CHAPTER 5

Forests & Forest Settlements in the Himalayas

5.1 Ecological Significance of the Himalaya Forest

The Himalaya range is the youngest mountain range in the world, and extends to almost 2500 km covering entirely or partially all the states in the northern boundary of India. This mountain range covers almost 505641 sq. km. (50.56 million ha.) and can be divided into three distinct geological zones, namely the Outer Himalaya, the Middle Himalaya, and the Great Himalaya. The Outer Himalaya is contiguous with the Great North Indian plain except for the south of Bhutan and Darjeeling rises at an average between 1000 to 2000 metres. The Middle Himalaya zone is approximately eighty kilometres wide and average elevation is 3000 to 5000 metres. The Great Himalaya is the highest ecological zone in the entire planet having fifty peaks of more than 7000 metres. From the foothills to the peaks in Great Himalaya zone the height is reached within a short horizontal distance and hence the slope of the mountain is steep. Steep slope plus a loose top soil makes the Himalaya a delicate mountain ecosystem.

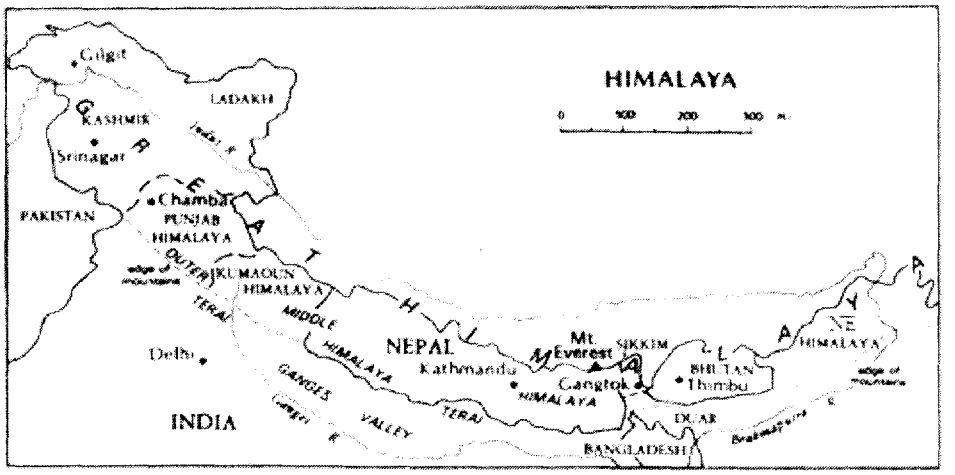


FIG 5.1

Source: Karan and Iijima (1985).

Over millions of years this fragile ecosystem has developed its own safeguards through a thick blanket cover of mixed natural forests. The rich vegetative cover on the slopes protects the mountain from torrential rainfall during the monsoons. The importance of an ecologically stable Himalaya for the South Asian economy in

general and for India in particular is widely acknowledged (Moench and Bandyopadhyay[i], 1986; Baland, J.M[ii]. *et al*, 2006).

In the Himalaya Mountain, forest and water are important natural resources vital for survival of the habitat. The Himalaya is a rich store house of numerous flora and fauna species. Diversity of plants ,both naturally available and cultivated, providing edible output is an incomparable feature of mountain ecosystem. It has been estimated that one-fourth to one-fifth of the 666 species cultivated plants of the world have originated from this region (Singh[iii], 1995; p. 56).

5.2 Dependence on Forests in the Himalaya

According to FSI (2009[iv]) 55.51 million ha of India's forest cover lies below 1000m, 11.67 million ha between 1000 to 3000m and only 1.91 million ha above 3000m altitude. Thus most of the forest in the hills are at lower altitude and at high altitude we have cold deserts that supports a livelihood predominantly based on animal husbandry. However, the dependence of hill populations on regional forests is extremely high; the causes are found as much in agro-climatic factors as in the nature of hill agriculture. Both land scarcity and low crop yields account for wide prevalence of mixed farming in mountain regions like the Himalaya. Thus a switch entirely to cash crop cultivation generally proves unsuccessful because of problems of food, fodder and fuel security. As it has evolved, the Himalayan farming system combines cultivation with livestock farming. It is a characteristic of such a system that heavy forest-dependence exists for meeting energy and animal husbandry requirements within it. Moreover, native peoples of the Himalaya who for countless centuries have lived in close contact with Himalayan biodiversity have a well developed knowledge of the utility of local forest usufructs, including various wild-fruit, wild vegetables and herbs, medicinal and utility plants, etc., besides other more commonly known NTFPs. Because of the closeness of this contact, the existence of these communities has depended on their having open access to these resources (Mukherjee and Choudhury[v], 1999).

The traditional agriculture in the Himalaya is closely dependent on the surrounding forests for resources. The agriculture system in the hills is different from that in the plains and has evolved as an outcome of years of experience. Through numerous experiments people have been trying to develop a sustainable agriculture technique

that can be practised in harmony with nature. In presence of large variations in agro-climatic conditions, lack of market integration and high dependence on small agricultural plot of land situated on steep slopes of the mountain - all these led to the evolution of a subsistent village economy that has the highest regard for harmonious coexistence with nature (Nautiyal[vi], S. *et. al.*, 2002-03).

The Himalayan forests are essential for maintaining the hydrological cycle, nutrient cycle and the ecological balance. The trees help to slow down the run-off and control soil erosion and landslides by retaining water in their root system, a phenomenon better known as "leaching effect". Besides, the forest is an important source of valuable organic matter in the form of litter to the agriculture land and fodder to the livestock. Therefore, decline in forest cover in the Himalayas is not only a serious cause of concern from the ecological point of view but its decline also threatens the very livelihood system of the rural hill communities.

Apart from the functions mentioned above, forests also provide food, fuel, fibre to the rural people and also generate a scope for employment in the tourism sector. Increasing land-man ratio and limited scope of employment outside agriculture combined with deteriorating ecological conditions and rise in natural hazards have increased the vulnerability of the hill people in general and that of rural communities of the hill in particular. Environmental degradation erodes the natural resource resulting in reduction in the amount of available natural resources and also correspondingly increasing the time required to collect them. A number of studies have shown that such loss in resource base affects the poor's wellbeing especially in terms of their health, food security, income etc. (Amacher[vii] *et al*, 2001; Baland[viii] *et. al.* 2009).

5.3 History of Human Settlement in Himalaya

The Himalayan Mountain acts as a barrier between India and China the two great nations in Asia. Most of the settlement in this great mountain range has been in the south facing slopes. Prior to the British annexation of the region the history of state formation in the central and eastern Himalaya can be seen as an expansion of tribal populations under the patronage of rulers from the plains. The Buddhist monastic principalities that controlled access to the high mountain passes along the Himalayan periphery remained independent of domination from the plains in the south both

because of their religious and political alliances with Tibet and their importance in the trans-Himalayan trade between India and Central Asia. The pre-dominance of transhumance herding in their subsistence economy - combined with the cultivation of limited and generally dispersed agricultural lands – acted as a hindrance for large-scale settlement of populations and the appropriation of agricultural surpluses. The monastic principalities derived their revenue largely from trade and, also in a lesser amount from tribute yielded by agricultural tenants and artisans attached to monastic estates. Only the rajas of Sikkim and Bhutan were successful in extending their control over lowland tribal groups. The agricultural surpluses extracted from these populations provided the basis for more extensive political consolidation (English[IX], 1985).

