

Impact of Deforestation on Some Economically Important Tree Species of Langate Forest Division in Kashmir Valley

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ABSTRACT

The present study deals with the impact of deforestation on some economically important plant species of Langate Forest Division in Kashmir valley. The study revealed significant differences in various community features of trees growing in protected and areas. In general, higher values for Importance Value Index (IVI) were recorded in protected areas as against the degraded areas for all the species.

Keywords: Deforestation, Ecological impacts, Forests, Kashmir, Importance Value Index

INTRODUCTION

The vast and varied natural resources of the earth are essential for the sustenance and well being of mankind. Among the natural resources, the forest resources occupy a unique position in as much as they play an important role in the development of society by providing a wide range of goods and services. Besides the economic amenities, the forests have diverse ecological roles as the forests are the primary source to regenerate productivity of land through recycling of nutrients, which may change the physicochemical features of soil favourable for plant growth (Mathur *et al.*, 1982). Despite their economical and ecological importance, forests are facing multitude of impacts which have not only reduced their overall cover but have also lead to the extinction of some important species of both plants and animals. The degradation of forests is chiefly due to various anthropogenic pressures.

STUDY AREA

The present study was carried on Langate Forest Division in Kupwara district of Jammu and Kashmir. The Division falls in the north-west part of Kashmir valley. The Division is situated between 34° 15' and 34° 45' N latitude and 73° 45' and 74° 35' E longitude and lies in an altitudinal range of about 1650 -3500 m (a.s.l). It is bounded by district Baramulla in the south while in the north it is bounded by areas of Machal, Keran and Karnah of district Kupwara.

The Langate Forest Division extends over an area of 360.60 km² and occupies north-eastern slopes of Kazi-Nag and Shamasbari Ranges. The drainage of most of the area is eastward with nallah Pohru forming its eastern boundary.

