

Land utilization farming with reference to Uttarkashi, the Hilly District of Uttarakhand

VARDAN SINGH

- Department of Botany D.S.B. Campus Kumaun University, Nainital Uttarakhand (India)
 - Author for correspondence
 - Email: vrd_carbon@rediffmail.com

ABSTRACT

Traditional knowledge system has been a key to the survival of the hill society, be it in cropping, forestry or health. It has not only ensured continuous livelihood of farm households but also ecological sustainability. Farming in the hills is highly interdependent with forestry and animal husbandry. The present study deals with the major environmental problem related to deforestation in Uttarkashi district of Uttarakhand, their remedial measures, socioeconomic status and the links of forestry, animal husbandry and agents of change. [Academia Arena, 2009;1(5):35-40]. ISSN 1553-992X.

Key Words: Uttarkashi, Development Strategy, Traditional system

INTRODUCTION

Large-scale indiscriminate cutting of trees, uncontrolled overgrazing overexploitation of communities, unscientific exploitation of natural resources reflects their effect on vegetation and environment. At present there is hardly 46 million hectare area with reasonable forest cover but according to national forest policy, there should be at least 110 million hectare area under forest. The national target is to reclaim annually 3-5 million hectare of waste land and to plant trees and grasses on vacant government land, community land, marginal agricultural land and the Agro forestry will be vital for bridging the gap between demand and availability of various forms of wood. Traditional Agroforestry system and fixed farming are well established in the Ganga and Yamuna valley, planting and harvesting of trees for wood products, fruit, fodder, leaves etc since ancient time, the type of agroforestry system found in a particular area is determined to some extent by agro-ecological and socio-economic factors if these agro forestry system are modified properly play an important role in reclamation of waste land and soil conservation.

Rearing of livestock is an integral part of the economy of the people of the district, due to over-grazing, desirable nutritive grasses and medicinally important species have been depleted considerably, during past times the grazing incidence has decreased due to bringing more and more area under agriculture, horticulture and closing of existing grazing areas by state forest department as a measure of soil conservation and also under different afforestation programmes. High density of human and livestock population over exploitation of community, unscientific exploitation of natural resources, reflect their effect on the vegetation and indirectly on environment in various ways like soil erosion, global warming, irregular rain fall extinction of various species these are caused mainly by cleaning forest for agriculture, horticulture, illicit lopping and cutting of forest vegetation for fuel, food, fodder, charcoal, removal of litter from forest floor for manures, grazing and commercial exploitation of important forest species. The study describes how environmental legislation has slowly taken away the traditional livelihoods of vast numbers of people. Wood carvers, whose handworkers be seen in the traditional houses, have disappeared over years, nomadic sheeps and goats herders are slowly dying and agriculture is Back-breaking work that does not yield enough for subsistence.

MATERIALS AND METHOD

The present study was conducted in the Uttarkashi district of Uttarakhand which is basically divisible as Ganga and Yamuna Vallies located between 31° 02' north latitude and 78° 44' to 78° 43.4' east longitude of western Himalaya covering about an area of 8016 square km. Uttarkashi is the northmost district of the

Uttarakhand bordering Himachal Pradesh to Northwest, Chamoli district on eastern side, Dehradun district on western side, Tibet on northern side and Tehri district on southern side. The district bears unique cultural, heritage, significant forest and water resources. The detailed information about the study materials was collected with the co-operation of Statistical department, forestry department, and horticulture department. The information regarding the problem is based on following parameters-

- 1 Population and its growth rate
- 2 Live stock population
- 3 Forest composition and its growth stock
- 4 Land use statistics
- 5 Distribution of land holdings by size classes
- 6 Area and yield of principal crops
- 7 Area and production of fruits
- 8 Area and production of vegetables

RESULTS AND DISCUSSION

The total population of Uttarkashi district during year 2001 is 294179 in the comparison of Uttarakhand population (8479562). The growth rate of the population is high as 22.72 beside this the population density of this hilly district is lowest (37) out of the 13 districts of Uttarakhand, large part of the population is in rural areas (Table- 1). The sheep and goats are migratory taken for grazing to alpine pastures during summer and lower hills during winter while the cow and buffaloes grazed in an areas near the villages, free grazing are practiced for these livestock. From 1998 onward the live stock population increased from 394466 to 438086, which is the maximum value of livestock in Uttarakhand (Table 2). Milk availability in the district is low and the milk societies require capital to develop infrastructure and markets. There is also no fodder department. Cattle bought from outside are less adaptable to the cold weather of Uttarkashi and thus cross-breeding is needed within the district, but vaccine is a constraint. Since Uttarkashi is rich in livestock, wool-rearing is a viable option. The total forest area of the district is 88.86%. On the basis composition the forest of the region are broadly classified as coniferous forest and broad leaved forest including undisturbed forest, *Pinus roxburghii*, *Cedrus deodara*, *Pinus wallichiana*, *Picea smithiana*, *Abies pindrow* are important conifers while Oak (*Quercus leucotrichophora*, *Quercus semicarpifolia*, *Quercus floribunda*) are important broad leaved species with a number of other temperate and tropical hardwoods growing in this region. *Quercus leucotrichophora* has maximum area 33724.04 (ha) while *Pinus roxburghii* have least area of 1284.06 (ha) (Table 3). All land, which is used wholly or partly for agricultural production, are operated as one technical unit by one person alone or with others without regard to the title, legal form, size or location. The Barren and unculturable wasteland is 4.65%, current fallow and other fallow land is 0.57% (Table 4). The area under agriculture is about 3.97% of the total land area, due to large agricultural population and limited arable area the size of land at present is about 23.23%, about 86.21% of the farmer are small and marginal owing about 49.40% of the land holdings area. The number of holdings bigger than 10 hectare area are negligible (Table 5).

