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Empirical investigation on forest sector in Jammu and Kashmir: Structural changes and determinants of growth

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Abstract

India, provide habitation to vast area of forests which interacts with number of biotic and a biotic component which provides goods and services. In consideration of the fact that forests with woodlands and huge biodiversity contribute significantly towards development of economy of Jammu and Kashmir, a northern state of India, an attempt has been made in this study to investigate the forest sector in Jammu and Kashmir and to check its structural changes and determinants of growth. The study confirms that, recently forestry sector (FNDP) has contributed about 10 per cent to the agricultural net domestic product and 2 per cent of state net domestic product. FNDP has increased significantly over the years and the estimates of compound growth rates indicated that the area exploited for extraction has decelerated at 6.33 per cent per annum, while the quantity extracted for it by 3.81 per cent. Consistent with declining extraction, the totals out-turn has been consistently declined over the years and has reached to just 73.92 (000m³) in recent years. The government has invested 408 lakh rupees in forest and logging sector during 2013-14 though it has declined drastically since 2005-06 that led to the decline of investment intensities to this sector over the years. Estimates of Forest Growth Model revealed that rural literacy, public investment in forestry, plantation and export value has contributed positively in forest development while proportion of urban population, rural poverty has negative impact on it. Based upon various findings, the study put forth few policy options for sustenance of forests and provide spectrum of ecosystem goods and services towards the human recreational activities.

Keywords: Forest, investment, growth, rural literacy, public investment in forestry, plantation and export value

Introduction

Natural resources are capital endowments that determine nation's wealth and its status in the world economic system. Among various natural resources, forests are of immense importance as they account for 75 per cent of the gross primary productivity of the earth's biosphere, and contain 80 per cent of the earth's plant biomass (Anonymous, 2011). Forests and woodlands occupy about 38 per cent of the Earth's surface and they are more productive with great biodiversity than other types of terrestrial vegetation. In India forests spread over an area of 79.42 million hectare and satellite imagery has shown an increase in this area over the years, though the increase were primarily in northern, central and southern Indian states, on the other hand, north-eastern states witnessed a net loss in forest cover between 2010 and 2012 (Anonymous, 2015) [1]. It has played a major role to influence patterns of economic development, supporting livelihoods, helping structure economic change, and promoting sustainable growth. For millennia prior to industrial revolution, forests were the source of land for cultivation, settlement, construction materials, fuel/energy and indeed of food and nutrition (Williams, 2002) [15]. The kind of forest in a given place results from a complex of factors including micro-climate, seed source, soils, slope, insects/pathogens and history of human influence. Forest biodiversity interact with each other and with other living and non-living component of environment to make up a "forest ecosystem". A forest ecosystem consists of many components that can be broadly divided into biotic (living) and a biotic (non-living) component. The living parts include trees, shrubs, vines, grasses and other herbaceous (non-woody) plants, mosses, algae, fungi, insects, mammals, birds, reptiles, amphibians, and microorganisms living on the plants, animals in the soil while the non-living part of the environment including the soil, water, and minerals, etc.

Material and methods

Data Collection

The Kashmir region was selected purposively on the basis of maximum proportion of geographical area under forest. The data was collected from the Digest of Forest Statistics, Forest Department, Government of Jammu and Kashmir (GoJK).

Estimation of growth rate

Function of following exponential form was employed to find out the growth trends in indicators of forest development in the state.

$$Y_t = ab^t$$

Where, Y_t is area/production, etc. in the year (t), a is the intercept indicating Y in the base period (t=0), b is the regression coefficient indicating the extent to which dependent variable changes with respect to change in time, t is time in years (1,2,3,...).

