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PLANNING STRATEGY FOR SUSTAINABLE DEVELOPMENT : A CASE STUDY OF FOREST RESOURCES OF KASHMIR VALLEY.

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ABSTRACT : The imbalance which exists between the exploitation and regeneration of forest resources has brought into focus the forest development strategies which are economically and ecologically sustainable. The forest policies and priorities must change giving due consideration to the need of local people without creating any imbalance in the ecosystem. An attempt has been made to analyse the proportionate contribution of forests in fodder, fuel and timber requirements for the valley of Kashmir. It is estimated that about 56.6 percent of the house-holds, meet hetween 50 to 75 percent of their fodder needs from the forest. As far as the fuel-wood is concerned about 97.57% of the households meet more than 80% of their timber needs from the forests.

It has been found that the annual fuel-wood consumption is around 7 tonnes per household. The study has revealed that 34850 tonns of fuel-wood is required for an average size of 5000 households district which can be achieved in a scientifically managed 2091 hectares of land with the involvement of local people. In case of fodder an average yield of 3 tonns per hectare, per year is achievable if 25% of trees planted are fodder trees.

A common forest area of 3586 hectars for fuel and fodder has been worked-out for an average size of district (5000 households) to meet the other needs like agriculture impliments, electric poles for which 1000 hectares of land is required.

The optimal size of the forest for an average size of district in Kashmir valley has been worked out to be 4586 hectares excluding the timber requirements. Kashmir valley as a whole has about 3.83 lac hectares of land available which can be forested and developed for sustainable development of forest resources for the valley dwellers.

INTRODUCTION

Development of any region depends on the effecitve utilization of natural resources without creating any imbalance to its natural ecosystem. Forest resources are one of the most important natural resources of the valley of Kashmir. The forest resources contribute about 3.22% of the total domestic products of Jammu and Kashmir State (Digest of statistics, 1991). The importance of forest resources to local population is mostly in the form of non commerical operations and products such as fodder, fuel and timber without which the hill economy cannot survive.

The degradation and destruction of forests are taking a heavy toll on our fertile soil and water resources. An estimated 6000 million tonnes of top soil with essential nutrients flow in to the sea every year from India (8th 5 year plan, 1992-94, vol II). Loss of top soil, vegetative

cover, unregulated surface cover and surface run off with poor recharge of aquifers seriously affect the natural ecosystem in general, especially in the mountain areas. The overall degradation of nature is also making our resources less productive, leading to impoverishment of rural population.

With the process of modernization, various resources of Jammu and Kashmir have received attention for commercial exploitation. At the same time various developmental processes such as urbanization, blasting, road constructions, hydro-projects etc are on rapid increase. All these processes have created an imbalance to its natural eco-system. The valley of Kashmir has been subjected to intensive cultivation, over grazing, ruthless felling of trees, new human settlements and population influx, all at the cost of forest cover of the valley.

The imbalance which exists between the exploitation and regeneration of the forest resources have brought into focus the forest development strategies which are economically and ecologically sustainable. In case of the forests the policies and priorities must change giving due considerations to the need of the local people without creating an imbalance in the ecosystem.

In this paper an attempt has been made to assess the forest status, commercial and non-commerical exploitation of forest resources of the valley of Kashmir and to work out a viable people-oriented scheme of forest development in the area under study.

STUDY AREA

The valley of Kashmir is located within the gamut of drainage channels and the mountains of the northwestern Himalayan complex, between 33°-24 ' to 34° - 54' north latitudes and between 73° - 57' and 75° - 36' east longitude. Administratively the Valley of Kashmir has been divided into six districts - Anantnag, Pulwama, Srinagar, Budgam, Baramulla and Kupwara (Fig. 1). It covers an area of 8,115 km^2 and accommodates a population of over 41.22 lac people, distributed in 2816 villages and 23 towns (Digest of Statistics, 1991).

Rising from less than 5000 feet to 14000 feet from the mean sea level, the valley has varied topography, climate and natural vegetation. Based on the altitudinal complexity of physical features and geological chronology, three physiographic zones have been identified (Raza *et al.* 1978) :

1. The northern and north-Western slopes and the foot hills of Pir panjal range.
2. The slopes and the foot hills of the great Himalayan and the north Kashmir range.
3. The valley floor.

