

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

Vardan Singh Rawat

Department of Botany D.S.B. Campus Kumaun University, Nainital

Uttarakhand, 263002, India

singhvardan@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. [Researcher. 2009;1(6):41-47]. (ISSN: 1553-9865).

Key Words: Uttarkashi, Development Strategy, Traditional system

1. 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 (Pant et.al. 1999). 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 same 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 forests 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 sheep's and goats herders are slowly dying and agriculture is Back-breaking work that does not yield enough for subsistence.

2. MATERIALS AND METHODS

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' and 78° 43.4' east longitude of western Himalaya covering about an area of 8016 sq. km. Uttarkashi is the north most district of the Uttarakhand bordering Himachal Pradesh to northwest, Chamoli district on eastern side Dehradun district on western side, Tibbet 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
- 4 Land use statistics
- 5 Area and production of fruits and vegetables
- 6 Area and yield of principal crops

3. RESULTS AND DISCUSSION

The total population of Uttarkashi district during year 2001 is 294179 in the comparison of Uttarakhand population (8479562) (Mittal, et.al. 2008). The growth

rate of the population is high as 22.72 beside this the population density of this hilly district is lowest in Uttarakhand (Table- 1).

Table 1- Population and its growth rate

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

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 area near the villages, free grazing are practiced for these

livestock. The live stock population increased from 394466 to 438086 from 1998 onward, which is the maximum value in Uttarakhand (Table 2).

Table 2- 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

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 includes 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).

Table 3- Forest composition and growing stock

Species	Area (ha)
<i>Quercus leucotrichophora</i>	33724.04
<i>Quercus semicarpifolia</i>	24308.30
<i>Quercus floribunda</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

The destruction and degradation of forests are taking a heavy toll on soil and water resources, making the land less productive and leading to impoverishment of the rural population. It is essential to regenerate degraded forest and wasteland (Malhotra, 2005). 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. Already, an area about 3.10% is under agriculture including fallow land beside this Barren and unculturable wasteland is 4.65%, current fallow and other fallow land is 0.57% (Table 4).

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

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 farmers are small and

marginal owing about 49.40% of the land holdings area. The numbers of holdings bigger than 10 hectare area are negligible (Table 5).

Table 5- Distribution of land holdings by size classes

Size class (ha)	Number of land Holdings	Percentage (%)	Area (ha)	Percentage (%)	Average size of Holdings
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

The important fruits are *Pyrus malus*, *Pyrus communis*, *Prunus persica*, *Juglans regia*. Among these the

Pyrus malus occupies larger area of about 6928 ha and lowest, 170 ha for *Prunus persica* (Table-6).

Table 6- Fruit production during year 2006-07

Sl. No	Name of Blocks	<i>Pyrus malus</i>		<i>Pyrus communis</i>		<i>Prunus persica</i>		<i>Pyrus persica</i>		<i>Prunus armeniaca</i>	
		Area (ha)	Production (M tones)	Area (ha)	Production (M tones)	Area (ha)	Production (M tones)	Area (ha)	Production (M tones)	Area (ha)	Production (M tones)
1	Bhatwari	277	4941	225	1647	30	4941	225	1647	20	205
2	Dunda	235	1955	159	1179	32	1955	159	1179	18	180
3	Chinyalisaur	235	1534	169	1161	21	1534	169	1161	15	145
4	Naugaon	2380	20314	290	2588	60	20314	290	2588	25	233
5	Purola	709	3416	250	1217	13	3416	250	1217	20	214
6	Mori	3092	10312	270	1904	14	164	67	490	24	92
	Total-	6928	42472	1363	9696	170.	1126	682	3887	122	1069

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Sl. No	Name of Blocks	<i>Juglans regia</i>		<i>Citrus species</i>		<i>Mangifera indica</i>		Other Fruits		Total	
		Area	Production (M tones)	Area	Production	Area	Production (M tones)	Area	Production (M tones)	Area	production