Forest growth model

To capture cause and effect of forest development, function of following structural form has been employed and estimated in linear form:

$NDP_f = f(\text{REV}, \text{PINV}, \text{PTN}, \text{MKRT}, \text{RLIT}, \text{Upop}, \text{PVRT}, \text{EXPV}, \text{PDEN}, \text{AREA}, \text{ADP}, \text{EMP}, \text{U})$ where,

REV :Revenue from forests (lakh ₹),
 PINVf :Public investment in forests (lakh ₹),
 PTN :Plantation (lakh no.),
 MKRT:Market rate of major forest specie (₹/m³),
 RLIT :Rural literacy (%),
 Upop :Urban population (%),
 PVRT :Rural poverty (%),
 EXPV :Export value of market produce (000 m³),
 PDEN :Population density (persons/ sq. km of geographical area),
 AREA :Forest area (Sq. Kms),
 ADP :Average price of deodar (₹/m³),
 EMP :Employment in forest sector (000 man days), and
 U :Error

The model was estimated with all specified exogenous variables but only those variables which gave best fit to the model were kept in its final form. Elasticity of significant variables was estimated by employing following formula to calculate their marginal impact on forest growth.

$$\varepsilon = b_i \cdot \bar{X}_i / \bar{Y}$$

Where,

ε : Elasticity,
 b_i : Regression coefficient of ith significant explanatory variable
 \bar{X}_i : Average of ith significant explanatory variable,
 \bar{Y} : Average of dependent variable.

Results and discussion

Status of Forests in Jammu and Kashmir

It was seen that there has been a decline in the forest area of Jammu and Kashmir from 1950 to 2012 and has reached to 20.23 lakh hectares accounting for 19.95 per cent of the total Geographical area of 101387 Sq. Kms, thereby have lost almost 500 sq. km area to degradation (Anonymous, 2011)^[1]. This decrease in forest cover is because of exponential increase in human and livestock population, rapid

industrialization, and a spurt in developmental activities. Earlier, forests were managed mainly for timber production. Although, commercial felling of green trees has now been discontinued, mortality of trees due to natural causes is unavoidable. Further, due to continuous and unrestricted grazing, most of the forests in the State are deficient in regeneration. It was also seen that there is dominance of dry alpine/ moist alpine dry alpine scrub forest category in the state which alone occupy about 51 per cent of total forest area. Sub-tropical pine is another type having occupied about 24 per cent of area and contrary to this Himalayan moist temperate forests are meagre in the state (Anonymous, 2013)^[2]. Considering peculiarities of state, our forests should have an abundance of species specific to this region like Himalayan moist alpine than other forest categories.

Table 1: Status of forest area in the state (Sq. kms)

Year	Area	%age geographical area
1950-51	20,800*	20.52
1960-61	20,800*	20.52
1970-71	20,857*	20.57
1980-81	20,174	19.89
1990-91	20,182	19.90
2000-01	20,230	19.95
2010-11	20,230	19.95
2011-12	20,230	19.95
2012-13	20,230	19.95

* Includes forest area under administrative control of Wildlife Department, GoJK.

