

Analysis on trends of geographic and demographic distribution of Indian cattle

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ABSTRACT

The Indigenous cattle are rich in variability and are endowed with many positive traits like superior disease resistance and better tolerance to heat/humidity and feed scarcity etc. The present status of indigenous cattle was evaluated in terms of the population trend and their distribution at state and district level. It is estimated that population of indigenous cattle will decrease to 120.453 million by 2031. The four states of Madhya Pradesh, West Bengal, Uttar Pradesh and Rajasthan hold the 40.3 percent of the indigenous cattle population of India. Region comprising three North-central districts of Dinajpur Uttar, Dinajpur Dakshin and Maldah in West Bengal has the highest density of 269.4 indigenous cattle per km². Medinipur-West district in West Bengal has the highest population (1.379 million) of indigenous cattle followed by Bankura (1.245 million), Bardhaman (1.142 million) and Coochbehar (1.115 million) districts of the same state. In terms of density per km² Coochbehar (329.2) and Dinajpur-Uttar (326.0) in West Bengal has the highest density of indigenous cattle followed by Kishanganj (307.6) in Bihar and Godda (296.3) in Jharkhand. During 2007-2012, the population of indigenous cattle registered a decline of 8.94 percent, but the rate of decline in the population of recognized breeds (31.9 percent) was more than thrice as fast during the same period. In view of deteriorating population of indigenous cattle and their breeds, it is imperative to formulate suitable programmes of genetic improvement, development and conservation of indigenous cattle available in India.

Key words: Cattle, Animal Demographic distribution, Population trend

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INTRODUCTION

Indigenous cattle populations of 142.11 million heads forms major chunk (73.45 %) of India's total cattle population (Livestock census 2019). The indigenous cattle are able to convert crop residues and sparse vegetation growing on uncultivable lands into high quality protein and fat for nutrition, hide, manure and provide valuable draught power. The indigenous cattle are primarily maintained for draught power and manure, although a few breeds like Sahiwal, Rathi, Tharparker, Gir and Red-Sindhi are classified as milch breeds (Nivsarkar *et al.* 2000). Indian cattle possess unique qualities in terms of heat tolerance, disease resistance and they are able to produce and work by surviving mainly on crop residues and grazing in uncultivable wastelands and forests. The cattle genetic resources of India are maintained under diverse agro-climatic conditions, therefore, their phenotype and outputs are equally diverse. In last three decades fast transformation of indigenous cattle to exotic/crossbred (CB) cattle has been observed in India. This paper attempts to describe the present status of cattle in India in terms of their population trends and distribution with special emphasis on indigenous cattle.

MATERIALS AND METHODS

The data on cattle population were obtained from Livestock census (Livestock census 1992, 2007, 2012, 2019) and state and district wise population densities per km² were calculated. The state and district wise census data for indigenous and exotic/crossbred cattle were grouped for population intervals to obtain the number of states or districts with specified minimum population. The regression equation for the population trend was developed (Gupta 2011) using census data from 1992 onwards and the population for the years 2023, 2027 and 2031 were estimated by method modified from (Singh *et al.* 1991) as

$$Y' = a + bX'$$

Where, Y' = Estimated population in the year X'

b = Slope in the regression equation $Y = a + bX$

a = Y, when X=0

Data for individual breeds was obtained from Livestock census (2007) and Breed survey (2013) estimate that is derived by disintegrating the figures of Livestock census (2012). The Andhra Pradesh refer to present day state excluding Telangana and Jammu & Kashmir refer to undivided state including Ladakh until unless specified.

RESULTS AND DISCUSSION

Cattle husbandry is a vital and important agricultural activity from temperate to tropical ecology of India characterized by feed scarcity, marginal land resources and poor economic conditions of the farmers. The population of indigenous cattle has registered a decrease of 24.96 percent from 1992 (189.369 million) to 2019 (142.106 million). Considering this trend, the population of indigenous cattle is estimated to decrease

to 133.968, 127.210 and 120.453 million in the years 2023, 2027 and 2031, respectively. Somewhat similar trend was also reflected for the total cattle population of the country. It stood at 193.463 million in 2019, showing a decrease of 5.44 percent from their population (204.584 million) in 1992. The total cattle population is also estimated to decrease to 189.135, 187.767 and 186.398 million in the years 2023, 2027 and 2031, respectively (Table 1).

