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## Investigation of structural changes in livestock sector in Jammu & Kashmir

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**Abstract**

This study has investigated the dynamics of livestock sector across different provinces of Jammu & Kashmir by employing chronological data obtained from diverse sources. The distribution pattern of livestock revealed maximum concentration of all species of animal in Jammu province. The share of almost all the species of livestock in Kashmir province has reduced over the years. Livestock system in the cold arid province Ladakh dominates in Goat and sheep. Changes in species composition in the state over the years have been an important determinant of pace of intensification across various regions. The public investment in Animal Husbandry & Dairy Development (AH&D) has shown undesirable decline since 2005-06 and has reached to a meagre proportion of 0.34 per cent of public expenditure in the state. The veterinary institutions have increased in absolute numbers between 1980-81 and 2015-16, however, their density with respect to livestock population has experienced a decline. The study emphasized upon appropriate species mix of livestock, preservation of CPRs, strengthening of extension system among and put forth few policy suggestions for growth of livestock sector in the state.

**Keywords:** Livestock, veterinary institutions, public investment, growth, J&K

**Introduction**

Contribution of livestock sector in the economic development and nutritional security has been significantly higher over the years. This sector is labour-intensive and possesses a huge potential for employment generation. Studies have reported that livestock resources have equitable distribution than land resources<sup>[1]</sup> and are considered to be a viable livelihood option for marginal and small farmers/landless labourers<sup>[2, 3]</sup>. This sector has been an important source of inputs and draught power for crop production, raw material for manufacturing units and food for human beings<sup>[4]</sup>. It contributes towards organic options, maintaining ecological balance and that incorporation of livestock in a production system is realized as a key to country's food security<sup>[5, 6, 7]</sup>. The consumption pattern has diversified in favour of livestock based products<sup>[8]</sup> in rural as well as urban areas as driven by consistent growth of economic status in the country<sup>[9]</sup>. Animal rearing in hilly regions forms an age-old crop-livestock mixed and provides livelihood alternatives in view of poor scope for development of manufacturing sector. It emphasized upon the sustained growth of livestock sector in Himalayan states. Despite the significant growth in the livestock sector and increase in its production with respect to time in Jammu & Kashmir (J&K), a northern Himalayan state of India, concerns are high regarding sustainability of these trends in view of shrinking Common Property Resources (CPRs) and shifting of productive land to non-productive uses. It implies that the structural changes in the livestock have implication in this geographical location in view of increasing demand for the animal products and ecological issues. In consideration of this background, this study is a humble endeavour to examine the growth pattern in livestock sector in relationship with public support in J&K to arrive at the pragmatic options for its sustenance in long run.

**Data and Methodology**

The study is based upon secondary data collected from different issues of various publications of Directorate of Economics Statistics, Ministry of Agriculture, GoI including Livestock Census Reports<sup>[10]</sup> & Basic Animal Husbandry Statistics<sup>[11]</sup> and Digest of Statistics, Directorate of Economics & Statistics<sup>[12]</sup>, Plan Documents, Planning Department<sup>[13]</sup>, Government of J&K. Averages and ratio have been estimated to analyze the data.

## Results and Discussion

### Livestock population across provinces

The endowment of livestock species across various provinces of the state is depicted in Table 1. With a few exceptions, there has been a drastic change in the contribution of each province in livestock species especially during the last decade though the concentration of livestock species varies across three provinces in the state. A good percentage of all livestock species was found more concentrated in Jammu province. Except for goat, there has been an increase in the share of Jammu province in total livestock population between 1992 and 2012 census. On account of the decline in male as well as female population of indigenous animals, Kashmir provinces has experience a decline of 5 per cent and 6 per cent in cattle and sheep population of the state, respectively. The

favourable increase in cross bred species of cattle and sheep from 1992 to 2012 has not overcome the decline in the livestock wealth accumulated in these species in Kashmir. Between two censuses the population of buffalo has also reduced in this provides and their decline could be attributed to the less preference for milk and other products from buffalo and their least resilience to with stand the harsh climate during winters. Owing to the available niches and altitudinal locations, Ladakh province marked a significant growth in the share of goats and other animals. Under the cold-arid climatic setting the goats yield pashmina- priced fine wool that supports growth of their population in this province<sup>[14]</sup>. While the proportion of sheep population has decline in this province, the buffaloes were not visible during 2012.