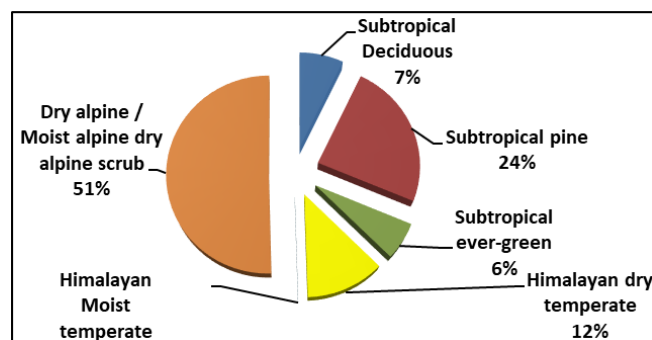


Fig 1: Specie-wise distribution of forest area

Forest net domestic product

The trend in the development of forest sector in Jammu and Kashmir has been lagging behind most of the states in regard to the growth of Net State Domestic Product (NSDP) (Anonymous, 2015)^[3]. The forest net domestic product (FNDP) generated in forestry sector (at 1980-81 prices) revealed that there was a gradual increase in FNDP up to 2010 but later it has decreased significantly toward recent year. The recent decline in net product generated in forest compared to agriculture sector as a whole may be due to the decline in the attention it deserves in the form of investment and government interventions. The FNDP has increased significantly over the years at an annual growth rate of 5.14 per cent; however, period-wise estimates of compound growth rate indicated that FNDP has exhibited slackened growth during period-I which has spurt in recent decade. In terms of growth though forest sector has exhibited a significant growth compare to agricultural sector, but its growth is much lower compared to SNDP. Efforts are to be made to contain this growth on long term basis. The decrease in forest net domestic product generated in the north eastern states of India has been documented by (Arun *et al.*, 2013)^[4], which they

described is due to the rapid growth of the global economy and faster growth of other sectors which include both government and private organizations.

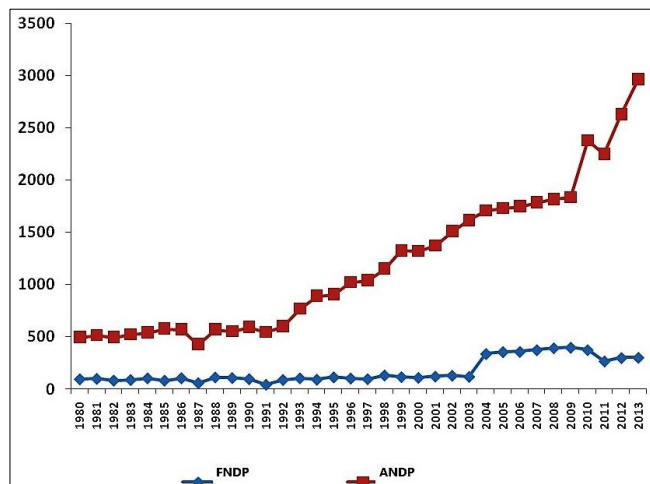


Fig 2: Absolute net domestic product in forestry and agriculture Sector (crore ₹)

Table 3: Contribution of forest net domestic product in the state economy at 1980-81 prices

Year	FNDP (₹ in crore)	FNDP% of		
		ANDP	PNDP	SNDP
1980-81	94	19.0	18.9	9.0
1985-86	81	14.0	13.9	5.7
1990-91	95	16.1	16.1	7.0
1995-96	112	12.4	12.3	4.7
2000-01	108	8.2	8.1	2.7
2005-06	357	20.6	20.5	5.9
2010-11	375	15.8	15.6	3.9
2013-14	301	10.1	9.6	2.0

FNDP= Forest Net Domestic Product, ANDP= Agriculture Net Domestic Product, PNDP= primary Net Domestic Product, SNDP= State Net Domestic Product

Table 4: Compound growth rates of forestry, agricultural and state net domestic product (%)

Period	Forest	ANDP	SNDP
All (1980-2013)	5.14*(0.65)	5.76*(0.24)	8.28*(0.31)
Period I (1980-97)	0.19(1.32)	3.89*(0.73)	4.94*(0.75)
Period II (1998-2013)	9.05*(1.71)	5.45*(0.35)	9.59*(0.39)

*Denotes significance at 5 per cent or better probability levels.

Figures within parentheses indicate standard errors

Extraction from forests

The extraction of timber in the state of Jammu & Kashmir has been a regular phenomenon owing to its utilization in all sects of the society. It has been seen that 86.59 thousand cubic meters of timber during the year 2012-13 has been extracted in quantity terms (Anonymous, 2013) [2]. The area exploited for extraction has decelerated at 6.33 per cent per annum, while the quantity extracted from it by 3.81 per cent from 1985-2013. It is encouraging that the value of extraction grew at 1.66 per cent per annum. The judicious extraction of forest products is desired owing to its role in export earnings and overcoming domestic demand, however it should be accompanied with rampant afforestation programme. Similarly, a marked reduction in population of species yielding important Non-Timber Forest Products, particularly medicinal plants, has also been noticed throughout the State. Of the 24 species, the extractions of 9 species were normal, 7 species are under normal and 8 species have reached zero status.