Table 1: Population trend of cattle in India

Census-year	Indigenous cattle		Exotic and crossbred cattle		Total cattle	
	Population (in million)	Percent change from previous census	Population (in million)	Percent change from previous census	Population (in million)	Percent change from previous census
1992	189.369		15.215		204.584	
1997	178.782	-5.59	20.099	32.10	198.881	-2.79
2003	160.495	-10.23	24.686	22.82	185.181	-6.89
2007	166.015	3.44	33.060	33.92	199.075	7.50
2012	151.172	-8.94	39.732	20.18	190.904	-4.10
2019	142.106	-6.00	51.356	29.26	193.463	1.34
2023 (Estimated)	133.968	-	55.176	-	189.135	-
2027 (Estimated)	127.210	-	60.565	-	187.767	-
2031 (Estimated)	120.453	-	65.944	-	186.398	-

However, during 1992-2019, the population of exotic/CB cattle has increased from 15.215 million to 51.356 million. Although, the population of exotic/CB cattle is much less compared to indigenous cattle, but it registered a whopping increase of 237.5 percent during 1992-2019 compared to 24.96 percent decrease in indigenous cattle during the same period. The population of exotic/CB cattle is estimated to increase to 55.176, 60.565 and 65.944 million in the years 2023, 2027 and 2031, respectively.

The population of indigenous cattle is more than 10 million in seven states (Madhya Pradesh, West-Bengal, Uttar Pradesh, Rajasthan, Bihar, Jharkhand and Assam), between 1-10 million in ten states (Chhattisgarh, Maharashtra, Odisha, Gujarat, Karnataka, Telangana, Andhra Pradesh, Tamil Nadu, Uttarakhand and Jammu and Kashmir), between 0.1-1 million in seven states

(Haryana, Meghalaya, Himachal Pradesh, Tripura, Punjab, Arunachal Pradesh and Manipur), between 50 thousand-0.1 million in two states (Kerala and Nagaland) and less than 50 thousand in four states (Goa, Sikkim, Delhi and Mizoram) and all the union territories. Madhya Pradesh has the largest population (17.056 million) of indigenous cattle, possessing about 12.00 percent of the total indigenous cattle population of India followed by West Bengal (15.685 million), Uttar Pradesh (12.897 million) and Rajasthan (11.615 million) as per Livestock census (2019). These four states of Madhya Pradesh, West Bengal, Uttar Pradesh and Rajasthan hold the 40.3 and 36.6 percent of the indigenous and total cattle population of the country. These states along with Bihar, Jharkhand, Assam, Chhattisgarh, Maharashtra and Odisha hold the 82.13 and 73.50 percent of the indigenous and total cattle population of India (Table 2).

Table 2: Total population and percent change during 2007-2012 and 2012-2019 of cattle in the states of India with sizable cattle population

State	Population		Percent change						
	Indigenous	Exotic	Total	2007-2012			2012-2019		
				Indigenous	Exotic	Total	Indigenous	Exotic	Total
Madhya Pradesh	17055853a	1694975	18750828c	-12.50	77.14	-10.55	-9.09	101.55	-4.34
West Bengal	15684764b	3393152	19077916a	-17.09	5.84	-13.94	14.34	21.34	15.52
Uttar Pradesh	12897013c	6122628b	19019641b	-5.67	83.98	3.57	-19.28	71.07	-2.75
Rajasthan	11614597d	2323033	13937630	2.53	112.72	9.94	0.22	33.89	4.60
Bihar	11297513e	4100467d	15397980d	-17.26	75.84	-2.61	29.02	17.99	25.89
Jharkhand	10596859	626193	11223052	-1.35	34.16	-0.58	25.05	144.44	28.56
Assam	10140290	768949	10909239	2.92	-3.55	2.65	2.31	94.23	5.84
Chhattisgarh	9716929	267025	9983954	3.56	-4.18	3.41	0.83	49.88	1.72
Maharashtra	9384574	4607730c	13992304e	-9.40	16.93	-4.32	-20.69	26.21	-9.63
Odisha	8323590	1580380	9903970	-2.75	-23.34	-5.59	-19.31	21.03	-14.78
Gujarat	6226448	3407189	9633637	17.91	68.69	25.18	-22.72	76.84	-3.51
Karnataka	4560842	3908162e	8469004	-20.52	32.81	-9.39	-30.94	34.19	-11.01
Telangana	3621726	610813	4232539	\$	\$	\$	-20.07	33.20	-15.17
Andhra Pradesh	2337858	2262229	4600087	-71.40	2.18	-58.96	-12.36	16.68	-0.14
Tamil Nadu	1793941	7724719a	9518660	-35.38	-13.93	-21.22	-27.06	21.56	7.99
Uttarakhand	1275303	576820	1852123	-20.43	46.60	-10.25	-15.46	15.92	-7.67
Jammu & Kashmir	1096013	1443227	2539240	-24.75	-12.38	-18.73	-17.51	-1.80	-9.26
Haryana	949541	979141	1928682	-17.66	75.92	16.48	16.94	-1.70	6.67
Meghalaya	870165	33405	903570	0.04	31.28	0.99	1.09	-5.23	0.84
Himachal Pradesh	759082	1068935	1828017	-21.06	24.08	-5.28	-34.86	8.64	-14.95
Tripura	610194	128837	739031	-6.79	67.82	-0.59	-25.19	-3.21	-22.11
Punjab	425873	2105587	2531460	-27.16	61.49	36.62	17.29	1.98	4.27
Arunachal Pradesh	332234	6987	339221	-7.05	-20.40	-7.82	-24.58	-69.92	-26.85
Manipur	206546	17926	224472	-20.53	-32.56	-22.84	-5.92	-59.54	-14.92
Kerala	82692	1259304	1341996	-35.19	-22.80	-23.65	7.33	0.62	1.01
Nagaland	59895	18401	78296	-50.88	-49.23	-49.99	-43.51	-85.73	-66.68
Others*	186131	320191	506322	-37.85	21.11	-10.86	2.44	7.16	5.37
India	142106466	51356405	193462871	-8.94	20.18	-4.10	-6.00	29.26	1.34

