

# DYNAMICS OF OVINE POPULATION IN HIMACHAL PRADESH

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## INTRODUCTION

Livestock is a key sector for socio economic development contributing about 4.1 per cent at current prices and 3.5 per cent at constant prices to the national economy in terms of Gross Domestic Product during 2012-13 (Basic Animal Husbandry and Fishery Statistics, 2015). According to 19<sup>th</sup> livestock census India holds second rank in cattle and goat population and third in sheep population (72 million). Within the animal husbandry sector, the significance of small ruminants particularly the ovine (sheep and goats) is substantial. The importance of small ruminants is primarily associated with their small size, which is significant and advantageous to the mankind for three important reasons: economic, managerial and biological (Devendra and Burns, 1983). Economic advantages include low initial investment and correspondingly smaller risk of loss from individual deaths. Managerial considerations favour their care by unpaid family labour and limited resource use for the supply of meat and milk in quantities suitable for immediate family consumption (Bial *et al.*, 2012). Biological factors include possible preference over large ruminants, food and reproductive efficiency, and in turn, economic use of the available land for maximum product output in terms of meat, milk, fibre and skins from both species (Mishra and Patro, 2010). In India, ovine are mostly raised on common property resources with little or no input supplement but contribute to the family income by way of sale for meat, wool/fibre, skin, milk and manure.

In Himachal Pradesh, 92 per cent of the households are engaged in rearing different livestock species. The rearing of ovine is mostly confined to traditional and tribal farming communities especially in Chamba and Kinnaur since time immemorial, who mostly reside in higher hills and mountain locked tribal pockets. With this background, a study was carried out to examine district wise trends in the small ruminant's population in Himachal Pradesh.

The study is based on secondary data collected from six quinquennial state livestock censuses viz. 1982, 1992, 1997, 2003, 2007 and 2012 of Himachal Pradesh. The time series secondary data were gathered on different aspects of livestock products from various publications of the Directorate of Economics and Statistics, Directorate of Land Records and Directorate of Animal Husbandry released from time to time. To meet out the objective of the study, compound growth rate were computed to examine the growth in ovine population. The findings of study revealed that India had 9.831 per cent of the world sheep population whereas goats shared 14.52 per cent during 2012. Both at the national as well as at the state level, about 40 % of the total livestock population comprised of ovine as per livestock census, 2012 due to their various advantages. Chamba, Kangra and Mandi continued to be the large livestock rearing districts in the state over different census period of 1982 to 2012 and their share stood at over 50 per cent in the state livestock population. In terms of growth rates Kinnaur has recorded the highest annual growth rate of over one per cent. In the state as a whole, total livestock decreased at the annual compound growth rate of below one per cent. District Chamba followed by Mandi were found to be the largest districts accounting for both sheep and goats population during 2012. Kullu in terms of sheep and

## ABSTRACT

The paper mainly focused on estimation of growth rates in ovine population over the years and major issues related to rearing of ovine by the shepherds. For this, secondary data collected from six quinquennial state livestock censuses viz., 1982, 1992, 1997, 2003, 2007 and 2012 of Himachal Pradesh. The study revealed that both at the national as well as at the state level, about 40 per cent of the total livestock population comprised of ovine as per livestock census, 2012. Both sheep and goats population have recorded the highest compound growth rate (approximately 2 % p.a) in district Kinnaur over 1982-2012 due to dominance of tribal communities in Kinnaur and Chamba. Major issues of shepherds are scarcity of grass during Jan-Feb especially for sheep, infestation of grazing areas with obnoxious weeds and increasing thefts in plains etc. In order to combat these problems various policy measures are suggested.

## KEY WORDS

Small ruminants  
Census  
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Kangra with respect to goats were the next important districts in the order of sheep and goats population. Highest sheep and goat population growth rate have been recorded in Kinnaur (approximately 2.18 per cent per annum) and Sirmaur (approximately 4.39 per cent per annum) over 1982-2012 respectively.

Therefore, keeping in mind the huge importance of ovine in Indian as well as state economy the present study was carried out to find out their population trends in Himachal Pradesh.