Table 5: The total extraction of timber-2012-13

Species	Area exploited (Km ²)	Quantity Extracted (000m ³)	Value (Lakh ₹)
Deodar	2.79 (10.42)	22.99 (26.50)	3938.48 (37.30)
Chir	2.16 (8.07)	5.51 (6.40)	192.52 (1.82)
Kail	8.07 (30.15)	24.11 (27.84)	3116.01 (29.51)
Fir	13.75 (51.36)	33.98 (39.24)	3310.44 (31.36)
Total	26.77 (100.00)	86.59 (100.00)	10557.45 (100.00)

Figures within parenthesis indicate percentage of total

Table 6: Status of forest extraction (%)

Species	All (1985-2012)			Period I (1985-1998)			Period II (1998-2013)		
	Area	Quantity	Value	Area	Quantity	Value	Area	Quantity	Value
Deodar									
CGR	-2.35	-3.48*	1.98	-13.69*	-16.01*	-6.05	-3.00*	-2.97*	-3.37
SE	1.42	1.50	1.46	4.43	4.61	4.67	1.62	1.63	2.3
CV	0.67	0.79	0.52	0.76	0.79	0.62	0.28	0.28	0.41
Chir									
CGR	-1.23	-0.79	0.1	-12.50*	-17.66*	-8.63	-0.62	-0.45	-1.21
SE	1.83	2.23	1.86	6.57	7.46	6.59	1.78	1.78	3
CV	0.90	1.14	0.89	0.97	1.23	1.05	0.34	0.34	0.56
Kail									
CGR	-3.20*	-2.53	3.52*	-11.49*	-17.10*	-3.25	-4.19*	-3.28*	-1.7
SE	1.74	2.3	1.78	6.46	8.24	6.61	1.99	1.72	1.88
CV	0.80	2.57	0.53	0.83	2.38	0.78	0.45	0.31	0.28
Fir									
CGR	-6.75*	-5.43*	0.28	-8.45*	-8.35	-1.5	-3.46*	-6.57*	0
SE	0.98	1.33	1.61	3.56	5.05	6.5	1.67	2.07	1.58
CV	0.84	0.78	0.60	0.66	0.69	0.75	0.60	0.69	0.43
Total									
CGR	-6.33*	-3.81*	1.66	-11.62*	-9.92*	-8.17	-3.55*	-4.50*	-1.83
SE	1.03	1.37	1.57	3.5	5.07	5.31	1.74	1.78	1.77
CV	0.83	0.71	0.49	0.68	0.71	0.71	0.47	0.42	0.27

*Denotes significance at 0.05 or better probability level.

CGR= Compound growth rate, SE= Standard error, CV= Coefficient of variation

Table 7: Species-wise average production and present status of NTFP's in J&K

Species	Present Status	Range (Qtls.)
Anardana, Katha, Resin, Tez Patter, Harar, Bamboo Dry, Guchies, Dioscoea, Bazar Bang	Normal	300 to 19600
Barain, Kour, Rasount, Chir Waste Wood, Kail Cones, Brahmibooti, Hericulum, Dhoop.	<Normal	0.22 to 90
Deodar Oil, Overlay Brinji, Willow Clefts, Rosin, Cutch, Cedar Oil, Tarpin Oil, Gul Banafsha, Kakar Singhi.	=Zero	0