The zonal distribution of natural vegetation is determined primarly by the physical configuration, altitudes, soil and the climatic variables such as temperature, moisture, intensity and duration of sunshine and atmospheric humidity (forest Atlas, 1981). On the basis of these factors, the forests of the valley have been classified into the following four major types (Fig. 2).

1. Himalayan Moist temperate forests.
2. Subtropical Dry evergreen forests.
3. Subalpine forests.
4. Moist alpine Scrubs.

The valley is thickly and unevenly populated with an overall density of 252 persons / km^2 as against 59 persons/km^2 for the whole state (Digest of Statistics, J & K Govt. 1991).

MATERIALS AND METHODS :

The analysis in this paper is based on the primary and secondary source of information.

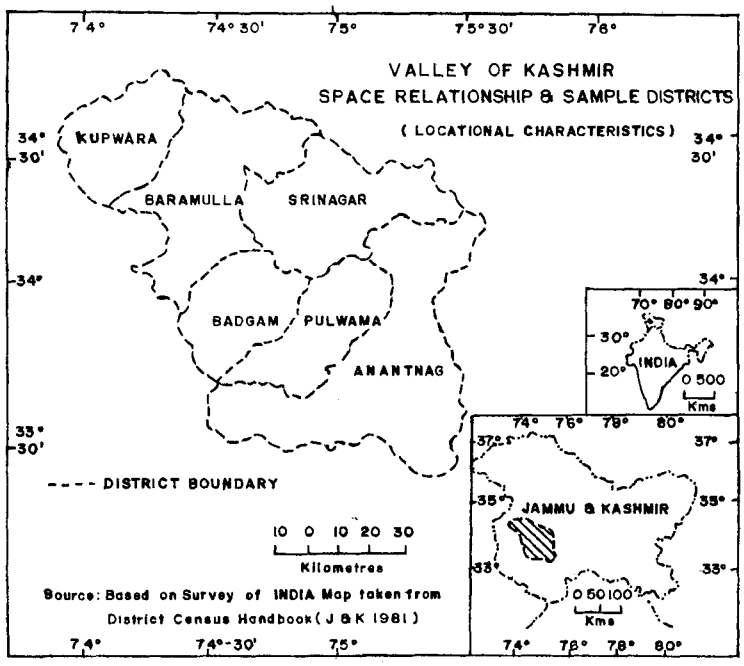

Fig. 1 : A Valley of Kashmir Space Relationship & Sample Districts

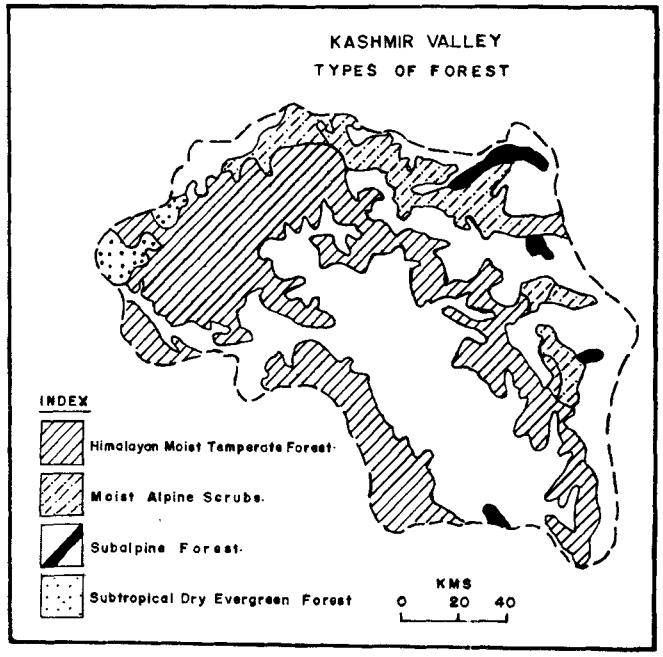

Fig. 2 : Kashmir Valley - Types of Forest

The primary information has been collected from 10 percent random sample house holds during the field survey in the year 1995-96. The analysis of the forest use has been calculated on the basis of data collected from the random sample house holds of the 6 districts representing various population sizes and altitudinal locations. The analysis of the forest cover like waste land, area under degraded forests, cultivable waste land and pasture lands have been computed on the basis of the data taken from the Digest of Forest Statistics, 1987, Digest of Statistics 1991, District Census Handbook of different Districts and Report of Area Statistics of Land use/land cover generated by National Remote Sensing Agency Hyderabad (1995). Suitable cartographic and Statistical techniques have been employed to represent the data.