The British interest in the Himalayas has its standard imprint of two distinct phases in the development of the colonial economy in India: the first being the period of mercantile exploitation under the Company, and the second being the expansion of commercial agricultural investment under the civil administration of the Raj. During the eighteenth century, the Company's interest was in Indo-Tibetian trade, and therefore a number of trade missions were initiated not only to learn more about this trade but also to establish trade relation with Nepal, Bhutan and Sikkim and ultimately Tibet. Later the control of the trans-Himalayan trade was considered essential to gain access to the large untapped market of China through Tibet (Pemble[X], 1971).

The second phase of British interest in the Himalayas saw expansion of commercial agricultural investment (like tea) to increase output to meet the increasing demand for tea. Much of these investments were concentrated in Lower Province (Darjeeling, Jalpaiguri *Duars* and Assam) because of its close proximity to ports in Bengal. Again, annexation of the Himalayan region made available a vast stretches of forests land which was primarily worked for its timber. The expansion in economic activity in the hills increased the demand for labour from outside the region. There was a general encouragement by the investors to settle labourers in this region which set the momentum for growth of settlements in the Himalaya.

5.4 Population Growth, Natural Resource Depletion and Usufructuary Rights

Natural Resource in the Himalayas came to be degraded either from anthropogenic or non-anthropogenic factors like fire, landslides from heavy rainfall, diseases to plants

and at higher altitudes from frost. Anthropogenic factors may be classified into two, first those that arose from the subsistence needs of the poor and second, those relating to felling of trees for commercial purposes. A debate that naturally ensues, is to what extent is the subsistence need of the poor responsible for degradation of the forests.

More than 36 million people live in the Indian region of the Himalaya (Census, 2001). Seventy percent of the population in the Himalaya lives in Outer and Middle Himalaya zone. The Greater Himalaya consists of vast stretches of high altitude deserts not suited for human settlement. The density of the population varies between as low as 13 per sq. km. in Arunachal Pradesh to 511 per sq. km. in Darjeeling Himalaya region. The density in the hills is much lower compared to that in the plains, yet rapid urbanisation in many places in the hills have resulted in population growth far exceeding the carrying capacity of the local ecology. The growth of population in the hills is not same everywhere, nor has the growth of population remained constant over the years in different regions of the hills. To compare the growth of population we have considered population figure for only those census years that corresponds to important events under the Indian forest policy[xi]. In 1901, the population in the Indian Himalaya region was 5.55 million which increased to 9.85 million in 1951 and further increased to 16.98 million in 1981. The rate of growth during 1901-51 was 1.15% p.a. which increased to 1.84% p.a. during 1951-81. The increase in the growth rate during 1951-81 seems to be the direct result of relative improvement in health care system in the hills which otherwise have remained neglected during the colonial government. But the pace at which population increased in the hills after the Forest Conservation Act 1980 is unprecedented in the history of human settlements in the Himalayas. During 1981-91 the growth was as high as 3.4% p.a. and the overall growth for the period 1981-2001 was 2.89% p.a. Such high growth rate in population cannot be explained by the natural increase in population alone, rather this was caused by large influx of population from the neighbouring regions.

Increase in population adversely affects the land-man ratio, and an increase in population density implies more pressure on narrow zones of agriculture lands. The density of population in the Himalaya is generally low throughout, though comparatively high density in the Himalaya is recorded in Kashmir valley, foothills of Himalayas around Jammu, Kalka, Dehradun, Kothgodam and tourist destinations like

Simla, Masoorie, Nainital, Darjeeling etc. in India. The Greater Himalayan region have very low population density due to harsh topography, climate and low level of accessibility. The pressure on agriculture land is evident from the decrease in the average size of the land holding 0.09 ha during 1996-7 to 2001-02. The number of land holdings from all categories has increased by 1.44 million and the maximum increase has been in the marginal land holding category which increased by 1.18 million during the same period (Agriculture Census, 1996-97, 2001-02). The number of land holdings has partially increased due to fragmentation and also due to expansion in land holding made possible through forced entry into areas which were formerly under natural resource cover. Not only has there been a decrease in the size of holding but there also has been an increase in its fragmentation, making traditional agriculture less profitable. In the mountains, rural communities generally compensated any fall in agriculture income by increasing extraction from the natural resource stock. However, when accesses to such resources are restricted then it worsens their situations even further.

Table 5.1 Change in land holding in Indian Himalaya (1996-97 to 2001-02)

Sl. No.	Size Group (ha)	Change in Total Holding		Change in total No. of Parcels	Change in average number of Parcels per holding	Change in average area per parcel	Change in average area per holding
		No	Area				
1	Marginal (below 1.0)	1178833	277332	4868590	0.47	-0.06	-0.06
2	Small(1.0-1.99)	164306	182202	1940632	1.07	-0.11	-0.04
3	Semi-Medium (2.0-3.99)	57091	77799	1140965	1.22	-0.16	-0.10
4	Medium (4.0-4.99)	22839	127317	379094	0.96	-0.16	0.02
5	Large (10 and above)	21184	400432	108930	-0.46	0.52	1.92
	All Groups	1444253	1065082	8438211	0.60	-0.10	-0.09

Source: Estimated from Agriculture Census.

The increase in population over the years has also forced expansion of agriculture into forest lands. Extension of agriculture land use into forestland coupled with several other factors such as fragile land use policies, lack of awareness among the people, ecosystem degradation arising from traditional practices of litter collection for maintaining agricultural soil fertility and unsustainable harvesting and overexploitation of the resources could be threat to forest biodiversity and ecosystem

services on one hand and sustainability of traditional farming on the other (Singh[xii] *et. al.*, 1984).

As a result of growth of population, traditional communities and economies in the Himalaya are facing serious challenges both from within and as well as from changes in factors outside the region. Efficient use of the narrow zone and specialising in particular trade has been the foundation for human survival in the mountains. Generally, communities who settled in the valley and at lower altitude were agriculturists while highlanders specialised in animal husbandry. This kind of mixed agriculture united the two ecological zones of alpine pastures and valley lands to give a distinct ecological characteristic of the mountain agriculture. As a consequence, the landuse pattern and landownership in the hills came to be different from that in the plains below. The highlanders of the Himalaya have developed a distinctive landuse pattern where the community allowed private ownership of small plot of land near the main village but at the higher altitude forests and alpine pastures were held in common (Karan and Iijima[xiii], 1985; p. 75).

The success of animal grazing and forest use require coordinated efforts between the communities. But with the growth of population there has been a transformation in the landuse and landownership in the mountains. The Himalaya as home to considerable bio- and species-diversity has also suffered deforestation due to rapid growth in population. The inevitable consequence of this is unstable rainfall, increasing soil erosion and landslides. Although these physical changes have now assumed enormous proportions, their economic and social implications cannot be ignored either. Increasing numbers and growing settlement accompanied by the quickening of urbanisation have imposed an external liability on the forests to provide timber and other commercial forest products to meet the needs of the new urban centres (Mukherjee and Choudhury).

