

## Dynamics of Dairying in Karnataka

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Received 6 March 2019; Accepted 11 April 2019; Published on 2 May 2019

**Abstract** The study aimed at analyzing dynamics in dairy sector in Karnataka at regional levels. Study used secondary data for analysis. Four regions were Bengaluru, Belagavi, Kalaburagi and Mysuru. Secondary data was collected from the year 1997 to 2015. Changes in bovine population, compositional changes in indigenous cattle, crossbred cow and buffalo, bovine density and veterinary infrastructure was analyzed. Results revealed that highest percent change in population was registered in crossbred population (31.21%). Highest negative change in population was recorded in case of indigenous cattle (-10.88%) followed by buffalo (-8.14%). Totally bovine population was changed negatively to a tune of 5.03%. With respect to compositional changes in bovine population, Bengaluru (51.02%) and Belagavi (50.59%) regions' indigenous cattle share was lower than states average (56.85%). This need to be addressed through specific policy measures. Belagavi (7.28%) and Kalaburagi (2.87%) regions' cross bred

share was lower than states' average (14.37%). In Kalaburagi (27.82%) and Mysuru's (17.91%) buffalo share is lower than Karnataka's average buffalo share (28.78%). In case of veterinary infrastructure, Kalaburagi and Mysuru regions veterinary infrastructure growth was lesser than states average (27.40%). These regional imbalance need to be strengthened. To improve dairy sector in Karnataka, policies need to be framed at regional level. It addresses the needs of dairy sector at ground level.

**Keywords** Percent change, Bovine density, Veterinary infrastructure, Dynamics of dairying.

### Introduction

Livestock sector is an important sub-sector of Indian agriculture with significant contribution towards national economy and employment of rural populace. Livestock systems have both positive and negative effects on the natural resource base, public health, social equity and economic growth. Currently, livestock is one of the fastest growing agricultural sub-sectors in developing countries (Ramachandra et al. 2014). Livestock sectors provide socio economic status to rural households. Holding livestock was a social status earlier. Gradually due to change in socio economic status of rural farmers, that trend is gradually reducing. Bovine animals would provide assured income and employment to farming community. It also plays a significant role improving farmers livelihoods. Dairying plays an important role in strengthening rural economy of India. It is perceived to be an effective

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instrument for bringing socio-economic transformation (Soju and Meena 2017). Bovine provide food items such as milk and meat for human consumption. Bullock power is used in agriculture operations. Dung and urine are used as manure.

In Karnataka indigenous cattle population reduced to a tune of 47.37% from 12548037 to 6603967 during 1992 to 2012. Buffalo population reduced about 18.35% from 4250902 to 3470505 during the same period. But crossbred cattle population tripled to an extent of 364.75% from 626677 to 2912517. Bovine population increased for about 25.47% from 17425616 to 12986989. This shows decline in bovine population over the years.

Above changes in bovine population due to change in farming practices since independence. Now role of bullock are reduced. Such activities are performed by tractor and equipments. This situation is due to less availability of farm labors.

Many studies have carried out to examine temporal and spatial changes in Karnataka. But study on temporal and spatial changes at regional level is new of its kind. Present study aims at studying dynamics

of bovine population in Karnataka at regional level viz. Bengaluru, Belagavi, Kalaburagi and Mysuru. Results would reveal changes in population from one region to another.

## Materials and Methods

### Data collection

The study was based on secondary data compiled from various published sources. Data on ovine population, veterinary institutions was compiled from Directorate of Economics and Statistics, Government of Karnataka.

### Percent change in bovine population

Percent changes in bovine population was worked out. For this panel data were used. This would give idea about changes in bovine population from one livestock census to another.

$$\text{Percent change (\%)} = \frac{\text{Current year value} - \text{base year value}}{\text{Base year value}} \times 100$$

**Table 1.** Species wise inter census period growth rate in terms of percent change of bovine population in Karnataka, 1997-2012. Source: Directorate of Economics and Statistics, Bengaluru (compiled from annual reports). Period I - 1997-2002, Period II - 2002-07, Period - 2007-12.

