of the local development benefits through a land-titling (A legal right to possess and dispose of property) process and has been involved in undertaking a forest-management plan, capacity building of the technical team members in the communities, and provided technical support to the Central Indigena de

[13] APOCOM (now PRODECOM) aimed to improve quality of life by providing benefits through improved development and production activities in the communities.

Bajo Paragua (CIBAPA). Personnel of this programme have also been involved in internal-negotiation processes between community leaders (FAN, 1999).

Initially the communities were opposed to the park expansion with the fears that access to traditional lands would be prohibited. Absence of organized local representation was also one of the key challenges encountered at the design stage. The communities lie far from the project headquarters and decision making was centralized because of pressure from higher levels for the project's success. Objectives were unclear over the use of project resources and there was little sense of responsibility on the part of the park and NGO regarding compensation (May et al, 2004).

3.3 Impact Assessment of the NKMCAP

The impact of the NKMCAP can be studied by three pillars of sustainable development: social, economic, and environmental. All three are necessary to achieve sustainable development. Each of these pillars is framed within different levels: global, national, and local.

Table 3: Impact Assessment Table of the NKMCAP (May et al, 2004)

Sustainability Aspects	**Impact Levels**	**Positive Impacts**	**Drawbacks**
Environmental Impact	Global	Sequestration of 14 million tons of CO_2 over 30 years was actual impact.	Initial estimations were twice than what was achieved.
	Regional	Expansion and protection of the national park to approximately 1,500,000ha. Hopes to contribute to the decrease of deforestation in the region.	The national policy context is still favorable to conflicting conservation and development policies. Moderate risk of forest fires in the dry season still exists.
	Local	Improved agricultural and livelihood systems. Sustainable forest-management plans.	Slow diffusion of technology. Link between project's leakage potential and local development needs to be clear. Better dialogue on conservation between project and wider community members especially women is needed.
Social Impact	Global and National Regional	Technical 'know how'. Capacity building among key stakeholders. Dissemination of scientific information. Awareness of the park's importance to the region.	Institutional weaknesses: both physical and cultural remoteness between stakeholders. Global and national priorities to demonstrate project potential can hamper the local priorities.
	Local	Helps in capacity building among local organizations. Institutional strengthening.	Resistance at local level towards intervention design and priorities. Conflicting priorities due to ambiguous rules and introduction of new norms.
Economic Impact	Macroeconomic regional/local	Additional source of income in the form of carbon credits for conservation. Entry of resources into region for purchasing concessions.	No carbon credits accrued to date and not likely to by Kyoto criteria. Returns from logging at regional and local level perceived as diminished. Regional and local priorities for employment.

	Macroeconomic enterprise	Provision of credit incentives and rotating funds.	Distance and location of communities in relation to markets. Maintenance of road and other transport links limits opportunities. Perception of loss of jobs/income. Historical and cultural context are an important to consider in design.

3.4 Discussion of NKMCAP case study:

Most successful conservation and development projects have involved local communities in project development (Wells and Brandon 1992), and it is increasingly evident that such involvement must be from the beginning. The NKMCAP shows that carbon forestry projects have great potential to sequester carbon, protect biodiversity and contribute to sustainable development. However, if carbon forestry projects are in reality to contribute to improving rural livelihoods, they must be designed and implemented participatively from the earliest stages of project development. Further, equitable distribution of the benefits among stakeholders requires that traditional user rights to forests are recognized and adequately compensated (Asquith et al, 2002).

Observable results so far from the project are that the area is fully protected from deforestation by timber concession acquisition. In terms of generation and distribution of carbon credits to the stakeholders including local communities have not been implemented. No carbon credits accrued to date and it is also not likely to by Kyoto criteria (May et al, 2004). One reason might be that sustainable forestry practices have not been included in

Kyoto criteria and methodologies to measure carbon benefits of avoiding forest lands to agricultural lands are still in development phase.

The principle project benefits anticipated by local community members include land titling and sustainable forest management, expected to stimulate local development, generating income to pay for health and education. Over time and through greater dialogue, trust was built between the project executors and local communities. Community development objectives are now clearer and there is greater community participation. The principal economic impact on the communities of Park creation was their loss of employment in logging concessions. Lack of participation in project design led to uncertainties about access to resources and income earning activities, bringing initial opposition to the Park expansion by local communities. Model farms and planting trees promoted by the project had limited success, due to inadequate diagnosis of the complementarity of these proposals with local labour availability, as well as to insecure land tenure. A project-led microcredit scheme was also difficult, as the majority of loan recipients were unable to repay their debts. (May et al, 2004)

Regarding the contribution of these projects towards local sustainable development, a key issue is the degree of social inclusion attained by participation of surrounding residents in the generation of carbon credits. In order to contribute to local sustainable development project implementers should ensure that the link between carbon

sequestration and project's development activities is direct and apparent (Asquith et al, 2002).