The Himalaya too has in recent decades witnessed considerable growth of population and proliferation of urban settlement. Endemic poverty and high dependency ratios, with heavy reliance of prevalent agroforestry systems on primary resources have led upto diminishing culturable land per capita. Energy scenarios in rural areas in the Himalaya have traditionally shown high presence of non-commercial energy sources *i.e.* collected fuels, while scarcity of fodder has necessitated the continuous extraction of forest biomass for subsistence. The overload to this being added by commercial

felling of trees to meet urban construction, furniture and other needs threatens the sustainability of mountain agroforestry systems. A situation of conflict thus arises between survival necessities of the rural poor and luxury consumption patterns of the urban rich, with far-reaching consequences. As rural usufruct demands increase to levels at which fuelwood and fodder become priced rather than collected items, the rural poor begin to exercise their access rights to nearby forests as a means of livelihood, allowing urban demands also to be served by their collection efforts. Although extreme steps are then resorted to by government to preserve remaining forests by enforcing forest protection laws, these have an unequal impact within the community. While fuelwood demands from the urban rich are easily substituted by alternative fuel sources, it is the rural poor who suffer most from the loss of their erstwhile access to forest usufructs (*ibid*).

This recurring tragedy requires considerable rethinking on the forest policy. The present study shall therefore examine issues relevant to preservation of access rights of the people of the Himalaya, even as the forests of the region are being conserved.

5.5 Population distribution, density and growth in the Himalaya

The population settlement and economic livelihood patterns in the Himalayas have been to a great extent influenced by physiological and agro-climate variations in the region. Harsh living conditions, rugged terrain and dense forest zones tend to restrict movement and communication. As a result remote settlements in the hill especially in the higher altitudes have developed a distinct cultural identity of their own and are performing primitive subsistence economic activities like herding, gathering and cultivation. However, with the development of modern communication systems these isolated settlements have witnessed enhanced economic activities in recent times. These outside influences are affecting traditional social and cultural and economic structure in the Himalayas.

The Himalayas may also be divided into three main regions exhibiting homogeneous characteristics in terms of climate, plant and animal life, cultural and social ethos, economic activities and environmental issues. These regions are:

- Western Himalayas – Jammu and Kashmir and Himachal Pradesh
- Central Himalayas – Uttaranchal and Nepal

- Eastern Himalayas – Darjeeling Hills, Sikkim, Bhutan, Arunachal Pradesh and the eastern arc of Himalayas covering Nagaland, Manipur, Mizoram and Tripura.

However, we shall confine ourself to Indian Himalayas in this study mainly because of availability and uniform periodicity of data. Therefore, we will make minor changes in defining the regions according to the FSI;

- Western Himalayas – Jammu and Kashmir, Himachal Pradesh and Uttaranchal
- Eastern Himalayas – Darjeeling Hills, Sikkim, Arunachal Pradesh (except three districts) and
- North East Himalayas covering Nagaland, Meghalaya, Manipur, Mizoram and Tripura and Changlang, Lohit and Tirap districts of Arunachal Pradesh.

The Himalayas recorded 65.57 million persons in 2001, while the kingdom of Nepal and Bhutan recorded 27.07 and 2.18 million persons respectively (as per the Census 2001 and CIA- World Fact book data-2004). The Central Himalayan region accounts for 54 per cent of the total population in the Himalaya, while Western Himalayas and Eastern Himalayas account for the other 25 per cent and 21 per cent population respectively. Almost 55 per cent of the population live in the Indian Himalaya, while 41.5 per cent and 3.5 per cent live in Nepal and Bhutan respectively. The distribution of population in the Himalaya depicts a strong influence of physical and economic characteristics as valley bottoms, river valleys and plateau regions, have conducive conditions for economic activities like agriculture, horticulture and tourism activities and thus experiences concentration of population. The distribution of population among the Himalayan states falling in India, recorded concentration in Jammu and Kashmir (15%), Uttranchal (13%), Himachal Pradesh (9%), and the states in the north-east recorded population distribution between 1-5% each.

The population density in the hills is generally much lower than that of the plains mainly due to vast stretches of inhospitable terrain unfavourable to human settlements. Density of population in Himalaya increased from 13 persons per sq.km. in 1901 to 23 in 1951. The density of population did not double during the first fifty years of the twentieth century. But within the next fifty from 1951 the density increased more than three and a half times and stood at 85 persons per sq.km. The density of population in the Western, Eastern and North East Himalaya regions are 117, 88 and 150 respectively[XIV]. In the Eastern Himalayan region, the two states of

Arunachal Pradesh and Sikkim have population density of 13 and 76 respectively, whereas the hills of Darjeeling are more densely populated at 511 persons per sq. km. The rural population in the Himalaya constitute 82.5 % of the total population. The rate of urbanisation in the Himalaya is much less compared to the plains. With a high rural population and limited alternative employment opportunities, dependence on agriculture is obviously quite high in the mountains.

Table 5.2 Rural and Urban Population in the three regions of the Himalaya

	People	% of Himalaya	Rural	% Rural	Urban	% urban
Eastern Himalaya	3247991	4.98	2439808	75.12	808183	24.88
Western Himalaya	24710949	37.91	19955686	80.76	4755263	19.24
North East Himalaya	37218950	57.10	31420088	84.42	5797862	15.58

Source: Census, 2001.

Again, the average size of the landholding being low in the hills naturally make people more dependent on natural resources especially forest and pastures to supplement their income. The forest-dependent hill economies mostly depend on the commons (*de jure* and *de facto*) for fuelwood while intensive agricultural economies has been found to be more dependent on CPRs for grazing (Menon and Vadivelu[xv], 2006).

5.6 Forest Resources of the Himalaya

Forest biomass in the form of fuel and fodder constitutes the most important usufruct drawn by rural populations, both in the Himalaya and elsewhere. Total fodder drawals in the Western Himalaya (excluding the hill districts of UP), and the Indian Himalaya east of Nepal (excluding Assam and the Darjeeling region) may for instance be estimated at over 37 million tonnes [MT] dry-weight for a combined domestic animal population comprising 27.17 million livestock heads in 2003 (FSI). The estimate reflects both the composition of the livestock population as well as different levels of daily fodder consumption by animal and breed. Almost all of this consumption is drawn as a CPR. Similarly, the high dependence of populations on forest fuels in both Himalayas, is evident from Planning Commission figures (see Table 1), reflects the open access they have hitherto had to common forests.