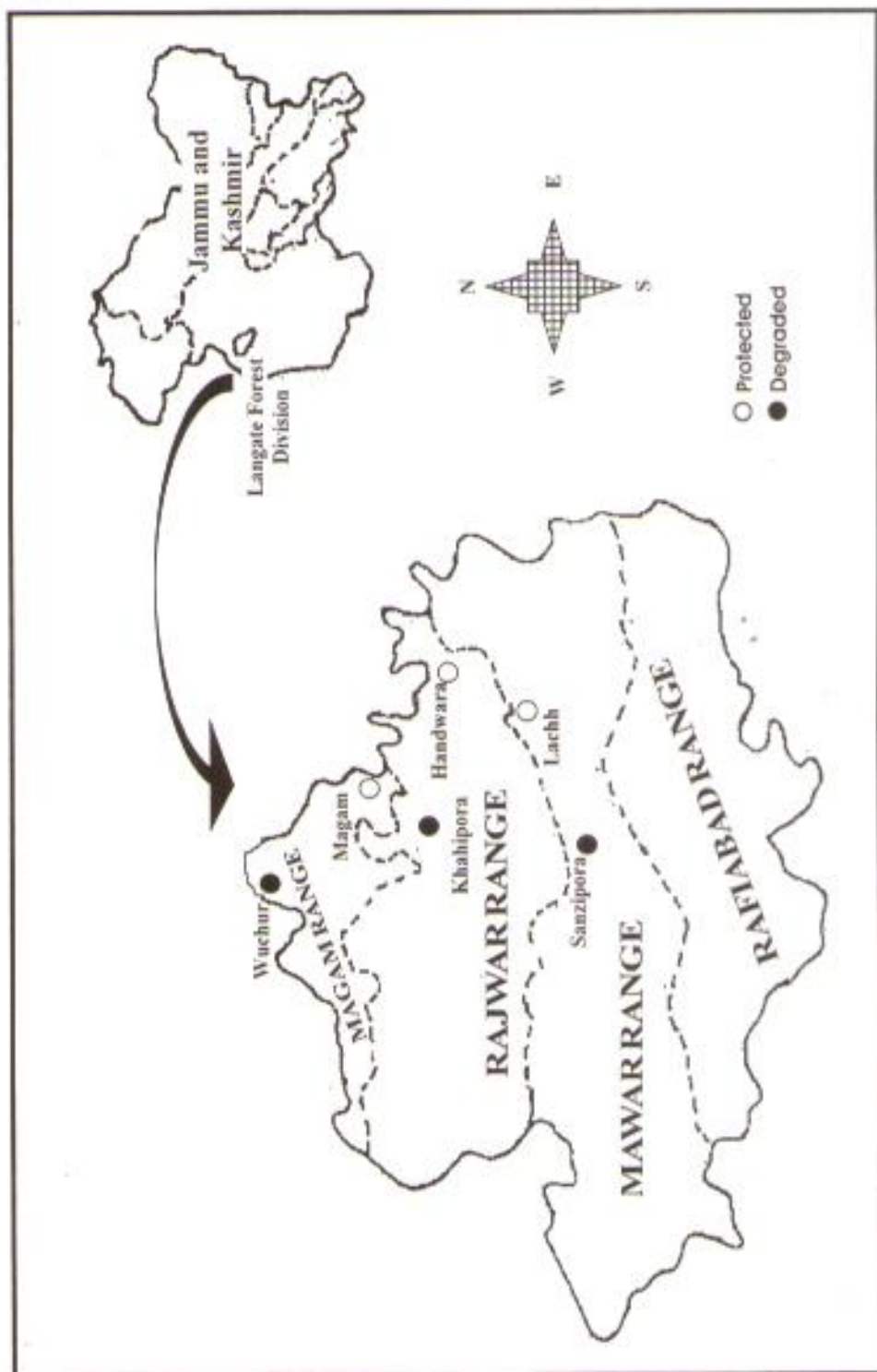


Fig. 1. Map of Langate Forest Division, showing various study areas

The entire area of Langate Forest Division comprises four territorial ranges (Fig. 1). These include Rafiabab, Mawar, Rajwar and Magam ranges. Out of four ranges only three ranges falling in district Kupwara were investigated during the present study. Two sites representing protected and degraded areas were selected from each range. Khahipora, Wuchur and Sanzipora represented the protected areas while as Handwara, Magam and Lach represented the degraded areas from Rajwar, Magam and Mawar ranges respectively. The Rafiabab range lying in district Baramulla was excluded.

METHODOLOGY

The impact of deforestation was studied in terms of Importance Value Index (IVI) of trees in protected and degraded areas, employing random quadrating method (Misra, 1968). The quadrats of definite size (10m x 10m) were laid randomly at protected and degraded sites in Mawar, Rajwar and Magam ranges for the estimation of relative frequency, relative density and relative abundance of various species. The relative value of frequency, density and abundance were summed up to determine the Importance Value Index (IVI) for each species.

RESULTS AND DISCUSSION

The present data revealed significant variations in various community features of trees growing in the area (Table 1). The relative values of frequency, density and abundance showed a pronounced decline in woody species as a result of clear-cutting. The concept of Importance Value Index has been used extensively as a means of assessing the biological contribution of species to the forest community (Curtis and McIntosh, 1951). A perusal of data shows that in the Mawar range of the Division, the importance value index for the protected areas was 85.89 for *Cedrus deodara*, 77.58 for *Pinus wallichiana* and 69.15 for *Abies pindrow* as against the values of 89.73, 67.75 and 20.87 for the degraded areas in the respective species. However, in the Rajwar range of the Division, the IVI for protected areas came to be 100.98 for *Cedrus deodara*, 75.75 for *Pinus wallichiana* and 47.64 for *Abies pindrow* as against the values of 90.45, 68.63 and 17.62 for the degraded areas in the respective species. Likewise, in the Magam range of the Division higher values of IVI were again recorded in the protected areas and lower values in the degraded areas. The noteworthy feature of the present study was the increase in IVI of broad-leaved species at the degraded sites in general.

Data on diversity index revealed significant differences between protected and degraded areas, being higher at the degraded sites than at the protected ones (Table. 2). The diversity index for the tree species recorded a maximum value of 1.438 and a minimum of 1.373 for the protected areas in the Mawar and Magam ranges respectively while for the degraded areas it ranged between 1.463 in the Rajwar range and 1.655 in the Mawar range. However, the index of dominance for the protected areas was maximum (0.184) in the Mawar and minimum (0.169) in Magam range in

Table 1. The Importance Value Index (IVI) of some economically important trees in protected and degraded areas