FOREST STATUS IN KASHMIR VALLEY

The status of forest cover in the valley of Kashmir is under dispute, not only because of definitional problems but also because of different agencies collecting data for different uses, providing different figurres. The forest department statistics states that 58.77 per cent of the total geographical area of Kashmir valley is covered by forests. The statellite data puts the forest area of the Valley around 36.11 percent of the total geographical area (NRSA, 1995).

The statellite imaginary has shown that out of the total forest area of 20,018 km^2, the actual cover of the forest is only 13012 km^2 (65%) and the remaining 7006 km^2 (35%) remain degraded (Martin, 1995).

Considering the NRSA data regarding the forest cover of the valley (36.11% of the total geographical unit) it has been observed from the imageries that even this area has poor crown density. The forests are very unevenly distributed over the districts (table 1). Whatever

Table 1. Kashmir valley, Forest area in different districts according to different sources.

Proportion of forest area to total Geographical area according to different sources.

Districts	Remote sensing statistics[1] (area in hectares)			Forest statistics[2] (area in hectares)		
	Total Geographical Area	Area under forests 1988-89	%age	Total Geographical area	Area under forest 1991-92	% age
Anantnag	388400	160600	40.31	398400	264770	66.45
Pulwama	139800	34429	24.62	139800	96815	69.25
Srinagar	222800	85447	38.35	222800	66052	29.64
Budgam	137100	20230	14.75	137100	48100	35.09
Baramulla	458800	139592	30.42	458800	296300	64.59
Kupwara	237900	135700	57.04	237900	165100	69.40
Total	**1594800**	**575998**	**36.11**	**1594800**	**937137**	**58.77**

Sources : 1. Report on area statistics of land-use/Land-cover generated using remote sensing techniques (1995) NERSA Hyderadabad.

2. Digit of forest statistics (1991) Forest Deptt. Srinagar.

the coverage, these forests are used by the local population and also for the commercial exploitation. Out of the total forest area, 98% is under the control of the forest department while the rest 2% is under the control of the revenue department (District census hand-books, 1981). This remaining 2% area which is outside the control of forest department can be of maximum use to the local people. It is treeless but on paper is shown as forest area. This foreces the local people to go to reserved forests to meet their domestic demands.

USE OF FOREST BY LOCAL PEOPLE

More than 80% population in Kashmir valley is forest dependent. Forest serves as primary resource base along with cultivable land in Kashmir valley. They are the basic source of timber, fuel and fodder affecting whole of the economic activities, indeed the economic activity itself is heavily dependent on forests.

Traditionally, wood has been a primary source of fuel for cooking and heating in the cold climate of Kashmir valley. The people living in Srinagar city alone consume about 5 lakh quintals of fuel wood coming from the forests.

The livestock rearing, which is essential to provide draught power for agricultural operations especially in hilly regions, is impossible to be maintained without the fodder coming from the forests. The fodder requirement of animals which are kept for milk, manure and cash income purposes cannot be met from crop residue which is barely sufficient for 6 months. During the course of present study, it has been worked out that the green fodder consumption per cattle unit (one cattle unit is equal to 4.04 cattles) per day in Kashmir valley is around 9./ 18 kgs in addition to the usual grazing. The study shows that for a single cattle unit maintained by a household one has to go to forests for about 180 days a year to collect the daily feed for the unit. This job like most of the other household and forest related jobs is performed by the women in the adjoining area of the forests. Therefore, one woman per household has to make 180 trips in a year to bring fodder from the forest covering an average distance of 2.7 kms. and spending about 3.5 hours in each trip.

Timber is another major product used by the population in house construction. In the valley of Kashmir the houses are mainly constructed by timber. The data collected shows that 5.5 trees of 3 to 6 feet girth are used by a single household in one time house construction and this may be replaced after every 30 years on an average. Due to the impact of urbanization, the

Table 2. Kashmir valley, forests resources used by the population.

Districts	Quantity of green fodder consumption/one cattle unit (One cattle unit = 4.84 cattles) per day (in kgs.) 1996	Fuel-wood consumption per household per per annum (in qtis.) 1996	Trees used in house construction per household per 30 years 1996
Anantnag	10.21	157.97	6
Pulwama	7.48	92.78	4
Srinagar	8.13	532.01	3
Budgam	7.78	99.46	5
Baramulla	10.48	156.96	8
Kupwara	11.00	105.93	7
Average	9.18	190.85	5.5

Source : Field work

Editorial note : The fuel-wood consumption for household per annum appears an overestimate.

concrete structures are replacing the wooden structures in towns and cities of the valley.