Table 5.3 Domestic Energy Use in the Himalaya & Contiguous Regions

Agro-Climatic Zone	Energy Consumption ['000kCal]	Commercial Energy (%)	Non-Commercial Energy (%)	Commercial ['000kCal]	Non-Commercial ['000kCal]	Fuel wood [kg]	Crop Residue [kg]	Dung [kg]
Western Himalayan Zone	2868.89	0.95	99.05	27.14	2841.75	710.45	52.41	79.13
Upper Gangetic Plains	1311.30	1.95	98.06	25.51	1285.79	129.99	127.30	156.0
Eastern Himalayan Zone#	2418.01	7.76	92.24	187.66	2230.34	621.41	-	-
Lower Gangetic Zone	2449.55	6.56	93.44	160.67	2288.88	*na*	*na*	*Na*

This zone includes India Himalaya east of Nepal.
Source: Mukherjee and Choudhury,1999.

However, the noticeable differences observed in fuel consumption patterns between the two agroclimatic zones deserve further comment. The Western Himalayan agroclimatic zone located at more northerly latitudes experiences winters more severe than in the Eastern Himalaya and hence per capita energy requirements there are higher, as can be ascertained from the table. While a significant percentage of these fuel needs are met from fuelwood, these are further supplemented by crop residues and animal dung, implying that fuelwood availability is insufficient in meeting the high order of demands. A possible consequence of the energy pressure on these non-wood resources is lowered availability of crop residues and dung for manuring purposes. Although per capita domestic energy demands in the Eastern Himalaya are lower than in the Western Himalaya, the dependence on non-commercial energy is still quite substantial and moreover is met solely from fuelwood. Percentage of commercial energy consumption is also much higher in this zone than in the Western Himalaya, reflecting negligible drawal of non-commercial energy resources other than fuelwood. The scarcity relationship between fuelwood demand and supply is therefore more pronounced in the Western Himalaya.

Although both the Upper and Lower Gangetic plains draw a substantial component of their non-commercial wood energy requirements from contiguous forest tracts of the Himalaya and the Himalayan foothills, noticeable differences again exist in the degree of this dependence. The Upper Gangetic region records lower per capita energy consumption than the Lower Gangetic region in calorific terms, presumably because of the higher consumption rates of crop residues and animal dung which yield lower calorific output than fuelwood energy. Although data for segregated non-commercial energy requirements are unavailable for the latter region, the juxtaposition of lower percentage consumption of non-commercial energy in the Lower Gangetic region

with high calorific consumption of the same indicates persistence of fuelwood as a primary energy source because of greater access to contiguous forests.

The NSSO survey data has shown that of the total goods collected from the CPRs, fuelwood and fodder constitute 98% in Western Himalaya. In the Indian Himalaya east of Nepal 53 % of the goods collected is fuelwood. From the survey it is reported that 70 % of the landless household depend on CPRs for fuelwood, also their dependence on CPRs for fodder is more than the landed owners of livestock (Menon and Vadivelu, 2006). Both Himalayan regions are therefore seen to be enormously dependent on fuelwood energy sourced from the forests. An examination of the extent of forest cover in these regions may thus be of further help in understanding a relationship between availability and demand for non-commercial fuelwood energy.

5.6.1 Forest Cover in the Himalaya

Table 5.4 (a) presents figures for recorded forest cover in the three Himalayan regions and their contiguous regions comprising the UP, West Bengal and Assam plains. It becomes readily apparent that proportionate cover in terms of area classified as forest is considerably higher in the North East than in other regions, with the sole exception of Himachal Pradesh. An intriguing feature however is the predominance of unclassed forests in the North East accompanied by lower proportionate presence of reserved and protected forests. Drawing upon our earlier discussion on CPRs, it may therefore be noted that a considerable part of the North East forests are managed under customary law systems, against reserved and protected forests elsewhere which are managed under statutory law, *i.e.* the various Forest Acts. More generally, the Western montane and submontane agroclimatic regions have lower classified forest cover on the whole than the other two regions, particularly because of low forest cover in J&K. A large part of the territory of this state *i.e.* Ladakh, is of course an unforested high altitude desert.

Table 5.4 (a) Area under Forests by Legal Status in Indian Himalaya. (in sq. km.)

State	Geographical Area	Total Forest Area	Recorded forest area 2005			% of GA
			RF	PF	UF	
Himachal Pradesh	55673	37033	1896	33043	2094	66.52
Jammu & Kashmir	222236#	20230	17643	2551	36	9.10
Uttarakhand	53483	34651	24638	9882	131	64.79
Western Himalaya	331392	91914	44177	45476	2261	27.74
Arunachal Pradesh	83743	51540	10546	9528	31466	61.55

Assam	78438	26832	17864	-	8968	34.21
Manipur	22327	17418	1467	4171	11780	78.01
Meghalaya	22429	9496	1112	12	8372	42.34
Mizoram	21081	16717	7909	3568	5240	79.30
Nagaland	16579	9222	86	508	8628	55.62
Tripura	10486	6294	4175	2	2117	60.02
North East Himalaya	255083	137519	43159	17789	76571	53.91
Sikkim	7096	5841	5452	389	0	82.31
Darjeeling Himalaya	3149	1204	1115	-	89	38.23
Eastern Himalaya	10245	7045	6567	389	89	68.77

120848 sq.km. is under illegal occupation of Kashmir and China.
Note: RF: Reserved Forest. PF: Protected Forest and UF: Unreserved Forest.
Source: SFR, 2005

Table 5.4 (b) Percentage of area under Forests by Legal Status in Indian Himalaya.

State	Recorded forest area 2005 (%)			
	RF	PF	UF	Total
Himachal Pradesh	5.12	89.23	5.65	100
Jammu & Kashmir	87.21	12.61	0.18	100
Uttarakhand	71.10	28.52	0.38	100
Western Himalaya	**48.06**	**49.48**	**2.46**	100
Arunachal Pradesh	20.46	18.49	61.05	100
Assam	66.58	0.00	33.42	100
Manipur	8.42	23.95	67.63	100
Meghalaya	11.71	0.13	88.16	100
Mizoram	47.31	21.34	31.35	100
Nagaland	0.93	5.51	93.56	100
Tripura	66.33	0.03	33.64	100
North East Himalaya	**31.38**	**12.94**	**55.68**	100
Sikkim	93.34	6.66	0.00	100
West Bengal (Darj)	92.61	0.08	7.39	100
Eastern Himalaya	**93.22**	**5.52**	**1.26**	100

What is most notable from the table however, are significant differences between the ratio of unclassed to classed forests between the Western and Eastern Himalaya. While in HP, the high degree of classified forest cover arises mainly because of the high component of protected forests, the position changes radically in the North East. States like Arunachal Pradesh, Meghalaya, Nagaland and Manipur show very high proportions upwards of 60 percent in the ratio of unclassed to classed forests, reflecting the degree to which the region's forests are under civil control. Even in Tripura and Mizoram, the extent of civil control over forests is relatively high and only in Sikkim and West Bengal is the proportion of unclassed forests uncharacteristically low. Against this, in the Western Himalaya, unclassed *soyam*

forests have a credible presence only in Uttarakhand, where most of these constitute the forest cover of the Uttarakhand hills.

The similarities and differences noted in the above analysis give forests in the three regions in the Himalaya, more of a CPR character than forests elsewhere, also indicating relatively easier customary access of resident populations to forest usufructs and fuelwood.