Plant species	Rajwar range						Megam range						Mawar range											
	Protected area			Degraded area			Protected area			Degraded area			Protected area			Degraded area								
	RF	RD	RA	IVI	RF	RD	RA	IVI	RF	RD	RA	IVI	RF	RD	RA	IVI	RF	RD	RA	IVI				
<i>Cochus discolora</i>	26.92	44.55	29.51	100.98	25.0	42.18	23.27	90.45	34.51	43.13	22.67	100.41	22.22	37.18	21.79	83.19	32.0	34.45	19.41	85.88	21.42	41.79	26.52	88.73
<i>Pinus wallichiana</i>	23.07	29.70	22.98	75.75	25.0	28.12	15.51	68.63	26.92	35.29	23.88	86.09	22.22	28.37	21.91	42.90	26.0	30.17	19.41	77.58	21.42	28.35	17.98	67.75
<i>Abies pindrow</i>	23.07	13.86	10.71	47.64	4.16	3.12	10.34	17.62	11.53	8.82	13.94	34.29	11.11	5.40	8.32	24.63	16.0	25.0	28.15	68.15	10.71	4.47	5.69	20.87
<i>Rubus pectinatus</i>	7.69	4.95	11.49	24.13	8.33	4.68	7.75	20.76	3.84	1.96	9.29	15.09	11.11	6.75	10.39	28.25	4.0	1.72	7.76	13.48	7.14	5.97	11.33	24.44
<i>Populus alata</i>	3.84	1.96	9.19	15.01	4.16	1.56	5.17	10.89	3.84	0.98	4.64	9.46	7.40	5.40	12.52	23.32	4.0	0.86	3.88	8.74	7.14	4.47	8.53	20.14
<i>Jodans regia</i>	7.69	2.97	6.89	17.55	4.16	3.12	10.34	17.62	7.69	6.86	16.26	30.81	7.40	4.05	9.39	20.89	8.0	6.03	13.59	27.62	3.57	1.49	5.09	10.75
<i>Alnus affinis</i>	3.84	0.99	4.59	9.42	4.16	1.56	5.17	10.89	0	0	0	3.70	1.35	6.26	11.31	0	0	0	0	0	7.14	2.98	5.09	15.81
<i>Alnus villosa</i>	0	0	0	0	6.33	3.12	5.17	16.62	0	0	0	0	0	0	0	0	0	0	0	0	3.57	1.49	5.09	10.75
<i>Celtis australis</i>	3.84	0.99	4.59	9.42	4.16	1.56	5.17	10.89	3.84	0.98	4.64	9.46	0	0	0	4.0	0.86	3.88	8.74	3.57	1.49	5.09	10.75	
<i>Morus alba</i>	0	0	0	0	12.50	10.93	12.05	35.48	7.69	1.96	4.64	14.29	14.81	8.10	9.39	32.30	4.0	0.86	3.88	8.74	14.28	7.46	7.11	28.85

Table 2. Indices of diversity and dominance for trees in various ranges of Langate Forest Division

Sites	Diversity Index		
	Mawar	Rajwar	Magam
Protected area	1.438	1.417	1.373
Degraded area	1.655	1.463	1.546
Dominance Index			
Protected area	0.184	0.182	0.169
Degraded area	0.144	0.131	0.151

comparison to degraded areas which recorded a maximum value of 0.44 in the Mawar range and a minimum of 0.131 in the Rajwar range. Thus, there exists an inverse relationship between index of diversity and index of dominance. Similar results were also obtained by Mc Naughton (1968), Singh and Misra (1969) and Singh and Ambasht (1975). In general, it has been observed that the diversity of the species increases stability of the ecosystem, whereas increased dominance makes the system more productive. The complete protection though helps to increase the cover reduces the diversity (Singh and Ambasht, 1975). The reduction in diversity may be attributed to the instability of most of the light demanding species to survive with the canopy closure and large accumulation of leaf litter in the forest floor inhibiting the growth of other plant species because of their inability to penetrate the layers of persistent leaf litter. From the present investigations it is clear that moderate anthropogenic disturbances are advantageous, resulting in maximum plant diversity while heavy disturbances deteriorate the ecosystem, triggering soil erosion as has been reported by Kumar and Joshi (1972). Brown and Schuster (1969) and Lloyd (1972) have also reported that such disturbances lead to the deterioration of the forest ecosystem.

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