**Table 1:** Livestock population across provinces of J&K (%)

Province	Cattle		Buffalo		Sheep		Goat		Livestock	
	1992	2012	1992	2012	1992	2012	1992	2012	1992	2012
Kashmir	49.29	44.33	4.26	2.19	39.54	33.96	10.90	11.18	34.04	29.09
Ladakh	2.09	1.42	4.96	0.00	8.78	6.79	11.93	15.31	7.00	7.38
Jammu	48.62	54.25	90.78	97.81	51.68	59.25	77.16	73.52	58.96	63.53

### Species composition across provinces

The spatio- temporal composition of livestock has changed noticeably presented in Table 2 revealed that there was a dominance of cattle and sheep among livestock in the state though a huge change was observed between 1992 and 2012. While the proportion of buffaloes marginally decreased, there was a decline of 5 per cent in the share of cattle from 1992 to 2012. The sheep comprised about 37 per cent of total livestock population in the state in 2012 which is 3 per cent more than its share in 1992. Across province the small ruminant population was relatively higher in Ladakh though there has been a decline in the share of sheep during the reference period in this province. Cattle and sheep dominate the livestock production system in Kashmir province. While the proportion of sheep has increased by 4 per cent, there has been a decline in the cattle population in this provides towards 2012. The cultivated area provides crop by-products and stubbles to the cattle especially cross bred and such interactions resulted in the dominance of cattle in Kashmir

provinces. The rising demand for cow milk has also encouraged cattle population in this part of the state. The percentage share of sheep indicated their dominance in Jammu followed by sheep, cattle and goats.

Over the years we have observed that the cattle population has reduced across all the provinces of the state though the decline was more pronounced in Ladakh. The percentage of buffaloes has also exhibited a decline in all the provinces of J&K. The extremes of the climate during almost half of the year in Ladakh and Kashmir province hamper the growth performance of buffalo in livestock production system. The percentage share of sheep went up perceptibly in both Kashmir and Jammu province though their proportion has gone down drastically in Ladakh. As far as goats are concerned, their share has shown a marked increase in Ladakh where as Jammu province has experienced a decline in their proportion. An earlier study have also shown same scenario during previous census periods<sup>[3]</sup>.

**Table 2:** Composition of livestock species across provinces in J&K (%)

Province	Cattle		Buffalo		Sheep		Goat		Livestock (lakh No.)	
	1992	2012	1992	2012	1992	2012	1992	2012	1992	2012
Kashmir	50.81	45.55	1.05	0.60	39.32	43.00	6.50	8.43	29.63	26.77
Ladakh	10.45	5.77	5.95	0.00	42.43	33.87	34.57	45.49	6.10	6.79
Jammu	28.94	25.53	12.95	12.37	29.67	34.36	26.54	25.38	51.34	58.45
J&K	35.09	29.89	8.41	8.03	33.85	36.84	20.28	21.93	87.07	92.01

### Livestock density

The degree of livestock intensity in the state was ascertaining by calculated a ratio of livestock number per sqkm of geographical area and the figures presented in the Table 3. It could be seen that in 2012 the intensity of livestock in J&K have reached to 91 animals sq km<sup>-1</sup> of geographical area thereby showing an increase of 4 animals per sqkm geographical area since 1992. Changing composition of livestock was observed to have blown up their intensity across various provinces of the state. The density of animals exhibits considerable variations in various provinces of J&K. Jammu province was found to have more livestock density followed by Kashmir province. The livestock intensity have increased in Jammu or remained more or less stagnant in Ladakh between 1992 and 2012, except Kashmir region, wherein the

decline in livestock intensity was substantial from 186 to 168 animal per sqkm from 1992 to 2012, and was due to fall in intensity of cattle, sheep and goats. The livestock density per sqkm in Jammu province (222) was higher compared to other provinces of the state. In 2012 the cattle density was higher in Kashmir province followed by Jammu province. In Kashmir province the density of cattle declined from 94 in 1992 to 76 animals per sqkm in 2012 while in the same period their density has marginally increased in Jammu region. The cattle density in Ladakh was meagre. The buffalo density is relatively more in Jammu province and has shown an increase since 1992. The intensity of sheep was higher in Kashmir province in 1992, however later in 2012 Jammu province has come out to be the sheep intensive province of the state.