Sl. No.	Region	Year	Indigenous	Crossbred	Buffalo	Bovine
I	Bengaluru	Period I	-25.92	17.43	-30.95	-21.95
		Period II	-1.09	30.51	0.68	5.44
		Period III	-23.14	26.99	-20.80	-10.65
		Average	-16.72	24.98	-17.02	-9.05
II	Belagavi	Period I	-12.08	2.25	-2.65	-7.56
		Period II	10.61	52.30	20.25	17.04
		Period III	-13.55	37.36	-10.10	-8.31
		Average	-5.00	30.64	2.50	0.39
III	Kalaburagi	Period I	-5.95	-29.89	5.82	-3.47
		Period II	8.96	19.67	11.48	9.93
		Period III	-13.01	50.68	-31.09	-16.96
		Average	-3.33	13.49	-1.60	-3.50
IV	Mysuru	Period I	-19.63	56.30	-17.91	-11.47
		Period II	1.47	40.44	-8.93	6.50
		Period III	-31.60	36.00	-27.33	-14.72
		Average	-16.58	44.24	-18.06	-6.56
V	Karnataka	Period I	-16.83	24.22	-13.05	-12.27
		Period II	4.71	36.61	8.37	9.58
		Period III	-20.51	32.80	-19.75	-12.40
		Average	-10.88	31.21	-8.14	-5.03

## Results and Discussion

### Changes in bovine population

In perusal of Table 1, in Bengaluru region, highest percent change was recorded in case of crossbred cattle followed (24.98%). Negative percent change was observed in buffalo (-17.02%) and indigenous cattle (-16.72%). So total percent change of bovine population was -9.05%.

In Belagavi region highest change was recorded in case of crossbred population (30.64%) followed by buffalo (2.50%). Negative change was observed in only indigenous cattle population (-5.00%). In total bovine population changed to a tune of 0.39%.

In Kalaburagi region, about 13.49% of change was observed from 1997-2012. Negative change was observed in buffalo (-4.60%) followed by indigenous cattle (-3.33%). Eventually bovine population changed to a tune of -3.50% over the years.

In Mysuru region, highest change was observed in crossbred cattle population (44.24%). Highest negative change was observed in buffalo (-18.06%) followed by indigenous cattle (-16.58%). Total change in bovine population was -6.56% from 1997-2012.

From macro perspective, highest percent change in population was registered in crossbred population (31.21%). Highest negative change in population was recorded in case of indigenous cattle (-10.88%) followed by buffalo (-8.14%). Totally bovine population was changed negatively to a tune of 5.03%.

In study conducted by Senthil Kumar et al. (2015) indigenous cattle population was declined in Tamil Nadu. Similar results were obtained in present study.

### Composition of bovine population

Composition of bovine population is an important aspect in studying spatio temporal changes in bovine population. Percent share of each bovine species gives fair enough insights into group of animals are being replaced by what kind of animals. Here comes the

**Table 2.** Composition of bovine population in Karnataka, 1997-2012. Source : Directorate of Economics and Statistics, Bengaluru (compiled from annual reports).

Sl. No.	Region	Year	(%) Indigenous cattle	(%) Crossbred cattle	(%) Buffalo
I	Bengaluru	1997	56.60	12.73	30.67
		2002	53.72	19.14	27.14
		2007	50.39	23.70	25.91
		2012	43.35	33.68	22.97
		Mean	51.02	22.31	26.67
II	Belagavi	1997	54.72	5.11	40.17
		2002	52.05	5.65	42.30
		2007	49.19	7.35	43.46
		2012	46.38	11.01	42.61
		Mean	50.59	7.28	42.14
III	Kalaburagi	1997	70.15	2.90	26.94
		2002	68.35	2.11	29.54
		2007	67.75	2.30	29.96
		2012	70.97	4.17	24.86
		Mean	69.31	2.87	27.82
IV	Mysuru	1997	68.62	10.27	21.11
		2002	62.29	18.14	19.57
		2007	59.35	23.92	16.73
		2012	47.60	38.14	14.26
		Mean	59.47	22.62	17.91
V	Karnataka	1997	61.86	8.38	29.76
		2002	58.64	11.87	29.49
		2007	56.03	14.80	29.17
		2012	50.85	22.43	26.72
		Mean	56.85	14.37	28.78