A set of important questions now arises. Firstly, despite the differences in forest cover and access rights between the three regions in the Himalaya as noted in the above analysis, is the fuel and usufruct dependence of the local populations on the forests all that different? Secondly, considering that differences in fuel dependence would exist more as a result of access to alternative fuels than because of denial of legal access to classed forests, is the extension of statutory law into the management of forests effective in reducing the depletion rates of CPR resources? If not, then has the sacrifice of the potential role of the community in managing customary law CPRs (such as seen in the case of the *soyam* forests and the civil forests of the North East) been responsible for creating free rider situations in the use of forest usufructs without let or hindrance?

Table 5.5 Actual Forest cover in the Himalaya, 2007

State	No. of Hill Districts	Forest Cover				% of Geographical Area	Change 2007-05
		VDF	MDF	OF	Total		
Himachal Pradesh	12	3224	6383	5061	14668	26.35	299
J & K	14	4298	8977	9411	22686	10.21	1413
Uttarakhand	13	4762	14165	5568	24495	45.80	53
Western Himalaya	**39**	**12284**	**29525**	**20040**	61849	**18.66**	**1765**
Sikkim	4	500	2161	696	3357	47.31	95
Arunachal Pradesh (E)	10	16349	25341	11964	53654	82.14	-162
West Bengal (Darj)	1	714	663	912	2289	72.69	68
Eastern Himalaya	**15**	**17563**	**28165**	**13572**	**59300**	**78.48**	**1**
Arunachal Pradesh (NE)	3	4509	6215	2975	13699	74.35	-262
Assam (H)	3	755	5798	6450	13003	67.89	-48
Manipur	9	701	5474	11105	17280	77.40	194
Meghalaya	7	410	9501	7410	17321	77.23	333
Mizoram	8	134	6251	12855	19240	91.27	556
Nagaland	8	1274	4897	7293	13464	81.21	-255
Tripura	4	111	4770	3192	8073	76.95	-82
North East Himalaya	**42**	**7894**	**42906**	**51280**	**102080**	**78.23**	**436**

Total	**96**	**37741**	**100596**	**84892**	**223229**	**45.49**	**2202**

Source: SFR, 2009.

Fourthly, has customary law proved more successful in the maintenance of forest cover and forest quality? And finally, if both customary law and statutory law systems are found equally wanting, can partial induction of property rights into usufruct systems, *e.g.* through JFM, prove more effective in forest management?

Although the answers to such questions may not immediately be obvious, the search for answers takes one deeper into the energy-forest relationship, particularly into detailed scrutiny of statewise forest cover figures from the previous table.

5.6.2 Trend in forest cover quality in the Himalaya

The FSI has been assessing the forest cover in the hill districts of the country since 1997. The hill districts are identified based on the criterion put forward by the Planning Commission for Hills Areas and Western Ghats Development Programme. A hill taluka is the one with altitude of more than 500 mts. from the mean sea level. A hill district is one whose total area of hill talukas is more than half of the geographical area of the district. There are 124 identified hill districts in the country of which 96 hill districts fall under the Himalayan mountain range.

Table 5.5 provides a closer look at the quality and composition of actual vegetative cover in the concerned states in the Himalaya, vide IRS remote sensing data from the biennial forest surveys conducted in India. While Table 5.4(a) had shown that recorded forests occupy larger tracts of CPR land in the North East than in the other Himalayan states as compared to the states in the Western Himalayas, highest actual forest cover is seen in Mizoram, followed sequentially by Nagaland and Arunachal Pradesh in the North East. Also notable in the comparison between Tables 5.5 & 5.4(a) is the sharp reduction of classified percentage of forest cover in HP of 66.52 percent to actual cover of only around 26.35 percent, which is in complete contrast to most other states where actual forest cover increases appreciably compared to classified forest area because of the inclusion of non-classified forests. This appears to be explained by the fact that the larger part of protected reserves in HP (such as the Greater Himalayan National Park) which make up most of classified forest cover of the state are actually treeless alpine areas.

Scrublands, which generally represent vestigial forests, are in highest proportion in Sikkim and J&K and more moderately in Meghalaya and Manipur, while other states have nearly negligible proportions. Although the extent of actual forest cover in the Himalaya from Table 3.5 may appear quite rosy, it should be noted also that open forests are present in fairly significant proportions alongside dense forests, indicating overall degradation in canopy cover of forested lands. Figures for the Western Himalaya once again reflect the apparent pressure on existing forests to provide the energy requirements of the people residing here, since actual forest cover in the region is quite low when compared to the Eastern Himalaya. It had already been noted earlier that the higher proportion of unclassed CPR forests in the North East states contributes to easier fuelwood availability for the population there, relieving the reserved forests of the region from immediate pressure. However for the state of West Bengal as a whole, where classified forest cover was already significantly low, actual forest cover is seen to be even lower with a fair proportion of forest cover actually comprising the Sunderban mangroves rather than Himalayan forests. On the other hand, most of North Bengal, which also includes the Darjeeling Himalaya, falls within the Eastern Himalayan agroclimatic zone and is thus, dependent heavily on the Himalayan forests for wood energy and fodder.

Collating IRS data from several consecutive Forest Surveys, it becomes interesting to examine changes in the status of actual forest cover in the Himalaya and adjoining areas in order to estimate the scale at which afforestation or deforestation has been taking place. Such changes over the decade commencing 1987, are presented in Table 5.6. Although, continuous data are not available because of the biennial nature of the survey, the gap-year series sufficiently captures alterations in forest cover of the states under review.

Forest cover in the states of HP, UP, West Bengal and Sikkim, where most of the forests are either reserved or protected forests, is seen to have registered areal increase over the decade. It has on the other hand declined noticeably in the North East. Since the remote sensing data include both classified and unclassed forests within differentiated dense and open canopy forests, it becomes apparent from joint consideration of Tables 5.4 (a) & 5.6 that open access to CPR forests in states (excluding Arunachal Pradesh) where unclassed forests occupy a significant proportion of total forest cover, as also possibly the prevalence of *jhum* cultivation in

these states, has resulted both in reduction of total cover as well as in degradation of canopy quality. The data from the table would indicate the opposite for the non-CPR states which show increments in forest cover. However there is no room for complacency over these increments because they may be more indicative of maturation in canopy quality of forests replanted in the 1970s and 1980s on large areas that had been felled prior to this period, rather than absolute gains in forest hectarage. Although the areal increments in these states might well be viewed as the result of institutional protection measures following the declaration of the National Forest Policy of 1988, and large scale promotion of JFM programme in various states in India (see table 5.7).