		(ha)		(ha)	(M tones)	(ha)		(ha)		(ha)	(M tones)
1	Bhatwari	182	151	47	153	2	8	200	320	1098	8273.00
2	Dunda	184	126	62	200	37	65	180	310	1027	4860.00
3	Chinyalisaur	210	142	42	150	25	55	220	315	1062	4369.00
4		288	202	28	125	87	290	290	332	3583	25028.00
5	Purola	164	132	16	62	25	-	180	303	1479	6199.00
6	Mori	252	113	10	63	18	-	168	280	3915	13418.00
	Total	1220	866	205	753	194	418	1238	1860	12182	62147.00

The production of the *Pisum sativum* is highest 1600 M tonnes among all vegetables and all blocks also the total area and production of the vegetables of the

district are 2745 ha and 41506 M tones respectively (Table7).

Table 7- Vegetable production during year 2006-07

Sl. No	Name of Blocks	<i>Pisum sativum</i>		<i>Brassica oleracea</i>		<i>Solanum melongena</i>		<i>Allium cepa</i>	
		Area (ha)	Production (M tones)	Area (ha)	Production (M tones)	Area (ha)	Production (M tones)	Area (ha)	Production (M tones)
1	Bhatwari	44	210	17.37	248.55	3.50	20.60	0.50	12
2	Dunda	65	550	35.68	640.45	7.50	210.40	18.10	375
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	606	3980	86	1177.45	25	317	72	1372

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Sl. No	Name of Blocks	<i>Capsicum annum</i>		<i>Lycopersicon esculentum</i>		<i>Solenum tuberosum</i>		Other vegetables		Total	
		Area (ha)	Production (M tones)	Area (ha)	Area (ha)	Area (Ha)	Production (M tones)	Production (M tones)	Production (M tones)	Area (Ha)	Production (M tones)
1	Bhatwari	0.50	35.00	35.00	480.79	298.35	7045.60	5572.4	6257.55	298.35	7045.60
2	Dunda	2.50	60.00	60.00	165.5	150.65	3528.40	4371.1	6231.95	150.65	3528.40
3	Chinyalisaur	4.75	10.50	10.50	117.75	160.65	3725.80	2240.4	2869.60	160.65	3725.80
4	Naugaon	4.25	125.50	125.50	596.95	550.35	15205.20	885.5	21681.70	550.35	15205.20
5	Purola	1.00	70.00	70.00	76.00	370.00	8745.00	479.5	2369.50	370.00	8745.00
6	Mori	1.00	8.00	8.00	17.80	400.00	9045.00	1712.7	2095.70	400.00	9045.00
	Total-	14	309	309.00	1454.79	1930	47295.00	15261.6	41506	1930	47295

Total cereal area and production is 40589 ha and 53599 M tones respectively while total food grain area and

production are 46811 ha and 59032 M tones respectively (Table-8).

Table-8- Area and Production of principal agriculture crops

Sl.No.	Name of the crops	Area (ha)	Production (M tones)
1	<i>Oryza sativa</i>	9884	16476
2	<i>Triticum aestivum</i>	15643	18393
3	<i>Zea mays</i>	5982	7969
4	<i>Barley</i>	175	203
5	<i>Glycine max</i>	48	37
6	<i>Macrotyloma uniflorum</i>	604	438
7	<i>Eleusine corocana</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	<i>Other pulses</i>	2868	2347
	Total food grains	46811	59032

The extension of cultivation to this area will be expensive, since it requires extensive work for soil and water conservation, irrigation and reclamation (Dewan, and Bahadur. 2005). 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- Qualitative and quantitative interaction between plants and soil in different type of associates
- 5- Awareness among the rural people through

trainings, workshops and seminars

- 6- Involvement and encouragement of rural women in awareness programmes by organizing site and need specific training, workshops and seminars.

Correspondence to :

Vardan Singh Rawat
Department of Botany
D.S.B. Campus Kumaun University, Nainital
Uttarakhand, 263002, India
Telephone. 05942235596

Cellular phone. 09411395791; 09548324398

Email. singhvardan@rediffmail.com

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Submission date- 3/08/2009