An attempt has also been made to analyse the proportionate contribution of forests in fodder, fuel and timber needs. It is estimated that about 56.6 percent of the households meet between 50 to 75 percent of their fodder need from the forest. As far as the fuel wood is concerned about 97.57 percent of the households meet more than 80 per cent of timber need from the forests. Apart from these, the forests are also used for the collection of herbs, gums, seeds and other minor products.

It is clear that the local rural population is dependent on forests of the Kashmir valley. This dependence increases as the altitude increases. This is firstly, because of increase in demand of fodder for more cattle per household and of fuel wood in the cold climate and, secondly because of the growing absence of alternatives to forest products.

FUTURE PLANNING STRATEGY FOR FORESTS

The foregoing analysis shows that the forests provide grazing land and cut fodder for animals and fuel for cooking and heating in the chilly areas of Kashmir valley. However, it is wrong to suggest that Kashmir deforestation is totally the fault of local inhabitants and a large area of the forest has been lost due to illegal felling. Recently there were attempts for quick and easy profit to be made by unscrupulous contractors and corrupt government officials working in league. The inhabitants can fully utilize the forest products because such utilization has not seriously affected the forests. Devastating depletion has occurred and is still occuring where the outside contractors have been given right to cut trees in order to make charcoal and for other commercial purposes. In this way the whole forests that have remained unaffected by hundreds of years of local use have suffered badly. This practice should be stopped. Even the forest department admits that illegal felling remains rampant and the legal exploitative felling continues. The forests not only provide the economic base to the people of valley but also affect other aspects of their life. The present forests resource use pattern is not likely to change in near future because that needs large scale corrective intervention in overall economic structure. Therefore, the provision of adequate and appropriate forest cover is of utmost importance.

The suggested optimal forest area is based on the available fuel and fodder yield from the well managed forests. It has been estimated that the annual fuel wood consumption is around 7 tonnes per household. The study has revealed that 34,850 tonnes of fuel-wood for an average size of 5000 households district can be achieved in a scientifically managed 2091 hectares of land, with the involvement of local people annually. In case of fodder an average yield of 3 tonnes, per hectare/per household annually is achieveable, if only 25 per cent trees planted are basically fodder trees.

Based on the above discussion a common forest area of 3586 hectares for fuel and fodder has been worked out for an average size of district (5000 household). To meet the other requirements, 1000 hectares of land is required to meet the need such as agriculture, implements, electrical poles and firewood to make the districts self-sufficient in its forest based needs. Thus the optimal size of the forest for an average size of district in Kashmir valley would be worked out to be 4586 hectares excluding the timber requirement of the district. (Fig. 3).

In almost all parts of Kashmir valley large areas of degarded forests, fallow land, cultivable waste-land and permanent pasture-lands are available which have to be managed and