Table 5.6 Area under forests in Indian Himalayan Region

State	1987	1989	1991	1993	1995	1997	1999	2001	2003	2005	2007
Arunachal Pradesh	60500	68763	68757	68661	68621	68602	68847	68045	68019	67777	67353
Assam	26386	25058	24751	24508	24061	23824	23688	27714	27826	27645	27692
Himachal Pradesh	12882	13377	11780	12502	12501	12521	13082	12907	14353	14369	14668
J & K	20880	20424	20064	20443	20433	20440	20441	19886	15595	15613	22686
Manipur	17679	17885	17685	17621	17558	17418	17384	17889	17219	17086	17280
Meghalaya	16511	15690	15875	15769	15714	15657	15633	16535	16839	16988	17321
Mizoram	19092	18178	18853	18697	18576	18775	18338	16397	18430	18684	19240
Nagaland	14351	14356	14321	14348	14291	14221	14164	13980	13609	13719	13464
Punjab Hills			1234	1234	1232	1235	1255	1277	1200	1196	
Sikkim	2839	3124	3033	3119	3127	3129	3118	3164	3262	3262	3357
Tripura	5743	5325	5535	5538	5538	5546	5745	8830	8093	8155	8073
Uttarakhand			22536	22669	22658	23243	23260	23354	24465	24442	24495
West Bengal (Darj)	1332		1435	1455	1448	1455	1455	2196	2221	2221	2289
Himalaya	198195	202180	248395	249233	248416	249309	249670	232174	231131	231157	237918

Note: The figures in shaded portion are for undivided Uttar Pradesh
Source: SFR (Various Years)

Table 5.7 Joint Forest Management status in Himalayan States

States	Joint Forest Management					
	No of JFM	Area under JFM (ha)	Year of Commencement	Household involved in JFM		
				No	SC	ST
Arunachal Pradesh	347	90000	1997			
Assam	503	80000	1998	57341		28459
Himachal Pradesh	1690	420000	1993	265000		36000
Jammu & Kashmir	2697	114182	1990			
Manipur	280	90000	1990	26000		22000
Meghalaya	73	4000	2003			all families are ST
Mizoram	270	20000	1990	40000		mostly ST
Nagaland	335	20000	1997	85000		mostly ST
Sikkim	155	10000	1998	46000		17000
Tripura	374	100000	1991	33000		17000
Uttarakhand	10107	860000	1992	500000		15000
West Bengal	4096	630000	1989 (1971)	480000		110000

Source: SFR, 2009

The proportion of forest cover is less than the prescribed 60% in Western Himalaya, and the states of Assam and Sikkim as a whole. Barring Assam, the other two have a large proportion of area under high altitude cold deserts. Tripura and Darjeeling shows a lower proportion of forests till 1999 but thereafter shows a quantum jump. This increase has been caused by changes in FSI criterion for forest cover. From 2001, onwards the FSI made a conceptual change and incorporating forest cover instead of recorded forest area as done in earlier FSI. This added large tracts of land under tea in the three states, Assam, Tripura and Darjeeling Hills in West Bengal, showing huge increase in reported data.

Table 5.8 Forest cover trend in the Himalaya

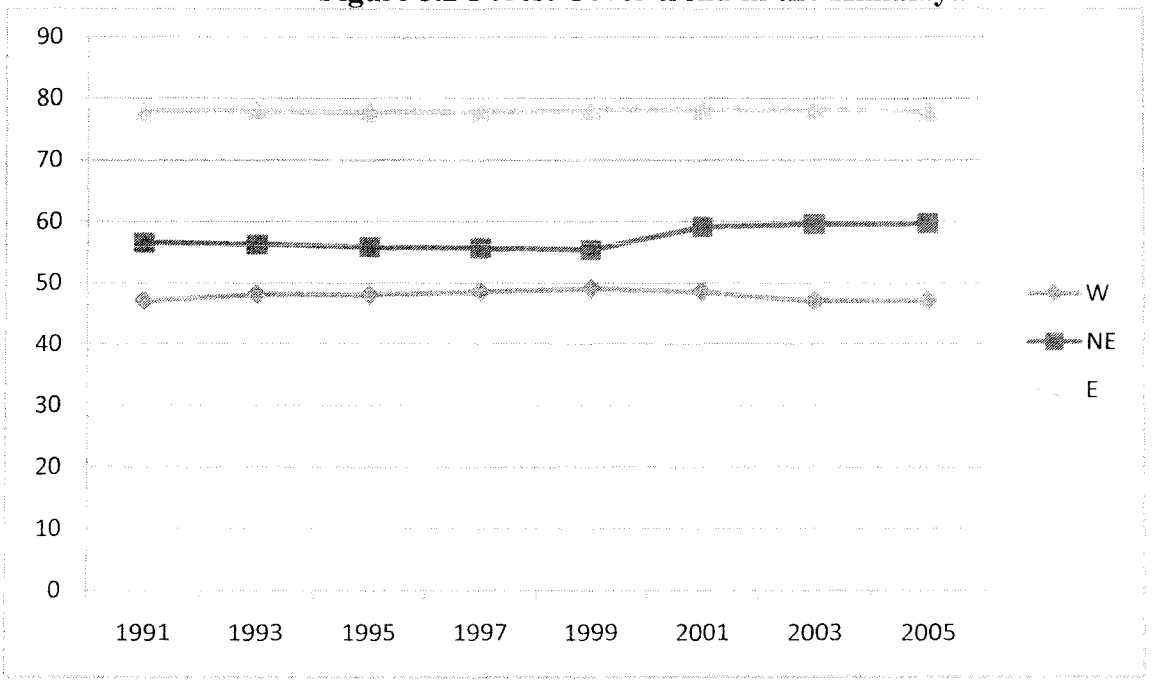
State	Land Area (sq.km)	Percentage of area under forests										
		1987	1989	1991	1993	1995	1997	1999	2001	2003	2005	2007
Arunachal Pradesh	83743	76.58	82.4	82.1	81.99	81.94	81.92	82.21	81.25	81.22	80.93	80.43
Assam	78438	32.08	31.66	31.55	31.25	30.68	30.37	30.2	35.33	35.48	35.24	35.3
Himachal Pradesh	55673	22.42	22.42	22.42	22.46	22.45	22.49	23.5	25.79	25.78	25.81	26.35
Jammu & Kashmir	222236*	9.41	9.2	9.2	9.2	9.2	9.2	9.2	9.56	9.57	9.57	10.21
Manipur	22327	78.27	79.21	79.21	78.92	78.64	78.01	77.86	75.81	77.12	76.53	77.4
Meghalaya	22429	73.41	69.75	70.78	70.31	70.06	69.81	69.7	69.48	75.08	75.74	76.82
Mizoram	21081	90.53	86.19	89.43	88.69	88.12	89.06	86.99	82.98	87.42	88.63	91.27
Nagaland	16579	86.82	86.85	86.38	86.54	86.2	85.78	85.43	80.49	82.09	82.75	81.21
Sikkim	7096	38.84	42.86	42.86	43.95	44.07	44.1	43.94	45	45.97	45.97	47.31
Tripura	10486	56.77	52.78	52.78	52.81	52.81	52.89	54.79	67.38	77.18	77.77	76.99

Uttaranchal	53483			42.14	42.39	42.36	43.46	43.49	44.76	45.74	45.7	45.8
Darjeeling	3149			45.57	46.21	45.98	46.21	46.21	69.74	70.53	70.53	72.69

*It includes 120,848 sq.km. under illegal occupation of China and Pakistan.
Source: State Forest Report (Various Years)

Though there has been a rush in the official circle to attribute the success of this spectacular increase in the forest cover to the participatory management programme, however a focused case study of certain parts of West Bengal and the Eastern Himalaya in the following section reveals a dismal picture.