Chapter 3: Current limitations and Concerns of linking community forestry with carbon market

There are many limitations as well as concerns of linking community forestry with carbon markets.

5.1 Current limitations of linking community forestry with carbon markets:

It is recognized that forests store carbon and that growing forests absorb carbon from the atmosphere, therefore afforestation/reforestation activities are included on CDM. Existing forests are also a big carbon store and there proper management can help preserving and enlarging this vast carbon pool and prevents the stored carbon to release in the atmosphere. The problem is that forest management such as practiced by *Van Panchayats* of Uttaranchal has not been included in the Clean Development Mechanism (CDM) of the Kyoto Protocol. A recent study on two community forests of Uttaranchal by an NGO Central Himalayan Environment Association (CHEA)[14] indicated that the management efforts of the local people saved carbon by avoiding deforestation (See appendix 1).

Local subsistence communities which are involved in sustainable forest practices are benefited apart from possible employment during the planting stage by doing so.

[14] Central Himalayan Environment Association, Nainital, http://www.cheaindia.org/programs.html Last accessed 10/05/2006

Afforestation/reforestation does not provide much benefit to the environment except when used in really degraded areas to help in land recovery. If this is the case, it could be the choice of the large investor for cheap production of carbon and may further worsen the position of poor rural people. Also afforestation/reforestation may increase the tendency to monoculture and fast growing exotic trees. It may also increase tendency to large scale, single owner, single manager systems (cost considerations). It could also 'lock out' systems for only exclusive function of the carbon and no entry for other purposes.

To avoid all these possibilities, forest management should be included in the CDM. It acts as an incentive for communities, thus they increase the amount of carbon stored in the vegetation by increasing sustainable forest management practices. Carbon could be viewed as an additional 'non-timber forest produce' and it could be measured, certified and sold to carbon investors. By doing so, the actual management of the forest need not necessarily change. These activities increase the amount of biomass in the forest. They also reduce the rate of deforestation and therefore frequent occurrences of landslides in the mountain region.

It is more difficult to measure the effects of management of forest in terms of the increase of biomass present. There are also fears that so much forest would be brought under CDM that the impetus to invest in energy technology, would be reduced.

Over reliance on carbon benefits of forests might discourage other main benefits of forests in which local communities are involved for centuries. It also needs sustainable efforts to conserve and manage forests to store the carbon in forests.

5.2 Concerns of linking community forestry with carbon market:

Markets for carbon credits in developing countries have emerged recently after evolving from the Kyoto Protocol and voluntary carbon markets mostly in the form of project based initiatives. Community forestry has achieved good accolades and attention due to their potential to mitigate climate change, enhance forest conservation and provide livelihood opportunities to local communities. Economists believe that although ecosystem services are positive externalities or public goods, their public benefits are not captured in to prices which leads to their under valuation and environmental degradation and thus markets for ecosystem services can fill this gap (Corbera, 2004).

It is good to provide evidence from some ongoing carbon forestry activities in order to examine their potential to achieve environmental and development outcomes. On the flip side carbon forestry projects have received far more attention related to their perceived global environmental benefits in terms of potential for net carbon savings and far too little attention related to their potential consequences for local sustainable development and community capacity building. Different carbon forestry projects reveal the fact that they strengthen local capacities and leadership and support community based natural resource management across the region (Brown, 2000). However these projects still fail to achieve

more favorable environmental and equitable outcomes due to inability to create fairer institutional arrangements.

Potential risks of linking carbon market with community forestry include:

A project may deny local people of their traditional rights to access land or forest products or services critical to livelihoods. Where local land ownership is informal, more powerful entities may claim land rights for the objective of receiving payments for carbon sequestration. Local jobs may be lost when commercial harvesting rights are terminated. Local communities may lose control and flexibility over development and conservation options and directions, if projects require rigid commitments on future land uses. Use of inappropriate tree species, sites, or management systems could introduce invasive species, damage wildlife habitat, or reduce water quality or supply.