## MATERIALS AND METHODS

The study is based on secondary data collected from six quinquennial state livestock census of HP viz. 1982, 1992, 1997, 2003, 2007 and 2012. The time series secondary data gathered on different aspects of livestock were obtained from various publications of Government offices like Statistical Outline of Himachal Pradesh, Himachal in figures (Economics and Statistics Department), Integrated sample survey reports for estimation of Animal Produce in Himachal Pradesh, Livestock Census Reports of Himachal Pradesh, Basic Animal Husbandry Statistics, Annual Reports of the related departments and other relevant official websites of Food and Agriculture Organization (FAO), Directorate of Animal Husbandry, Govt. of India, Govt. of HP, etc. In order to meet out the different objectives of the study, various analytical and statistical techniques have been employed for analysis and interpretation of the data collected from various sources. The tabular method of data analysis like averages, ratios and percentages were extensively used in the study. Also, following formulae were employed to work out the Compound Growth

Rates (CGRs):

Exponential function used to compute Compound Growth Rates (CGRs) is as follows:

$$Y = a b^t$$

$$\log Y = \log a + t \log b$$

$$\text{CGR (\%)} = [\text{antilog}(\log b) - 1] 100$$

Where,

Y = Population in numbers

a = Constant term i.e the estimated value of Y and t

b = regression coefficient

t = time variable in years

CGR = Compound Growth Rate per cent per annum

The following formula was used to derive growth rates for quinquennial livestock census data:

$$P_t = P_0 (1 + r/100)^t$$

$$r = [(P_t/P_0)^{1/t} - 1] 100$$

Where,

$P_t$  = Ovine population in  $t^{\text{th}}$  Year

$P_0$  = Livestock population in base year

r = Compound Growth Rate per cent per annum

t = Time in Years

## RESULTS AND DISCUSSION

The results of the study obtained from the analysis of factual data pertaining to the objectives of the study have been

**Table 1: Total livestock population in World, India and HP (2012)**

Sr. No.	Name of Species	World ('000)	India ('000)	% share of India to World	HP ('000)	% share of HP to India
1	Cattle	1422364(29.18)	190904(37.28)	13.42	2149.26(44.37)	1.13
2	Buffalo	192319.4(3.95)	108702(21.23)	56.52	716.02(14.78)	0.66
3	Sheep	1105703(22.68)	108702(12.71)	9.83	804.87(16.61)	0.74
4	Goat	930675.6(19.09)	135173(26.40)	14.52	1119.49(23.11)	0.83
5	Pigs	971681.5(19.93)	10294(2.01)	1.05	5.03 (0.1)	0.05
6	Other livestock	251805.2(5.17)	1915(0.004)	0.001	49.73(1.03)	2.6
Total	4874549(100)	512057(100)	10.505	4844.4(100)	6.01	

Figures in parentheses are the per centages of the total; Source: Livestock census, 2012; FAO official site (www.fao.org)

**Table 2: District wise trends in livestock population in HP (Per cent)**

Sr. No.	Name of the district	1982	1992	1997*	2003	2007	2012	CGR
1	Bilaspur	4.77	4.64	4.56	4.14	4.44	4.34	-0.314
2	Chamba	14.43	14.13	14.15	15.95	17.64	16.81	0.510
3	Hamirpur	5.07	4.65	4.45	3.82	3.70	3.53	-1.200
4	Kangra	16.38	17.95	18.79	17.55	15.53	16.62	0.048
5	Kinnaur	1.87	2.21	2.36	2.70	2.43	2.60	1.105
6	Kullu	6.63	6.42	6.27	7.66	7.41	7.67	0.487
7	Lahaul and Spiti	1.33	1.24	1.19	1.39	1.19	1.27	-0.154
8	Mandi	17.33	18.61	19.08	16.83	18.07	17.07	-0.050
9	Shimla	12.67	11.38	10.73	10.45	9.80	10.25	-0.704
10	Sirmaur	8.20	8.26	8.23	9.12	10.03	9.96	0.650
11	Solan	6.36	6.35	6.32	6.34	6.01	5.98	-0.205
12	Una	4.95	4.16	3.87	4.05	3.75	3.90	-0.792
Himachal Pradesh (No.)		5123771	5116933	5224067	5046044	5211087	4844431	-0.618

Note: \* indicates the Projected Census; Source: Livestock census, 1982, 1992, 1997\*, 2003, 2007, 2012