Figure 5.2 Forest Cover trend in the Himalaya



From SFR 2003, a three way forest cover classification was introduced. Forest land identified as those having at least 10% canopy cover, from 10 to 40 % was open forest, 40 to 70% was moderately dense forest [MDF] and above 70% canopy cover was considered as very dense forest [VDF]. The earlier classification was two way and made a distinction between dense forest (more than 40% canopy) and open forest (less than 40% canopy). Land with less than 10% canopy is the scrubs land that is not considered as part of the forest. For continuity and easy comparability we have merged VDF and MDF into one category i.e. dense forest.

Figure 5.2 shows that proportion of land under forest cover has remained more or less the same in three regions of the Himalaya. The highest proportion of forest in the Himalaya is in the eastern region. However, if we leave out Arunachal Pradesh, then the remaining part of the

eastern Himalaya shows a dismal picture. Both in Sikkim and Darjeeling Himalaya the proportion is much below the prescribed national limit of 60% (see table 5.8). The increase in forest cover in Darjeeling Himalaya since 2001 as mentioned earlier, is rather conceptual than any real increase in forest cover. During the decade 1991-2001 the forest in Darjeeling district shows a relative improvement in its dense forest cover and also shows an addition to its open forest area (see table 5.9) . From Table 5.9, it is obvious that in the Eastern Himalaya, the proportion of dense forest is higher to that of open forest. However, the Table suggests that over the last decade there has been an increase in open forest area in the region. Relative increase in open forest implies that the forests in the region are being degraded mainly due to growth of rapid increase in population in this region.

Table 5.9 Ratio of open forest to dense forest

State	1987	1989	1991	1993	1995	1997	1999	2001	2003	2005	2007
Western Himalaya	0.48	0.89	0.47	0.47	0.47	0.48	0.51	0.49	0.55	0.55	0.47
NE Himalaya	2.65	2.92	2.96	2.96	2.78	2.84	1.24	0.96	1.07	1.13	0.83
E Himalaya	0.19	0.27	0.26	0.26	0.27	0.27	0.20	0.27	0.28	0.30	0.31

Note: A ratio value less than one implies relative abundance of dense forest.

In Darjeeling district, there has been an increase in the number of marginal holdings categories only, for all other categories not only the number of holdings and also the area under it has decreased during 1996-97 to 2001-02. The area under total holding also shows a decrease indicating transfer of agriculture land for non-agriculture purposes.

Table 5.10 Change in land holding in Darjeeling during 1996-97 to 2001-02

Sl. No.	Size Group (ha)	Change in Total Holding		Change in total No. of Parcels	Change in average number of Parcels per holding	Change in average area per parcel	Change in average area per holding
		No	Area				
1	Marginal(below 1.0)	12539	28472	57677	0.57	0.06	0.31
2	Small(1.0-1.99)	-4416	-7984	12027	1.34	-0.53	-0.08
3	Semi-Medium (2.0-3.99)	-5321	-15066	-5209	1.41	-0.74	-0.07
4	Medium(4.0-4.99)	-921	-5456	-1308	1.79	-1.31	-0.05
5	Large(10 and above)	-7	-97	1	3.00	-4.13	-2.13
	All Groups	1874	-131	63188	0.66	-0.26	-0.02

Source: Agriculture Census (various years)

The scenario is the same for the state as well, where from 8015 sq. km. in 1991 the forest area increased to 10, 693 sq. km. in 2001 in West Bengal. Out of the total decadal increase of 2678 sq. km. in forest area in the state, the two northern districts of the state account for 1568 sq. km. However, these two districts also represent a large area under tea plantation and such increase may add almost nothing to forest stock of the region. Also during the same period, Jalpaiguri district shows an increase of 807 sq. km. in forest cover, but there is a corresponding fall in dense forest of 249 sq. km. and an increase in 1056 sq. km. of open forest. The difference between the two is exactly equal to 807 sq.km. What it implies is that though 1056 sq.km. of open forest has been added under forest cover in the district, but at the same time there has also been a degradation of 249 sq.km. dense forest. The loss of forest cover quality in the two districts has serious implications. Loss of dense forest in the hills results in frequent landslides and splash floods during the monsoon resulting in loss of life and assets. It also decreases the water retention capacity of the soil resulting in unavailability of water for prolonged period. Besides, the loss of forest quality affects the forest dependent communities strongly whose wellbeing depends to a large extent on the availability of forest products.

5.7 Rural livelihood needs and forest depletion in West Bengal

The foregoing discussion has shown West Bengal as being rather unenviably placed in the realm of forest: fuelwood relationships. While population density in the state is well above 903 per sq.km (2001 Census) resulting in a high 85.36 percent of non-forest area, access of the rural population to commercial energy is still very low, so that most energy needs have to be met from a combination of fuelwood, animal dung and crop residues. Again, because of the high density of population, per capita availability of crop residues and dung is low, adding to the grimness of the energy situation. Significant forest cover in West Bengal exists only in the Sunderbans to the extreme South and in Darjeeling and Jalpaiguri districts to the extreme north. Several districts of the state have forest cover ranging from nil to negligible but have fairly significant wasteland and/or scrub cover. The compaction of a large population within a limited land area has had two results. Firstly, virtually every bit of arableland is pressed into economic use through agriculture and horticulture, etc. Secondly, close contiguity of settlement areas has allowed an intricate network of roads to develop along which both agricultural and forest products can readily flow to meet the widely dispersed demands for these. Quite evidently, the energy consequences of these are that despite being located far away from forests, rural populations through most of West

Bengal can draw upon fuelwood as a priced fuel from the nearest point of availability. This would account for the pattern of energy consumption in the region noted earlier in Table 5.1.

In CPR terms, this creates a piquant situation. Officially, most forests in the state are reserve forests with closed rights of access. The existence of a vast fuelwood demand and the lack of manpower and will to enforce the closure results in a huge outflow of fuelwood from the forests as and where these exist. Not all of this outflow is legal, especially since the extent of working of the forests in the state has fallen considerably after enactment of the new forest policies. A scrutiny of official timber and fuelwood extraction figures for the state of West Bengal between 1965-97 reveals certain interesting features while also establishing a close relationship between the two forest products. In general, both timber and fuelwood yields have declined over the period, at least partially reflecting the efficacy of the shift towards conservation in forest policy (Mukherjee and Choudhury, 1999).