issue of extinction of certain species from biodiversity point of view. With this background changes in bovine population was captured through Table 2.

In Bengaluru region indigenous cattle population declined from 56.60% to 43.35% among total bovine population in a period between 1997 and 2012. In contrary crossbred population share was increased from 12.73% to 33.68% during the same period. Buffalo population declined from 30.67% to 22.97%. On an average from 1997 to 2012 indigenous cattle population share was highest among total bovine population with share of 51.02%. Rest of share were captured by buffalo (26.67%) and crossbred (22.31%). In this region decline in indigenous and buffalo population was diverted towards crossbred population.

In Belagavi region, in 1997 bovine population comprised of 54.72% of indigenous cattle popula-

tion followed by buffalo (40.17%) and crossbred population (5.11%). But in 2012, bovine composition changed to an extent that 46.38% were indigenous cattle followed by buffalo (42.14%) and indigenous cattle (7.28%). It is interesting to note that buffaloes and crossbred cattle population had increased. on an average from 1997-2012. 50.59% of bovine population was indigenous cattle followed by buffalo (42.14%) and only 7.28% were crossbred cattle.

In Kalaburagi region 70.15% of total bovines were indigenous cattle followed by buffalo (26.94%) and crossbred population (2.11%). But in 2012 indigenous cattle accounted for 70.97% of bovine population, followed by buffalo (24.86% and crossbred cattle (2.87%). Indigenous cattle declined increased from 70.15% in 1997 to 70.97% in 2012. Interestingly crossbred population has increased from 2.90% in 1997 to 4.17% in 2012. Buffalo population decreased marginally from 26.94% to 24.86%. On an average from 1997-2012, 69.31% of bovine population comprised of indigenous cattle (69.91%) followed by buffalo (27.82%) and crossbred population (2.87%).

In Mysuru region, in 1997 bovine population comprised of 68.62% of indigenous cattle followed by buffalo (21.11%) and crossbred cattle (2.90%). In 2012, region registered decline in indigenous cattle and buffalo population to a tune of 47.60% and 14.26% , respectively. Crossbred population quadrupled from 10.27% to 38.44%. On an average from 1997 to 2012 among total bovine population. 59.47% were indigenous cattle followed by crossbred (22.62%) and buffalo (17.91%). Here too indigenous cattle population dropped drastically.

It is important to look at compositional changes in bovine population in a macro perspective viz. Karnataka State as a whole. With respect to indigenous cattle. their share in bovine population had registered a drastic fall from 61.86% in 1997 to 50.85% in 2012. This need to be addressed. Crossbred share tripled from 8.38% to 22.43% during the same period. Buffalo population marginally dropped from 29.76% in 1997 to 26.72% in 2012. on an average from 1997 to 2012, 56.85% of bovine population were indigenous cattle followed by buffalo (28.78%) and only about 14.37% were crossbred cattle.

To sum up, Bengaluru (51.02%) and Belagavi (50.59%) regions indigenous cattle share was lower than states average (56.85%). This need to be addressed through specific policy measures. Belagavi (7.28%) and kalaburagi (2.87%) regions crossbred share was lower than states average (14.37%). In Kalaburagi (27.82%) and Mysuru's (17.91%) buffalo share is lower than Karnataka's average buffalo share (28.78%). These inferences denotes regional imbalances in cattle population. These scenario suggests the need to frame regional specific policies to protect native breeds and improve dairy sector.