**Table 3: District wise population of ovine of HP in 2007 (Per cent)**

Sr. No.	Name of the district	Number of Sheep	Number of Goats	Total Ovine
1	Bilaspur	0.1	5.29	3.08
2	Chamba	31.67	18.27	10.63
3	Hamirpur	1.12	2.21	1.29
4	Kangra	10.51	18.11	10.54
5	Kinnaur	8.28	2.97	1.73
6	Kullu	15.37	6.16	3.58
7	Lahaul and Spiti	4.47	0.73	0.42
8	Mandi	14.16	17.46	10.16
9	Shimla	12.32	9.21	5.36
10	Sirmaur	1.41	12.93	7.52
11	Solan	0.2	5.46	3.18
12	Una	0.1	1.21	0.70
Himachal Pradesh (No.)		804870	1119490	1924360

**Table 4: District wise population trend of sheep in HP (Per cent)**

Sr. No.	Name of the district	1982	1992	1997*	2003	2007	2012	CGR
1	Bilaspur	3.13	2.23	1.80	0.28	0.16	0.2	-8.76
2	Chamba	25.83	25.81	25.68	33.00	44.01	31.67	0.68
3	Hamirpur	5.45	4.86	4.55	1.82	1.71	1.12	-5.14
4	Kangra	8.64	13.80	16.60	10.93	7.17	10.51	0.66
5	Kinnaur	3.96	4.87	5.33	6.23	8.62	8.28	2.49
6	Kullu	9.48	9.77	9.87	14.78	9.17	15.37	1.62
7	Lahaul and Spiti	3.96	3.04	2.59	4.79	3.48	4.47	0.40
8	Mandi	18.17	18.83	19.08	15.81	12.49	14.16	-0.83
9	Shimla	14.71	12.08	10.73	9.90	9.32	12.62	-0.51
10	Sirmaur	3.38	2.47	2.03	2.06	3.30	1.41	-2.87
11	Solan	2.23	1.69	1.43	0.39	0.32	0.1	-9.83
12	Una	1.06	0.55	0.33	0.02	0.25	0.1	-7.57
Himachal Pradesh (No.)		1090322	1036772	1006425	995965	772163	804870	-1.21

Note:- \* indicates the Projected Census; Source: Livestock census, 1982, 1992, 1997\*, 2003, 2007, 2012

**Table 5: District wise population trend of goat in HP (Per cent)**

Sr. No.	Name of the district	1982	1992	1997*	2003	2007	2012	CGR
1	Bilaspur	5.75	5.64	5.49	4.73	6.13	5.29	-0.33
2	Chamba	16.34	15.82	16.79	16.57	19.39	18.27	0.45
3	Hamirpur	3.71	2.75	2.29	2.66	2.50	2.21	-2.05
4	Kangra	14.00	18.43	20.25	18.74	15.89	18.11	1.03
5	Kinnaur	1.90	2.56	2.83	3.10	2.44	2.97	1.80
6	Kullu	5.95	5.06	4.58	7.00	5.60	6.16	0.14
7	Lahaul and Spiti	1.08	1.00	0.96	0.95	0.68	0.73	-1.55
8	Mandi	17.91	18.15	17.94	17.01	18.25	17.46	-0.10
9	Shimla	9.81	8.62	7.93	8.80	7.40	9.21	-0.25
10	Sirmaur	10.24	10.37	10.24	12.44	13.57	12.93	0.94
11	Solan	7.06	7.40	7.43	6.05	6.59	5.46	-1.02
12	Una	6.26	4.20	3.26	1.94	1.55	1.21	-6.36
Himachal Pradesh (No.)		1090322	1059862	1118094	1167992	1115587	1119491	0.11

Note:- \* indicates the Projected Census; Source: Livestock census, 1982, 1992, 1997\*, 2003, 2007, 2012

presented systematically within Table 1 to Table 8. The total livestock population of World, India and Himachal Pradesh during 2012 has been presented in Table 1. The data revealed that India contributes 10.505 per cent to the world livestock, while Himachal

Pradesh is having very low contribution of 6 per cent to the overall livestock of the country. In case of ovine, India contributes largest number of goats (14.52 %) and second highest to sheep (9.83 %) in the world. Ovine contributes 39.72 % to the total livestock of the state that indicates that

major households mainly in the rural areas rear sheep and goats in tribal pockets.