**Table 3:** Density of livestock population (per Sqkm of geographical area)

Province	Cattle		Buffalo		Sheep		Goat		Livestock	
	1992	2012	1992	2012	1992	2012	1992	2012	1992	2012
Kashmir	94	76	2	76	73	72	12	14	186	168
Ladakh	1	1	0.6	1	4	4	4	5	10	11
Jammu	56	57	25	57	58	76	52	56	195	222
J&K	30	27	7	7	29	33	17	20	86	91

### Level of replacement with crossbred and improved animals

A well known approach for enhancing the yield levels of animals is crossbreeding of indigenous animals with exotic animals [3]. To get an idea about the replacement of indigenous animals, cross bred animals as percentage of total animals were calculated and estimated presented in Table 4. The crossbred cattle constitute 53.44 per cent of total cattle in 2012 which is double their share in 1992. Between 1992 and 2012, the proportion of crossbred sheep has increased from 40.59 to 68.31 per cent. There has been a widespread variations in the adoption of crossbred technology across provinces of the state. In 2012 as high as 76.77 and 33.14 per cent and of cattle was crossbred in Kashmir and Jammu province, respectively while as, there was cent per cent replacement of indigenous cattle in Ladakh province of the state. The higher adoption of crossbred cattle in Ladakh was owing to the decline in the number of both indigenous male and female cattle. The preference for buffalo milk in Jammu was partly responsible for the lower increase in the percentage of crossbred cattle in Jammu province. Kashmir province has relatively more adoption of crossbred sheep compared to other provinces and this lent the support to the earlier findings [15].

**Table 4:** Level of adoption of cross-bred animals across provinces in J&K (%)

Region	Cattle		Sheep	
	1992	2012	1992	2012
Kashmir	25.32	76.77	38.21	84.55
Ladakh	21.47	100.00	21.13	24.27
Jammu	26.61	33.14	45.80	64.05
J&K	25.94	53.44	40.59	68.31

### Growth of livestock products

Consistent with the increase in the livestock population in the state there was a significant increase in the livestock products over the years (Table 5). The growth in livestock based products revealed that the production of milk in J&K went up from 13.21 lakh metric tonnes to 23.76 lakh metric tonnes between 2000 and 2016. The rise in the production of milk over the years improved its availability per capita. On account of significant increase in meat production its per capita availability has shown a substantial increase in recent years and this growth need to be contained with policy support. As far as the production of other livestock products is concerned, the total production and per capita availability of wool has increased upto 2000 however in recent years it has exhibited an unfavourable decline. The decline in the production of livestock products is essential in view of widening gap between demand and supply of these food items [16].

**Table 5:** Growth of livestock products in J&K (2000 to 2016)

Year	Milk		Meat		Wool	
	Production	Per capita availability	Production	Per capita availability	Production	Per capita availability
2000	1321	365.21	26.29	7.27	5583	563.4
2005	1400	346.19	27.00	6.68	7400	667.9
2010	1609	358.35	30.97	6.90	7382	600.09
2015	2273	461.28	75.08	15.24	6866	508.58
2016	2376	473.77	85.10	16.97	7265	528.74

Note: Production of milk & meat is in '000 tonnes, & wool in '000 kg and per capita availability is in gms/day in case of milk and meat, & no./capita/day in case of eggs.

Source: Basic animal husbandry statistics (various issues), Ministry of Agriculture, GoI

### Government support to livestock sector

a) **Public development expenditure:** A significant change was observed in public support to the livestock development in the state over the years. The support to the livestock sector has undergone drastic changes over the years in the state. The government expenditure on Animal Husbandry & Dairy Development (AH&D) has increased consistently up to 2005-06 but later it has declined unfavourably. Public development expenditure in this sector as proportion of investment in agriculture grew from 10.69 per cent (1980-81) to 11.29 per cent (1995-96), however, thereafter it has declined to just 6.5 per cent in 2014-15. Public investment in livestock has declined to a meagre proportion of 0.34 per cent of total

public expenditure in the state (Table 6).

b) **Growth of veterinary institutions:** The veterinary institutions are important physical capital endowments in the state. The number of these institutions has increased by about 4 folds from 951 (1980-81) to 3089 (2015-16). However it is important to note that density of veterinary institutions with respect to livestock population has unfavourably declined (Table 7). Accordingly the number of animal treated per institute has shown a marginal decline. Good progress has been observed in vaccination and artificial insemination services provided by these institutions. Besides building up new institutions, there is a need to equip them with logistics and capacity development of manpower is of dire need.