Earlier worker also obtained similar results viz, decline in population of buffalo in Himachal Pradesh. Earlier workers also studied growth in bovine population in India . Those results were also at par with this study. Except buffalo population that registered decline in population.

**Table 3.** Bovine density. Source: Directorate of Economics and Statistics, Bengaluru (compiled from annual reports). \*Total values were rounded off to zero decimals.

Sl. No.	Region	Year	(No km <sup>2</sup> )			
			Indigenous cattle	Cross-bred cattle	Buffalo	Bovine
I	Bengaluru	1997	37	3	27	67
		2002	33	4	27	64
		2007	36	5	32	73
		2012	31	7	29	67
		Average	34	5	29	68
		1997	56	13	30	99
		2002	41	15	21	77
II	Belagavi	2007	41	19	21	81
		2012	31	24	17	72
		Average	42	18	22	82
		1997	48	2	18	68
III	Kalaburagi	2002	45	1	19	65
		2007	49	2	22	73
		2012	43	3	15	61
		Average	46	2	19	67
		1997	63	9	19	91
IV	Mysuru	2002	51	15	16	82
		2007	51	21	14	86
		2012	35	28	11	74
		Average	50	18	15	83
		1997	50	7	24	81
V	Karnataka	2002	42	8	21	71
		2007	44	11	23	78
		2012	35	15	18	68
		Average	42	10	21	74

### Bovine density in Karnataka

Bovine density acts as a proxy for resource availability for cattle and buffalo in a particular region. More density denotes low availability of space and resources and vice versa. Hence bovine density was calculated and details were furnished in Table 3.

In Bengaluru region, from 1997-2012 34 indigenous cattle were present in for every km<sup>2</sup> area. Whereas, crossbred population density was increased from 3 animals per sq. km to 7 animals per km<sup>2</sup> area. On an average 5 crossbred cattle were present for every sq. km. Buffalo density increased from 27 to 29 animals/km<sup>2</sup>. In Bengaluru average bovine density was 68 for every km<sup>2</sup> geographical area.

In Belagavi region, indigenous cattle density declined from 56 to 31 animals for every km<sup>2</sup> geographical area. Crossbred density increased from 13 to 24. Buffalo density declined from 30 to 17. In total bovine population density declined from 99 animals per km<sup>2</sup> to 72 animals per km<sup>2</sup> during 1997 and 2012.

In Kalaburagi indigenous cattle density declined from 48 to 43. Crossbred density increased from 2 to 3 animals per sq. kms. In case of buffalo density, it declined from 18 to 15 animals per sq. kms. Bovine density declined from 68 to 60. In Kalaburagi average bovine density was 60 for every km<sup>2</sup> geographical area.

In Mysuru region, indigenous cattle density declined from 63 to 35 during 1997 and 2012. Crossbred cattle density increased from 9 to 28. Buffalo population density declined from 19 to 11. Total bovine density declined from 91 to 74 animals for each km<sup>2</sup>.

Karnataka as a whole, on an average from 1997 to 2012, indigenous cattle density is highest among bovine population of 42 animals/km<sup>2</sup> followed by buffalo (21) and crossbred population (10). On an average, 74 animals were present in each km<sup>2</sup> of geographical area.

### Conclusion

The present study inferred that over the years bovine population shown declining trend. But it is not uniform. Indigenous cattle reduced drastically. Buffalo population also reduced. But the changes in bovine population was favored towards crossbred population. Changes are an integral part of development and good indicator. Increasing demand for milk and milk products was met by crossbred cows. Since their production efficiency was higher than buffalo and indigenous cattle. Scenario of increase in crossbred along is not good from biodiversity perspective. To maintain growth in all bovine special breeding programs may help in maintaining balance among three categories of bovines.

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