The important fruits are *Pyrus malus*, *Pyrus communis*, *Pyrus persica*, *Prunus persica*, *Juglans regia*, *Citrus spp.* among fruits in the region the *Pyrus malus* occupies larger area of about 6928 ha and lowest 170 ha for *Prunus armeniaca* (Table6) The important vegetables are *Pisum sativum*, *Lysopersicum esculentum*, *Raphanus sativus*, *Allium cepa*, *Brassica oleracea*, *Abelmoschos esculentus*, *Solenum tuberosum*

The production of the *Lysopersicum esculentum*, is highest (4012M tonnes) following *Pisum sativum* (3770 M tones), among all vegetables in all blocks the total area and production of the vegetables of the district are 4668.5 ha and 87434.7 M tones respectively (Table7). Total area and production of cereals are 40589 ha and 53599 M tones respectively while total food grain area and production are 46811 ha 59032 M tones respectively (Table8).

The extension of cultivation to this area will be expensive, since it requires extensive work for soil and water conservation, irrigation and reclamation. On the basis of diagnostic survey and appraisal of existing traditional farming system for satisfying farmer needs which are ecologically and economically feasible, the following aspects should need immediate care and attention

- 1- Preservation of genetic resources of the local species mostly exploited by the farmers
- 2- Identification of multipurpose woody species
- 3- Identifying crop associations which can be fitted in to different intensities of shed
- 4- Plantation of fuel wood and fodder species
- 5- Qualitative and quantitative interaction between plants and soil in different type of associates
- 6- Awareness among the rural people through trainings, workshops and seminars
- 7- Involvement and encouragement of rural women in awareness programmes by organizing site and need specific training, workshops and seminars.

RESULTS AND DISCUSSION

Table 1- Population and its growth rate during year 2001

Site	Male population	Female population	Total population	Rural population	Urban population	Sex ratio	Population density	Growth rate
Uttarakhand	4316401	8479562	6309317	2170245	2170245	963	159	19.20
Uttarkashi	151599	142580	294179	271255	22924	941	37	22.72

Table2- Live stock population

Year	Cow	Buffalo	Sheep	Goat	Total
1993	210632	38280	89329	95613	433854
1998	199263	38594	72367	84242	394466
2003	202535	38690	101268	95593	438086

Table3- Forest composition and growing stock

Species	Area (ha)
<i>Quercus leucotrichophora</i>	33724.04
<i>Quercus semicarpifolia</i>	24308.30
<i>Quercus dilatata</i>	14471.75
<i>Pinus roxburghii</i>	1284.06
<i>Cedrus deodara</i>	3346.54
<i>Abies pindrow</i>	1619.06
<i>Picea smithiana</i>	3288.94

Table 4- Land use statistics

Characteristics of Uttarkashi	Area (Ha)	Percentage of total land area
Total area	812415	100
Forest	721661	88.83
Agriculture land/Cultivable land	2278	0.29
Current fallow land	1539	0.16
Other fallow land	3099	0.38
Land put to non-agricultural uses	5381	0.65
Culturable waste land	40694	5.00
Barren and uncultivable waste land	37763	4.65

Table 5- Distribution of land holdings by size classes

Size class (ha)	Number of land Holdings	Percentage (%)	Area (ha)	Percentage (%)	Average size of Holdings (ha)
Less than 0.5	20182	52.41	3212	9.42	0.16
0.5- 1.0	6346	16.48	4132	12.12	0.65
Marginal farmer	26528	68.88	7344	21.54	0.28
1-2	6670	17.32	9500	27.86	1.42
Small and marginal farmer	33198	86.20	16844	49.40	0.50
2-4	4282	11.12	11673	34.24	2.73
4-10	1014	2.63	5326	15.61	5.25
10 and above	21	0.05	257	0.75	12.24
Total	38515	100.00	34100	100.00	23.23