Table 2 shows the trends in the livestock population across different districts of the state during 1982 to 2012. The data states that Chamba, Kangra and Mandi continued to be the largest livestock rearing districts in the state over different census period of 1982 to 2012 and their share stood at over 50 % in the state livestock population. In terms of growth rates, Kinnaur has recorded the highest annual growth rate of 1.105 per cent per annum due to shift in peoples preferences towards rearing

**Table 6: Ovine population trend in HP over 1951-2012 (in Lakhs)**

Year	Sheep	Goats	Total
1951	6.27	5.72	11.99
1956	6.97	6.52	13.49
1961	6.61	5.95	12.56
1966	10.49	8.13	18.62
1972	10.39	9.06	19.45
1977	10.55	10.35	20.90
1982	10.90	10.60	21.50
1992	10.79	11.18	21.97
1997*	10.80	11.68	22.48
2003	9.06	11.16	20.22
2007	9.01	12.41	21.43
2012	8.04	11.19	19.23
CGR (1951-1972)	2.322	2.112	2.223
CGR (1972-1992)	0.189	1.057	0.611
CGR (1992-2012)	-1.46	0.004	-0.664

Note: \* indicates the Projected Census; Source: Livestock Census for different years Directorate of Animal Husbandry, H.P

**Table 7: Issues in Ovine husbandry**

Particulars	Decade before	Existing	Change
Total number of households in the sampled village (Avg.)	125	170	+ 45
Shepherding Households (Avg.)	29	16	- 13
Percentage of the households rearing ovine husbandry (%)	23.2	9.41	- 13.78
Average herd size (Avg.)	260	190	- 70
Minimum size of herd (Avg.)	120	75	- 45
Maximum size of herd (Avg.)	610	560	- 50
Proportion of Sheep to Goat (Avg.)	55 : 45	45 : 55	-15 : + 15

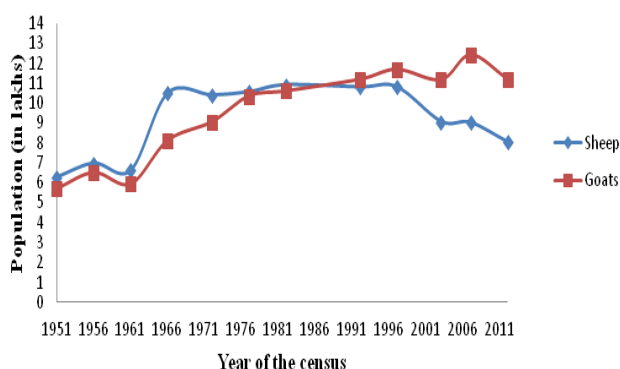
**Table 8: Problems faced by the shepherds**

Sr. No.	Problem	Per cent herders facing
Grazing related		
1	Shrinkage of forests	21.08
2	Infestation of grazing areas by obnoxious weeds	100
3	Scarcity of grass during Jan-Feb especially for sheep.	60.33
Marketing related		
4	Non remunerative prices for wool	100
5	Non-availability of good market	21.67
General problems		
6	Rising incidences of thefts and threats in plain areas	100
7	Non availability of shelter on migratory routes	20.67
8	Increasing incidences of wild animal attack	21.33
Technology related		
9	Delayed shearing and marketing of wool	50.67
10	Non availability of efficient wool scissors for shearing	50.67

ovine due to their significant advantages in difficult terrain of Kinnaur. In the state as a whole, total livestock decreased at an annual compound growth rate of below one per cent per annum *i.e.* -0.618. In 2012, Mandi (17.07 %) ranks first followed by Chamba (16.81 %) and Kangra (16.62 %) in total livestock population of the state. Una, Hamirpur, Kinnaur, Lahaul & Spiti and Una were found to be having very less share in total livestock population across the state. All these together contribute less than 20 per cent to the total livestock. Overall, there is a decrease in total livestock population over the years 1982–2012 this may be due to shift of peoples preferences towards growing other crops like maize and wheat in lower Himachal districts like Hamirpur, Bilaspur, Una etc. and apple, peach orchards in Kinnaur, Shimla and Mandi

districts (A. Dogra, 2009).

District-wise ovine (Sheep & Goat) population of Himachal Pradesh in 2012 has been shown in Table 3. It can be envisaged from the table that district Chamba followed by district Mandi of the state were found to be the largest districts accounting for both sheep and goats population during 2012. Chamba in terms of sheep and goats was the important district in the order of sheep and goats population the main reason behind this is the dominance of tribals communities like "Gujjars" in the district. The share of Bilaspur, Solan, Hamirpur and Una districts was found to be less than 6 per cent to the total ovine in the state as the topography of these districts is plain and people mostly practice rearing of cow and buffalo as conditions are quite favourable for large ruminants like



**Figure A: Trends in population of sheep and goats of HP (1951-2012)**

easy availability of fodder and other requirements for them. Overall, there are 1924360 number of ovine in the state (804870 sheep and 1119490 goats) which quite more as compared to other livestock.