Out-turn and export of forest produce

The total out-turn from forests came from sale of timber and NTFP's though the timber contributed its major share. In accordance with the declining forest area it was observed that the totals out-turn has been consistently declined over the years from 154.73 (000 m³) in 1990-91 to just 73.92(000 m³) in recent years. The less extraction due to ban on green felling and the trees who have acquired rotation age won't be extracted or this may be owing to bad floating seasons as indicated by Anonymous, 1980. The export of timber had been increasing progressively until private forest lessees were banned in 1985. However by and large there has been a quantitative decline in the export of major forest products from the J&K State. The declining export rate of forest produce in the state is partly due to the depletion of forest resource due to over-exploitation of the high quality timbers in the previous decades and partly to the inability of the Forest Departments and to develop the secondary species which now constitute the main timber contents of the forest estate. This scenario emphasis upon rigorous afforestation programme so that the minor forest products could be harnessed on continuous basis. In this matter, the State Government should take up the responsibility of collection and trade of forest products so that the forest products could be optimally utilized. The dip in domestic timber production following the Hon. Supreme Court Order (1996), coupled with a growing domestic demand for timber, in the same year led GoI to liberalize its import policy of wood and wood products (ICFRE, 2010) [8]. India as a whole has become an importer of timber (ITTO, 2013) [9]. As a result, wood imports have been steadily rising since then and there had been an increase in imports quantity of timber (Bansal, 2004; Indiatat, 2015; ICFRE, 2011) [10]. The increase in import of wood volumes and shrinking the export volume may disturb trade balance. Currently Timber trade is not regulated in India; thus, there is no fixed domestic pricing pattern for timber available in the country. The shifting of attention from timber production to biodiversity conservation, due to the recognition of the multiple benefits of forests with regard to ecosystem services could be an important measure to harness much from these resources on long term basis. These changes in forest management also have been observed across the globe, as reflected in policies and regulations with a focus on biodiversity conservation (Cashore and Stone, 2012; Le *et al.*, 2012; Winkel, 2014; Raum and Potter, 2015) [7, 12, 13].

Table 8: Out-turn of major forest produce

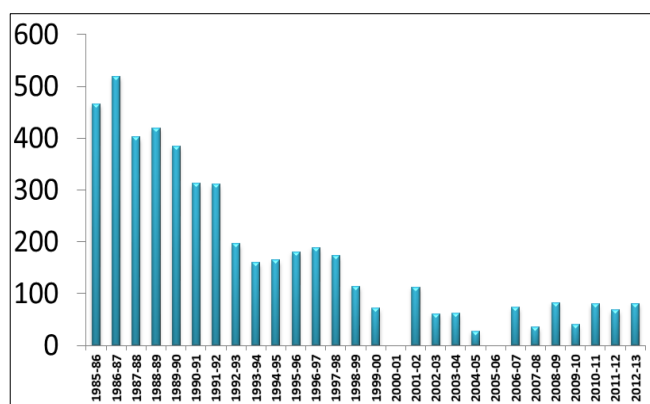
Year	Production (000Cums)
1990-91	154.73
1995-96	110.27
2000-01	110.58
2005-06	63.15
2010-11	52.61
2012-13	73.92

Table 9: Export of timber and Non-timber forest produces from 1980 to 2013

Year	Timber (000m ³)	Non-timber (Qtls.)
1980-81	257.47	636647
1990-91	53.39	321526
2000-01	25.1	19013.41
2010-11	0.529	86482.59
2012-13	0.2054	41216.44

Government interventions

The Ministry of Environment and forests in India is entrusted with planning, protection and coordination of environment and forestry programmes. The Ministry is involved in conservation and survey of flora, fauna, forests and wildlife, prevention and control of pollution, afforestation, regeneration of degraded areas and protection of overall environment. To accomplish these tasks, the Ministry undertakes various measures. At the state level J&K Forest Department has been taking up the task of conservation, development and sustainable Management of the Forest treasure of the State. The government with its specified department is very much proactive towards development of these resources by way of enacting bans and implementation of central/state sponsored schemes and externally aid projects etc. There is a dire need of strict implementation of laws and acts and the time demands convergence of various schemes to have a desired result. In order to bring maximum area under forest and tree cover, afforestation was carried out on all degraded and denuded lands in the State, within and outside forests. The number of plants planted by the forest department in the year 2012-2013 was around 80.94 Lakh. Although Government has played a vital role by way of plantation programme but the forest cover is yet to go long way to reach a desired status of being a mountainous state. The ruthless felling of trees and rapid urbanization demand protection of forest resources and enhancing forest cover. With the change in role from exploitation to conservation, Forest Department is no longer considered as revenue generating machinery.