Table 6- Fruit production during year 2006-07

Sl. No	Name of Block	<i>Pyrus malus</i>		<i>Pyrus communis</i>		<i>Prunus persica</i>		<i>Pyrus persica</i>		<i>Prunus armeniaca</i>	
		Area (ha)	Production (M tonnes)	Area (ha)	Production (M tonnes)	Area (ha)	Production (M tonnes)	Area (ha)	Production (M tonnes)	Area (ha)	Production (M tonnes)
1	Bhatwari	277	4941	225	1647	30	188	115	660	20	205.00
2	Dunda	235	1955	159	1179	32	175	120	670	18	180.00
3	Chinyalisaur	235	1534	169	1161	21	200	125	667	15	145.00
4	Naugaon	2380	20314	290	2588	60	194	135	750	25	233.00
5	Purola	709	3416	250	1217	13	205	120	650	20	214.00
6	Mori	3092	10312	270	1904	14	164	67	490	24	92.00
	Total-	6928	42472	1363	9696	170	1126	682	3887	122.00	1069.00

Sl. No	Name of Block	<i>Juglans regia</i>		<i>Citrus species</i>		<i>Mangifera indica</i>		Other Fruits		Total	
		Area (ha)	Production (M tonnes)	Area (ha)	Production (M tonnes)	Area (ha)	Production (M tonnes)	Area (ha)	Production (M tonnes)	Area (ha)	Production (M tonnes)
1	Bhatwari	182	151	47	153	2	8	200	320	1098	8273
2	Dunda	184	126	62	200	37	65	180	310	1027	4860
3	Chinyalisaur	210	142	42	150	25	55	220	315	1062	4369
4	Naugaon	288	202	28	125	87	290	290	332	3583	25028
5	Purola	164	132	16	62	25	-	185	303	1497	6199
6	Mori	252	113	10	63	18	-	168	280	3915	13418
	Total	1280	866	205	753	194	418	1243	1860	12187	62147

Table 7- Vegetable production during year 2006-07

Sl. No	Name of Block	<i>Pisum sativum</i>		<i>Brassica oleracea</i>		<i>Solanum melongosa</i>		<i>Allium cepa</i>	
		Area (ha)	Production (M tonnes)	Area (ha)	Production (M tonnes)	Area (ha)	Production (M tonnes)	Area (Ha)	Production (M tonnes)
1	Bhatwari	44	210	17.37	248.55	3.50	20.60	0.50	12.00
2	Dunda	65	550	35.68	640.45	7.50	210.40	18.10	375.00
3	Chinyalisaur	27	240	8.40	117	8.50	10.50	10.50	150.50
4	Naugaon	260	1600	10.75	228	3.50	40.50	40.40	800.50
5	Purola	155	1250	5.00	50	0.50	7.50	1.50	18.50
6	Mori	55	130	8.80	142	1.50	27.50	1.00	15.50
	Total	596	3770	86.00	1177.45	25.00	296.4	72.00	1360.00

Sl. No	Name of Block	<i>Capsicum annuum</i>		<i>Lycopersicum esculentus</i>		Other vegetables		<i>Solenum tuberosum</i>		Total	
		Area (Ha)	Production (M tonnes)	Area (Ha)	Production (M tonnes)	Area (ha)	Production (M tonnes)	Area (ha)	Production (M tonnes)	Area (Ha)	Production (M tonnes)
1	Bhatwari	0.50	35.00	35.00	95.80	523.6	5769.1	298.35	7045.60	922.82	13336.65
2	Dunda	2.50	60.00	60.00	305.20	229.9	4210.6	150.65	3528.40	569.33	9780.05
3	Chinyalisaur	4.75	10.50	10.50	105.60	109.2	2195.5	160.65	3725.80	339.55	6555.4
4	Naugaon	4.25	125.50	125.50	3005.40	678.25	15975.99	550.35	15205.20	1673	36981.6
5	Purola	1.00	70.00	70.00	450.00	28.8	354.5	370.00	8745.00	631.8	107744.5
6	Mori	1.00	8.00	8.00	50.00	66.7	789.16	400.00	9045.00	532	10006.5
	Total-	14.00	309.00	309.00	4012.00	1636.5	29214.84	1930.00	47295.00	4668.5	87434.7

Table8- Area and Production of principal agriculture crops

Abbreviations: ha= Hectare, (M tonnes)= Metric tones

Sl.No.	Name of the crops	Area (ha)	Production (M tonnes)
1	<i>Oryza sativa</i>	9884	16476
2	<i>Triticum aestivum</i>	15643	18393
3	<i>Zea mays</i>	5982	7969
4	<i>Hordeum vulgare</i>	175	203
5	<i>Glycine max</i>	48	37
6	<i>Macrotyloma uniflorum</i>	604	438
7	<i>Eleusine coracana</i>	5640	7308
8	<i>Echinochloa frumentacea</i>	2613	2775
	Total cereal	40589	53599
1	<i>Cicer arietinum</i>	4	2
2	<i>Lens culinaris</i>	40	100
3	<i>Phaseolus mungo</i>	593	213
4	<i>Cajanus cajan</i>	180	90
5	<i>Pisum sativum</i>	342	212
6	<i>Phaseolus vulgaris</i>	2195	2469
7	Other pulses	2868	2347
	Total food grains	46811	59032

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