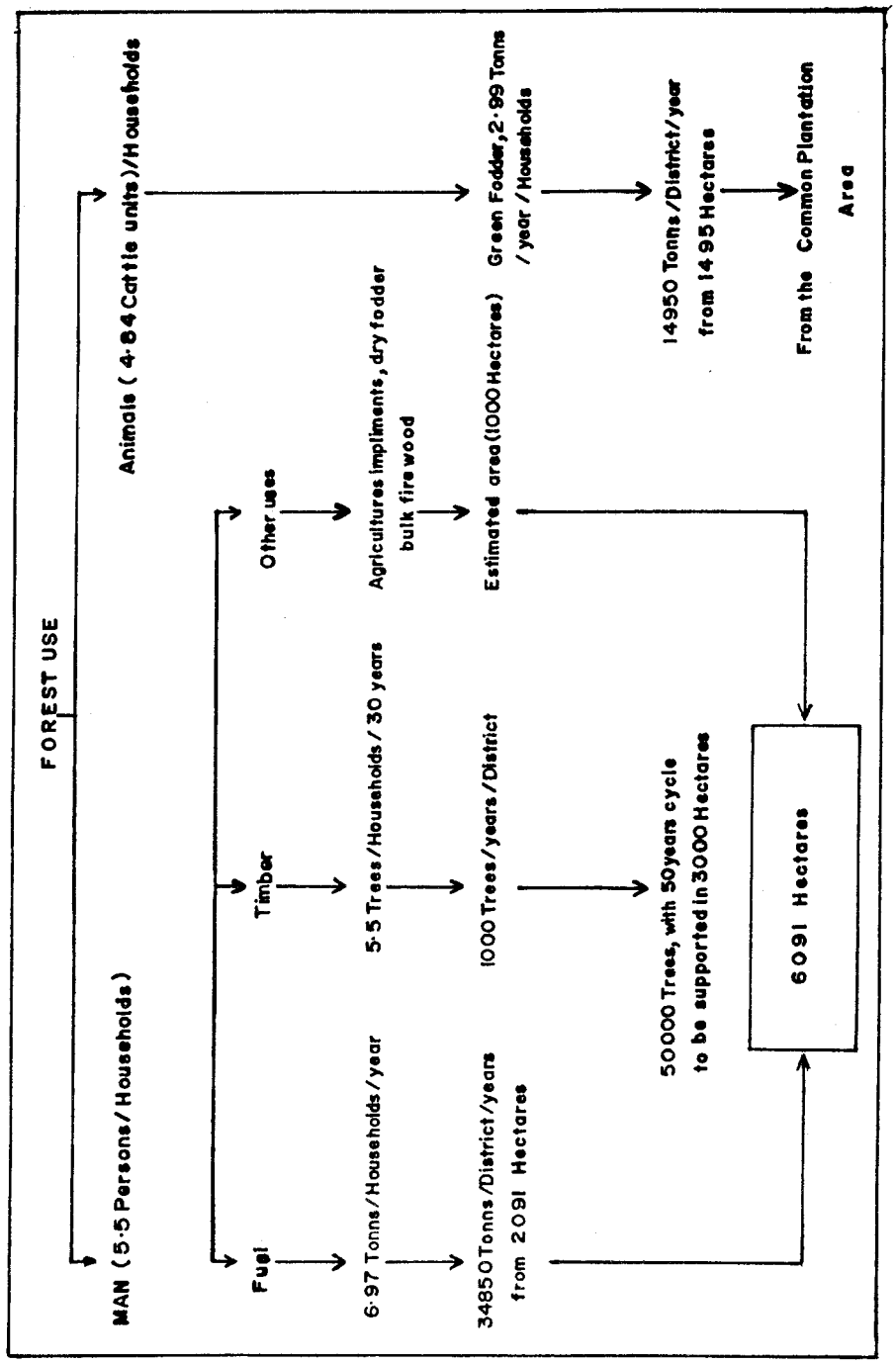

Fig. 3 : Forest use

developed scientifically. In case there is no such land in a particular area, common forest can be developed for the local people.

In the valley of Kashmir, 1.34 lac hectares lying as cultivable waste land, 1.28 lac as permanent passtures and other grazing land, 0.41 hectares as fallow-lands and 0.80 hectares as degraded forests. Thus as a whole about 3.83 lac hectares of land is available which can be forested and developed for sustainable development of forest resources for the valley dwellers (Table 3).

Table 3

Kashmir Valley, Land available for sustainable development (Area in hectares)

Districts	Degraded forests (%)	Fallow land (%)	Cultivable waste land (%)	Permanent pasture land (%)
Anantang	56.00 (7.07)	16.00 (3.89)	72.00 (5.37)	96.00 (7.45)
Palwama	101.79 (12.86)	0 (0.00)	7536 (5.61)	1704 (1.32)
Srinagar	25347 (32.02)	200 (0.49)	24199 (18.03)	41278 (32.01)
Budgam	1730 (2.19)	0 (0.00)	14642 (10.92)	14091 (10.93)
Baramulla	0 (0.00)	35280 (85.67)	73172 (54.55)	20470 (18.88)
Kupwara	36000 (100)	4100 (100)	7400 (100)	41800 (100)
Total	**79156 (100)**	**41180 (100)**	**134149 (100)**	**128943 (100)**

It has been pointed out that about 98% area of the total forest area is under the control of forest department and a major portion of this has poor cover. Efforts are needed to develop this area into properly stocked forests for commercial and ecological purposes. It is the combination of the two which in reality can bring more greenry to the degraded forests and can fulfil the objectives of National Forest Policy which has recommended that 66 per cent area in the hilly areas should be under forests. This will reduce the backbreaking burden of women and ensure the peoples participation in developmental activities.

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