*States/UTs with total cattle population of <50000 (see text)

Superscripts a, b, c, d and e indicate rank of the state as first, second, third, fourth and fifth in India in population of respective class of cattle.

\$Population data not available for Telangana in 2007 census.

Among the states that has the indigenous cattle population of more than 50 thousand, ten states (West Bengal, Rajasthan, Bihar, Jharkhand, Assam, Chhattisgarh, Haryana, Meghalaya, Punjab and Kerala) have shown an increase in the population of indigenous cattle during 2012-2019 varying between 0.22 (Rajasthan) and 29.02 (Bihar) percent. The maximum decline in indigenous cattle was observed in the state of Nagaland (43.51 %) followed by Himachal Pradesh (34.86), Karnataka (30.94) and Tamil Nadu (27.06) during this period (Table 1). In case of exotic/CB cattle, nineteen states have shown an increase in the population of exotic/CB cattle varying between 0.62 (Kerala) and

144.44 (Jharkhand) percent. Jharkhand has registered maximum increase of 144.44 percent in exotic/CB cattle followed by Madhya Pradesh (101.55), Assam (94.23) and Gujarat (76.84) during this period. Overall, India has registered a decrease of 6.00 percent in the population of indigenous cattle and increase of 29.26 and 1.34 percent in exotic/CB and total cattle population, respectively, during 2012-2019 (Table 2).

Among these states (states with indigenous cattle population of more than 50 thousand), the indigenous cattle population constitutes more than 90 percent of the total cattle in seven states (Arunachal Pradesh,

Chhattisgarh, Meghalaya, Jharkhand, Assam, Manipur and Madhya Pradesh), between 70-90 percent in seven states (Telangana, Odisha, Rajasthan, Tripura, West Bengal, Nagaland and Bihar) and between 50-70 percent in six states (Uttarakhand, Uttar Pradesh, Maharashtra, Gujarat, Karnataka and Andhra Pradesh). In rest of the states the population of indigenous cattle is less than 50 percent.

Arunachal Pradesh has the highest percentage of indigenous cattle (97.94) followed by Chhattisgarh (97.33), Meghalaya (96.30) and Jharkhand (94.42). Kerala has the lowest proportion of indigenous cattle (6.16) followed by Punjab (16.82), Tamil Nadu (18.85) and Himachal Pradesh (41.52). Overall, indigenous cattle constitute 73.45 percent of the total cattle of our country (Table 3).

Table 3: Percent of indigenous in total cattle, percent in indigenous cattle and proportion in total population of India of indigenous, exotic/CB and overall cattle population in states with sizable cattle population