The dynamic nature of institutional arrangements in carbon forestry affects the implementation of the project. Corbera has observed in Mexico that Project managers realize that it is not possible to affect context specific and cultural norms that promote unequal distributions of power in formal decision making and, due to this, projects seem to detach from local distributions of power. The market for carbon is evolving very fast and because of the low demand for carbon savings from community forestry activities in Kyoto and voluntary markets, these markets do not allow focus on critical social development outcomes such as increasing levels of representation and participation in decision making

and better awareness of local histories and resource management conditions. (Corbera, 2004)

The large scale of most carbon offset projects puts another kind of pressure to the local development. To ensure profitability, forest carbon projects like some agricultural commodities require a reasonably large minimum area. Large areas are generally necessary to cover the considerable transaction costs, carbon monitoring, carbon credit commercialization, and technical assistance for better forest management practices as horticulture and planting and growing trees. The lack of land titles by many small farmers and rural dwellers could represent an unsurpassable barrier to the establishment of carbon projects on their lands because of uncertainty for investors. Setting up the tricky issue of carbon credits to communities may raise expectations that can not be fulfilled because of uncertainties in the market. It has been seen that pioneering forest carbon projects are typified by high transaction costs (Taiyab, 2006).

The emerging carbon offset payment schemes place poor rural communities in a volatile marketplace where they are at an extreme disadvantage in terms of experience, authority, as well as financial and human resource capabilities. The emerging guidelines for carbon contracts provide little or no flexibility to adapt to contextual circumstances or community limitations. Such potential risks for local communities and for natural biodiversity risks may be avoided by careful project selection, design and implementation (Taiyab, 2006)

Chapter 4: Discussion and Conclusion

Sustainable offsets will integrate global needs for carbon management with local livelihood requirements from the land with key non profit sector, corporate and government involvement. A reliable carbon commodity could assist local rural development, but only if appropriate policies, institutions, community mechanisms and project procedures can be put in place. The best way forward is to build on mechanisms that already work well in relation to sustainable land use and multiple local/rural stakeholders such as Van Panchayats. There will be some tradeoffs between the social benefits of community based forestry projects and their attractiveness to investors. Community based forestry projects have the highest potential for local livelihood benefits and pose the fewest risks to communities (Joyotee, Sara, 2003).

It became clear from the two case studies that stakeholder participation should be enhanced when designing, implementing and evaluating outcomes of forest carbon projects. In Uttaranchal, the *Van Panchayats* hold promise if they are able to link with carbon markets whereas in the Bolivia case, participation of local community members was found to have been limited, and therefore the local community did not get much benefit. It is essential to objectively seek stakeholders' opinions and to make certain that the project concept be transparent to all since its start.

In both the cases benefits from carbon credits have not been realized so far. In *Van Panchayat* case no efforts has been done to link forest conservation and management activities with the carbon market to provide the local communities an incentive for the sustainability of their work at the time when government is not much supportive. NKMCAP case of Bolivia is big in nature and due to lack of support from Kyoto Protocol project implemeters have not been able to get benefits from carbon credits. One respite could be to make bundles of carbon sequestration projects within umbrella NKMCAP project and link them with active voluntary carbon markets.

Inclusion of forest conservation and management activities or avoided deforestation projects in to the CDM will provide a strong incentive to the local communities to protect and manage forests for ongoing streams of benefits. Certainly markets for carbon are not designed to solve problems of the rural poor but they should not facilitate excuses for the rich to distance themselves further from the responsibilities of reducing poverty and mitigating climate change (Corbera, 2004).

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Appendix 1

Recently a research project has been implemented by Central Himalayan Environment Association, Nainital that how much carbon is saved by managing Uttaranchal's forest or avoiding deforestation by Van Panchayats. The study has been carried out in Van Panchayats of two villages Dhaili and Toli of Lagarah Development Block, Distt. Almora. The project rational is that problem of anthropogenic CO2 accumulation in the atmosphere can be addressed either by reducing CO2 emission or by developing carbon sinks. In Kyoto Protocol much of the emphasis is placed on afforestation and reforestation programs and the conservation and management of the existing forests is generally overlooked. The project advocates for inclusion of forest management practices by local communities in the Kyoto Protocol.

The Himalayan region is famous for its rich and diverse biodiversity and is among mega hotspots in the world. Uttaranchal lies in the western Himalayan region which is also valued for its ecosystem services to the Gangetic plains and serves more than 5 million people. Van Panchayats are one of the largest and oldest institutions in Uttaranchal based on collaboration between the state and local village community. Sustainable forest management under Van Panchayats is a good example of carbon sequestration and can go a long way to provide livelihood opportunities to the rural communities. The project also increased the capacity of communities involved in managing forest to monitor total carbon

absorbed by forest with the use of hand held devices as Geographic Positioning System (GPS).[15]

[15] Central Himalayan Environment Association (CHEA), Nainital, http://www.cheaindia.org/programs.html Last accessed 10/05/2006