5.7.1 Production Forestry and Fuelwood Dependency in West Bengal

Optimality of forest working rates in production forestry is reflected by steady flows of timber and fuelwood in a strong ratio relationship with each other. This is because at steady working rates, total fuelwood drawal from the forests are determined mainly in a byproduct relationship by the rate of timber extraction, both because a significant part of fuelwood is either drawn directly as the 'lops and tops' of roundwood production or indirectly as the inevitable consequence of the thinning and other silvicultural operations employed during timber forestry. Although timber drawals from the West Bengal forests have declined sharply over the period of 30 years from levels of over 3 lakh cum in 1976-77 to just 85 thousand cum in 2005-06, there seems to be a tendency for FW:T ratios to stabilise during these periods to values just under or over 2FW:1T, they may be treated as periods with internally stable rates of forest working. Nevertheless, the stable working rates were noticeably higher during then late 1970s and 1990s, from which inference of higher extent of clear-felling operations during the 1980s might be drawn. Such an inference would be consistent with the special stress laid on production forestry during the Sixth Five-Year Plan. Erratic upswings in fuelwood extraction have been more typical of the early 1980s and the 1990s, implying peaks in clear-felling and/or other means of wood extraction. Despite these periodic swings, the hypothesis of optimal forest working rates appears

to hold on the whole despite the declining trend in forest yields, as far as the official statistics are concerned.

Table 5.11 Timber and Firewood production in West Bengal

Year	Timber (in cum)	Firewood (in cum)	Firewood:Timber
1980-81	230417	450607	1.96
1985-86	210748	454096	2.15
1990-91	88252	210692	2.39
1995-96	88554	208589	2.36
1996-97	86363	196595	2.28
1997-98	88728	87589	0.99
1998-99	86769	152800	1.76
1999-00	145031	299563	2.07
2000-01	88160	250399	2.84
2001-02	147031	275514	1.87
2002-03	102357	218469	2.13
2003-04	130551	306729	2.35
2004-05	113871	366583	3.22
2005-06	85993	324092	3.77
2006-07	114589	387094	3.38

Source: Economic Review, 2006-07, Statistical Handbook: West Bengal 2007

From *a priori* characteristics of FW:T ratios in Table 5.11, a more or less stable relationship may be assumed to exist between fuelwood and timber output from forests in West Bengal. Since timber yields have declined on the whole over the period under reference, the fractional decline in fuelwood availability for every unit decline in timber output implies relative inelasticity of fuelwood production in the state despite curtailment in timber working. Declines in timber production in West Bengal has been of an order large enough to bring about sharp decline in fuelwood availability from official forestry operations. Obvious conjectures begin to arise then with regard to how this fuelwood gap is met in the face of rising populations and the limited availability of wood energy substitutes in the state. The period of the 1980s, which in table 3.11 had revealed the prevalence of higher FW:T ratios, is shown here to have been characterised by higher forest working rates than either the 1970s or the 1990s. It was only after the passing of FCA 1988 began to have some impact that a convergence in yeild estimates was seen. These findings gell very well with foreknowledge that the Sixth Plan period saw production forestry in the country reach a peak under the aegis of State Forest Development Corporations, with heavy

conversion felling of timber and mixed forests taking place to accommodate the projected needs of wood-based industry.

It had earlier been stated that a massive programme of forest conversion was undertaken after the 'high forestry' shift of 1952. The impact of this in West Bengal was initially felt in the rise in availability of fuelwood from official sources from 0.515 cum per capita to 0.667 cum per capita in 1961-71 during which the state population grew from 34.93 million to 44.31 million. Subsequently, fuelwood availability began to decline sharply to 0.0081 cum per capita in 1981 and 0.0030 cum per capita in 1991, and eventually to just 0.0031 cum in 2001, against a population increase from 55.58 million in 1981 to 68.08 million in 1991 and ultimately to 80.18 million in 2001. Although the decline from 1980s is both the result of fast population growth and declines in the extent of forest working, by far the major reason for the gap is the limitations imposed on extraction rates.

While lowered fuelwood availability in the state is explained in part by a slowdown in the rate of forest working, a more pernicious role in the crisis has been played however by the lack of a credible energy forestry policy in the country and the absence of fuelwood plantation programmes on reserve forest lands. Although during the 1980s, the social forestry sought to make partial amends for this by targeting village commons and other public lands under an energy plantation programme, evidence of the continuing commercial bent of government forestry is provided by the fact that even in the face of the crisis, no move has been made towards restoring CPR status to at least a section of the degraded reserved forest lands from which fuelwood and usufruct needs of the community had once been met.

As the analysis has just shown, for large sections of rural people the energy situation has turned increasingly desperate. Government takeover of the administration of forests in India had carried the onus of forest resources being managed for 'social benefit'. State ownership of the forests was accordingly fostered with the announced objective that the *national* (*i.e.* reserved and protected) forests would provide for strategic, communication and industrial demands, and consequently local demands to be covered actually declined. During 2001-07 however, scrub cover has declined by 80 percent, indicating a gain of forest canopy. While aggregate data for the district conceal the micro features in the forest situation, it stands to reason that the increase in open forest cover and fall in per capita firewood both represent fallouts of a worsening rural energy

situation. As a result substantial areas of reserved forest in the district have been subjected to indiscriminate felling without compensatory reforestation.

5.8 Conclusion

The poverty of fringe-communities in the Himalaya and the marginal character of ex-forest lands on which they are settled have dictated their adoption of a mixed farming model. Mixed farming in the Himalaya which combines agriculture with horticulture and animal husbandry and leads to a swelling of livestock populations, increases the dependence of these communities on forest CPRs.

In the section, where we have dealt with the issue of fuelwood in detail, the need for a policy on fuelwood forestry is highly felt. Absence of such a policy in post-Independence forest management has aggravated the depletion pressure on the forests of the Himalaya. Unsustainable forest-use practices in the region were masked in the past by apparently abundant outflows of forest product resulting from mass conversion of natural forests to monocultural 'created' forests.

Compared to other regions of the Himalayas, the institution of CPR is more pronounced in North East India[xvi] because of statutory provisions under the Sixth Schedule of the Constitution. In Eastern India, on the other hand, virtually the entire forest is held by the state. Such differences in forest access rights and property rights structures between different parts of the Himalaya exercise considerable influence on the nature of usufruct dependence of local communities. However, the survival of customary law institutions in the North East Himalaya appears to be more conducive to the maintenance of forest cover and forest quality. Over the years the proportion of dense forest to open forest has been improving in the North Eastern states (table 5.9) along with the proportion of land under forests in this region (table 5.8).

While forests under the Unclassed category is dominant in the North East region, on the other hand, in Western Himalayas almost half of the forests are under the Protected Forests category. In the Eastern Himalaya region (North Bengal and Sikkim) almost 93% of forests are Reserved Forest category. A small area (217 sq.km.) under PF is entirely in the Jalpaiguri district. Unlike the in North East, 89 sq. km. of unclassed forests in Darjeeling district has been handed over to D.G.A.H.C. under Darjeeling SF Division. It means that the unclassed forests in Darjeeling are not managed by the community and access to it is stringent. Besides, the rate of urbanisation in Eastern Himalaya is much higher compared to other two regions. Proliferation of urban

settlement in close proximity to forest community can lead to acceleration in forest resource depletion. Also, improved transportation and communication facilities in the region will bring additional resource demands from distant settlements to bear on contiguous forested regions, thereby accelerating the rates of resource depletion. Thus, forest-settlement equation in the Eastern Himalaya requires a detailed examination in the light of these distinctions from other regions of the Himalaya.

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