In case of sheep, Chamba district (31.67 %) accounted for maximum number of sheep followed by Kullu (15.37 %) and Mandi (14.16 %) districts in 2012 as is evident from Table 4. Kinnaur registered highest increasing annual compound growth rate of 2.184 per cent per annum while Solan district have shown highest decline in the sheep population of -9.963 per cent per annum. Overall, In case of sheep, negative growth rate of -1.21 per cent per annum has been recorded over the years 1982-2012 in HP.

Table 5 above indicates the district wise trends in goat population across different districts of HP. All the districts except Bilaspur, Hamirpur, Lahaul & spiti, Shimla, Solan, Una and Mandi and have shown a positive compound growth rate as these. The main reason behind this is the rearing of large ruminants in these districts as they are situated in plains. Overall in the state as a whole there is an increase to the tune of 0.11 per cent per annum compound growth rate. In case of goat numbers in 2012, Chamba (18.27%) ranks first followed by Kangra (18.11%). Kinnaur again has registered highest positive growth rate of more than 1 per cent per annum.

As can be envisaged from Table 6 ahead, three compound growth rates have been calculated for this period from 1951-2012. During the time, when a large part of Himachal Pradesh was in Punjab (1951-1972), both sheep and goats registered a positive growth rate of 2.322 and 2.112 per cent per annum respectively. But afterwards (1972-2007), sheep population grows at a decreasing rate (0.189 per cent per annum) while goats population increased over this period with an annual compound growth rate of 1.057 per cent per annum.

Overall from 1951 to 2007 (above table), there is small increase in the population goats (0.004 per cent per annum) whereas, sheep population declines at an alarming rate (-1.46 per cent per annum). The overall population of ovine shows a significant decline (-0.664 per cent per annum).

#### Issues of Households rearing Sheeps and goats:

To achieve the second objective of the study, a very small sample of shepherds was studied to understand and become

familiar with the various latest issues relating to these small ruminants in the state of Himachal Pradesh. Table 7 and Table 8 represent the latest issues in ovine husbandry in study area. In this regard Table 7 expresses that how the status of ovine husbandry has changed over last decade.

The survey data reveals that although the total number of households in the respected villages of the respondents have increased in numbers (+45), yet the ovine rearers have decreased (-13) over the last decade. The decline in the percentage of household doing ovine husbandry was found to be -13.78 per cent (from 23.2 per cent to 9.41 per cent) over the same decade. All average herd size (-70), maximum herd size (-50) and minimum herd size (-45) shows a decline. Also, the analysis of the gathered data revealed that the average herd size of ovine maintained by the shepherds has reduced by 70 units' i.e from 260 to 190 over the last decade. Furthermore, the proportion of sheep: goat which was 55: 45 a decade ago has now changed to 45: 60 i.e the number of sheep has been replaced by goats. Average distance covered throughout the year by the sampled shepherds comes out to be 595 kilometres per shepherd.

During the survey, some questions were asked from the respondents relating to the problems faced by them while grazing during migration, marketing and technology related as well as their general problems. Among the grazing related problems infestation of grazing areas with obnoxious weeds like *Lantana*, *Ageratum*, *Parthenium*, scarcity of grass for sheep during Jan-Feb months, shrinkage of grazing areas, etc. were reported by 100 %, 60.33 % and 21.08 % per cent of the total respondents respectively (Singh and Sharma, 2007). In marketing related problems, non remunerative prices for wool were reported by 100 per cent of the shepherds interviewed. Rising threats and thefts were also reported by 100 per cent of the shepherds. Also, technological problems like delayed shearing and non availability of efficient scissors each were reported by 50.67 per cent of the total respondents as the major problems in ovine husbandry of migratory graziers. An attempt has been made in Table 8 about the problems faced by the shepherds of the state.

Also, from the discussion with the shepherds, it was emerged that charges paid by the shepherds for getting permit is significantly higher in plains (Rs. 1.50 per goat and Rs. 0.75 Per sheep) than in higher altitude regions like Lahaul and Spiti (Rs. 0.80 per goat and Rs. 0.50 per sheep). These charges were found to be lower in case of sheep across the whole state. Generally, people use the services provided by wool federations for shearing purpose. Charges paid by them to Wool Federation Rs.6 (washed sheep) and Rs.7 (unwashed sheep) were found to be highly economical than any other services where it stood around Rs. 10-20 per sheep to them.

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