**Fig 3:** Number of Plants Planted (lakh no.)

The Government has been increasingly investing 408 lakh rupees in forest and logging Sector during the year 2013-14, though it has declined drastically since 2005-06. The forest investment as per cent total of state investment has shown a gloomy figure indicating that it constitutes just 0.4 per cent of total state investment in recent year. Though forest investment has been increasing at 2.28 per cent per annum from 1985-2013 but its growth has shown a declining trend in the recent decades. Intensities of forest investment revealed that government was investing about 3 per cent of FNDP in this sector in 1980-81 as investment.

Table 10: Public investment in forestry & logging at 1980-81 prices. (₹ in lakhs)

Year	Investment (lakh)	% of total state dev. Investment
1980-81	264	1.6
1985-86	686	3.4
1990-91	909	3.0
1995-96	1265	3.3
2000-01	2601	5.3
2005-06	2446	2.9
2010-11	784	0.7
2013-14	408	0.4

The intensity of forest investment has consistently increased up to 2000-01 but later it has received a major setback in 2013-14. It indicates that this sector has not received the policy support it actually deserves and demands enhanced intensity of public investment in forestry and logging. It was realized that the development of any primary sector can be achieved if investment is made equitable across regions (Baba *et al.*, 2010) [5]. Government of India, 1998 observed that while private investment has been the principal source of agricultural growth, particularly in the recent past, and will continue to be so in future, public investment is essential to correct existing infirmities and to impart added dynamism to the agricultural sector. This lesson has to be put in practice by encouraging private investment in forestry sector; of which social forestry forms an important component.

Table 11: Compound growth rate of public investment in forestry & logging sector and all economic sectors (%)

Period	Forestry	All
All (1980-2013)	2.28*(1.17)	6.25*(0.19)
Period I (1980-97)	9.99*(0.97)	6.18*(0.38)
Period II (1998-2013)	-11.12(2.50)	6.58*(0.69)

Figures within parentheses indicates standard errors

*Denotes significance at 0.05 or better probability levels

Table 12: Intensity of public investment on forestry and logging sector

Year	FNDP (₹ in lakh)	FPINV _f (₹ in lakh)	FPINV _f as % of FNDP
1980-81	9402	264	2.81
1985-86	8060	686	8.51
1990-91	9510	909	9.56
1995-96	11219	1265	11.28
2000-01	10779	2601	24.12
2005-06	35651	2446	6.86
2010-11	37529	784	2.09
2013-14	30081	408	1.36

FNDP= Forest Net Domestic Product, FPINV_f= Forest Domestic Expenditure

The auctions held by the Forest Department report an annual increase in the minimum price of all the forest species. The market prices of timber of different species have registered a considerable increase during the past years. The trend in the

average wholesale market rate of timber has shown a gradual increase from 1985-2013. It was seen that the prices of Deodar is considerable higher than that of the Chir, Kail and Fir. Demand creation in the global markets for timber and NTFP's with institutional support would ensure better prices to these products.

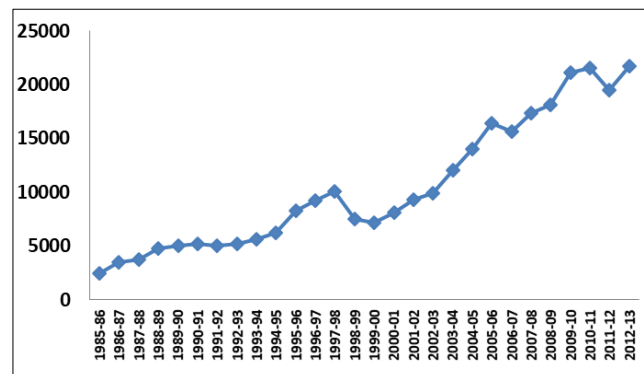


Fig 4: Average wholesale rate of timber-1985-13 (₹/cum)