**Table 6:** Public development investment in Animal Husbandry & Dairy Development in J&K (Rs in lakhs)

Year	Amount	% ag	% Total
1980-81	371.3	10.69	2.19
1985-86	485.5	7.57	1.77
1990-91	1310.0	11.29	2.04
1995-96	1635.3	11.18	1.48
2000-01	2285.3	6.87	1.30
2005-06	3260.4	7.31	0.92
2010-11	2425.5	4.96	0.42
2014-15	2208.2	6.49	0.34

**Table 7:** Veterinary institution across provinces of J&K (Number)

Year	Vet. inst.	Vet. inst, per lakh of animals	Animals treated (lakhs)	Animal treated per vet inst	Animal vaccinated / vet inst	Frozen semen centres	Artificial insemination/ frozen semen centre
1980	951	17	16.74	1760	1424	20	6421
1985	1719	26	31.56	1836	1251	71	2380
1990	1672	21	29.51	1765	3359	119	1403
1995	1587	18	28.45	1793	1783	117	2406
2000	1754	18	45.73	2607	4160	119	2265
2005	1803	19	34.98	1940	5687	135	1354
2010	2119	23	61.29	2892	7263	134	4494
2015	3089	22	53.04	2952	9096	147	5457

### Major hurdles facing livestock economy

The livestock rearing in the Kashmir valley is beset with number of constraints; of which few are:

- Deterioration of common property resources (CPRs) in the state and Kashmir Division in particular does not warrant to support growing livestock population.
- Rampant encroachment into permanent pastures coupled with unplanned expansion of residential areas not only provides less space for grazing but there are emerging ecological, economical and social concerns associated with it,
- A major issue confronting livestock rearing is non-availability of assured marketing infrastructure/market place, unregulated trade practices and poor extension network,
- There has been unscientific breeding of livestock with unidentified progeny that has resulted in genetic deterioration of existing stock,
- Illiteracy, inadequate skill and poor capacity development among farmers and labour engaged in its livestock rearing resulted in unscientific management of animals,
- Besides there are number of problems/constraints perceived by livestock farmer in production, and in marketing which need to be explored out and redressed in a holistic manner.

### Conclusion and policy implications

In an endeavour this study has made an attempt to investigate the growth of livestock sector across various provinces in J&K. The livestock endowment indicated higher endowments of all animal species in Jammu province. Share of cattle, goat and buffalo in Kashmir regions has declined over the years. There was a dominance of small ruminants in the cold arid agro-climatic setting of Ladakh. The pace of livestock intensification across various provinces of the state was observed to be on account of changes in species mix of livestock over the years. The proportion of milch animals and cross bred/improved animals has shown a significant increase in the state. The public investment in Animal Husbandry & Dairy Development (AH&D) has declined unfavourably since 2005-06 to reach a meagre proportion of 0.34 per cent of total public expenditure. The study put forth following policy

suggestion:

1. The study emphasized be on an appropriate species mix rather than increase in the number of animals. Efforts with firm extension network are needed to disseminate crossbred and animal production technologies to achieve higher adoption rates. Moreover encouragement of scientific management of animals shall enhance their productivity and overall socio-economic gains from this sector.
2. Higher allocation toward streamlining extension to farmers would have higher pay off. There is a need to enhance public investment in this sector both in absolute and proportionate terms.
3. Preservation of fodder resources is highly need to contain the growth trend livestock in the future. Scientific management of CPRs and concerted efforts are needed to prevent further deterioration of CPRs through public support. Integration of sown area, livestock and CPRs with effective grazing strategy is effective means of improving sustenance of livestock sector and environmental sustainability. Emphasis should, therefore, be on identification of areas with comparative advantages in the pasture development and their preservation through an integrated approach to ensure their sustainability in long run.
4. Major emphasis should be on animal health for which increase in the density of veterinary institution is very important. To sum up there is a need of an integrated approach for the growth of livestock sector.

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