Table 13: Species wise price structure (₹/cum)

Year	Deodar	Chir	Kail	Fir
1980-81	200	96	133	63
1990-91	343	280	665	153
2000-01	1598	292	1011	446
2010-11	1713	349	1292	974
2012-13	1713	349	1292	974

Discrepancy across data

A huge discrepancy has been observed across data sources with respect to area under forests. The satellite data revealed less forest area compared to information published by forest working plan. To build up a pragmatic policy for sustenance of forests, emphasis should be on improving quality of data where in consensus on common methodology would find important role. Application of remote sensing and GIS application would find an important role in conducting surveys and digitizing forest data.

Table 14: Discrepancy across data sources (Sq. kms)

District	Forest area By satellite	Forest area by working plan	Difference
Anantnag	1737.34	2068	-330.66
Budgam	255.74	477	-221.26
Baramulla	2469.17	2690	-220.83
Doda	5915.31	5555	360.31
Jammu	1047.99	959	88.99
Kargil	11.68	7@	4.68
Kuthua	1288.38	991	297.38
Kupwara	1562	1703	-141
Leh	0	29@	-29
Poonch	803.96	951	-147.04
Pulwama	347.14	810	-462.86
Rajouri	1317.59	1267	50.59
Srinagar	928.39	380	548.39
Udampur	2355.96	2343	12.96
Total	20040.65*	20230	-189.35

*Includes Alpine grasslands

@Estimated figures

Illegal Operations in forests

Despite an important role of institutions, there has been widespread over exploitation and crimes executed in forest area. The illicit feeling of trees had been done between 2007-

13 and a good proportion of trees have been partially or completely damaged. Although there had been a decline in illicit practice but these cases are still present in the state.

Strict supervision and surveillance within and around forests may keep reduce the undesired practices and in turn develop forests.

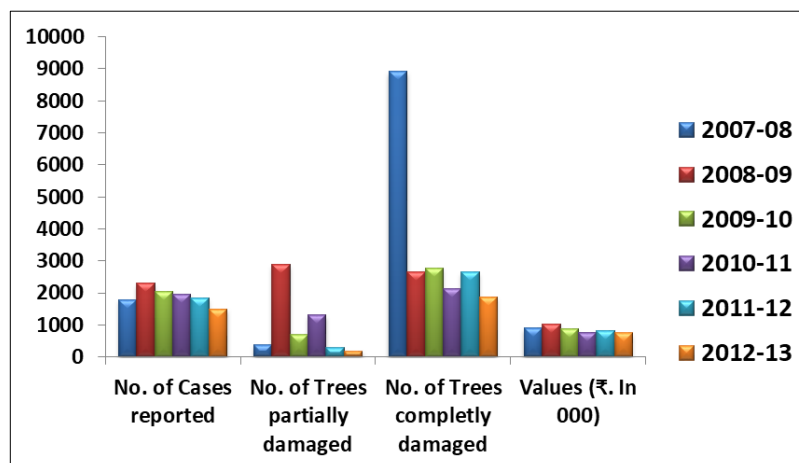


Fig 5: Illicit forest operations-2007-13

Estimates of forest growth model

It has been observed that rural literacy, public investment in forestry, plantation and export value has contributed positively in forest development, while urban population,

poverty has negatively impacted on it. The significant variables have a strong marginal impact forest growth in the state.

Table 15: Estimation of Growth function

Variable	Coefficient	Standard error	Elasticity	Marginal value (crore)
Intercept	264231	-	-	-
RLIT	1492*	424	16.50	646
UPop	-1389*	410	-8.60	-337
PVRT	-309*	176	-1.37	-54
EXPV	44*	24	0.09	4
MKRT	5	31	-	-
PTN	387*	188	0.17	7
PINV	31*	15	0.62	24
REV	27	24	-	-
Adjusted R2	0.7882			
F cal	13.7377			

*Denotes significance at 0.05 or better probability levels

Conclusion

- There has been a decline in the forest area of Jammu and Kashmir from 1950 to 2012 by almost 500 sq. km area to degradation and it raised a necessity to ascertain the area under forests and wildlife.
- The trend in the development of forest sector in Jammu and Kashmir has been lagging behind most of the states in regard to the growth of Net State Domestic Product (NSDP). It was observed that forestry sector has contributed about 10 per cent to the agricultural net domestic product and 2 per cent of state net domestic product in year 2012-13.
- It terms of growth FNDP has increased significantly over the years at an annual growth rate of 5.14 per cent and this growth was yet more significant in the period II (1998 to 2013).
- The total extraction of timber during the year 2012-13 has been 86.59 thousand cubic meters, of which the Forest Department extracted 33.98 thousand cubic meters and the extraction has significantly gone down over the years.
- The trends in the species-wise extraction has shown a declining trend between 1985-2012. The area exploited

for extraction has decelerated at 6.33 per cent per annum, while the quantity extracted from it by 3.81 per cent.

- In terms of total production the total out-turns has been consistently declined over the years from 154.73 (000 m³) in 1990-91 to just 73.92 (000 m³) in recent years.
- There has been a progressive increase in the export of timber until private forest lessees were banned in 1985. About 0.2054 thousand cubic meter of timber has been exported during the year 2012-13. Minor Forest Products of the order of 16668.27 Quintals was exported from J&K State.
- Various schemes were implemented by the State government for conservation, development and sustainable management of the forest treasures, which have best pay off.
- It was observed that plantation has been decreasing in the state which may have serious results in view of shrinking forest resources. The plantation has revealed its peak in the year 1986-87, since then it has been consistently declined.
- The government has invested 408 lakh rupees in forest and logging sector in 2013-14 though it has been declined drastically since 2005-06. The forest investment as total

percentage of state investment constitutes just 0.4 per cent of total state investment in the recent year.

- The period wise growth of investment in forest has shown a decline between 1998-2013, and contrary to this it has been increasing for all economic sectors.
- It was observed that government was investing about 3 per cent of FNDP in forest sector in 1980-81 and has consistently increased up to 2000-01 but its intensity has received a major setback in 2012-13.
- The market prices of timber have registered a considerable increase during the past years. The prices of Deodar are considerable higher than that of the Chir, Kail and Fir.
- The forest cover of state based on interpretation of satellite and working plan shows a net difference of - 189.35 Sq kms.
- Estimates of forest growth function revealed that rural literacy, public investment in forestry, plantation and export value has contributed positively in forest development while urban population, poverty has negatively impacted on it.

Policy suggestions/recommendations

- Forest policy/schemes laws should be strictly implemented for prevention of conversion of forest land, prohibition of illegal operation and up scaling of afforestation programmes.
- There is a need to enhance investment to forest sector in view of its important role in growth of forest sector.
- The declining share of forest sector in ANDP and SNDP is really a cause of concern and has to be augmented with afforestation programme and enhanced institutional support.
- In terms of growth though forest sector has exhibited a significant growth compare to agricultural sector, but its growth is much lower compared to SNDP. Efforts are to be made to contain this growth on long term basis.
- Investment intensities should be increased manifold to have desired results from this sector.
- Government should emphasize upon planned urbanization, literacy improvement and regulation of prices (in real terms).
- Efforts would be made to bridge the gap between demand and supply of timber by increasing productivity and actively facilitating import of timber.
- Planting of trees along roads, railway lines, rivers, streams and canals, and other available lands under State, institutional or private ownership.
- Employment generation through implementation of forestry activities, schemes and programmes would essentially augment livelihood opportunities available to the local communities. To realise this imperative, all major activities, schemes and programmes will henceforth have a provision for creating a corpus as a compulsory component, and put adequate money in the same to cater to the watch and ward, fire protection and maintenance needs of the assets created, during and after the project period. Focus of the employment generation will be on youth from local community and tribal communities.

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