State	Percent of indigenous in total cattle in state	Percent of descript in indigenous cattle in state*	Percent of state in total indigenous cattle of India	Percent of state in total exotic /CB cattle of India	Percent of state in total cattle of India
Madhya Pradesh	90.96	14.30	12.00	3.30	9.69
West Bengal	82.21	15.43	11.04	6.61	9.86
Uttar Pradesh	67.81	59.81c	9.08	11.92	9.83
Rajasthan	83.33	41.94	8.17	4.52	7.20
Bihar	73.37	16.97	7.95	7.98	7.96
Jharkhand	94.42d	9.82	7.46	1.22	5.80
Assam	92.95e	0.00	7.14	1.50	5.64
Chhattisgarh	97.33b	33.36	6.84	0.52	5.16
Maharashtra	67.07	24.47	6.60	8.97	7.23
Odisha	84.04	17.17	5.86	3.08	5.12
Gujarat	64.63	73.62b	4.38	6.63	4.98
Karnataka	53.85	83.75a	3.21	7.61	4.38
Telangana	85.57	-	2.55	1.19	2.19
Andhra Pradesh	50.82	34.54#	1.65	4.40	2.38
Tamil Nadu	18.85	22.00	1.26	15.04	4.92
Uttarakhand	68.86	8.17	0.90	1.12	0.96
Jammu & Kashmir	43.16	0.83	0.77	2.81	1.31
Haryana	49.23	52.30e	0.67	1.91	1.00
Meghalaya	96.30c	0.12	0.61	0.07	0.47
Himachal Pradesh	41.52	6.01	0.53	2.08	0.94
Tripura	82.57	0.00	0.43	0.25	0.38
Punjab	16.82	59.05d	0.30	4.10	1.31
Arunachal Pradesh	97.94a	0.00	0.23	0.01	0.18
Manipur	92.01	0.00	0.15	0.03	0.12
Kerala	6.16	9.77	0.06	2.45	0.69
Nagaland	76.50	0.00	0.04	0.04	0.04
India	73.45	26.68	100.00	100.00	100.00

Undivided Andhra Pradesh, *Breed survey, 2013, ^aFirst, ^bsecond, ^cthird, ^dfourth and ^efifth highest value under the respective column heading.

If we consider decrease in proportion of indigenous cattle during 1992-2019, Tamil Nadu has shown maximum decrease in the proportion of indigenous cattle (61.33 %) owing to increase in exotic/CB cattle, followed by Himachal Pradesh (45.50), Kerala (43.92) and Karnataka (41.90). The states of Nagaland (15.96 %), Arunachal Pradesh (3.80) and Manipur (1.89) has shown increase in the proportion of indigenous cattle

during this period. Meghalaya has shown minimum decrease in the proportion of indigenous cattle (1.33 %), followed by Assam (3.84), Tripura (6.05) and Madhya Pradesh (including Chhattisgarh, 6.10) during this period. Overall, India has registered a 19.11 percent decrease, from 92.56 to 73.45 percent, in the proportion of indigenous cattle during 1992-2019 (Table 4).

Table 4: States with minimum and maximum decrease in the proportion of indigenous cattle during 1992-2019, among states with sizable cattle population

State	Proportion of indigenous cattle in 1992	Proportion of indigenous cattle in 2019	Decrease in the proportion of indigenous cattle during 1992-2019
With maximum decrease			
Tamil Nadu	80.18	18.85	61.33
Himachal Pradesh	87.02	41.52	45.50
Kerala	6.16	50.09	43.92
Karnataka	95.25	53.85	41.39
Gujarat	96.58	64.63	31.94
Haryana	80.48	49.23	31.24
Jammu and Kashmir*	74.04	43.16	30.88
With minimum decrease			
Nagaland	60.54	76.50	+15.96
Arunachal Pradesh	94.14	97.94	+3.80
Manipur	90.13	92.01	+1.89
Meghalaya	97.64	96.30	1.33
Assam	96.79	92.95	3.84
Tripura	88.62	82.57	6.05
Madhya Pradesh*	99.27	93.17	6.10
India	92.56	73.45	19.11

* Jammu and Kashmir and Madhya Pradesh include Ladakh and Chhattisgarh, respectively

In terms population density per km², West Bengal has highest density of indigenous cattle (176.7) followed by Jharkhand (132.9), Assam (129.3) and Bihar (120.0). Among the states that has the indigenous cattle population of more than 50 thousand, the density (cattle per km²) of indigenous cattle is more than 100 only in these four states (West Bengal, Jharkhand, Assam and Bihar), between 50-100 in five states (Chhattisgarh, Tripura, Madhya Pradesh, Uttar Pradesh and Odisha) and between 10-50 in eleven states (Meghalaya,

Rajasthan, Telangana, Gujarat, Maharashtra, Uttarakhand, Karnataka, Haryana, Andhra Pradesh, Tamil Nadu and Himachal Pradesh). In these states, similar trend has been observed for total cattle density except Tamil Nadu that have overall cattle density of 73.2 per km². Besides the aforementioned states, Punjab also has the overall cattle density of more than 50 per km². At the national level, indigenous and total cattle has the density of 43.2 and 58.9 per km², respectively (Table 5).

Table 5: Population density per km² and per 1000 households of indigenous, exotic/CB and total cattle in states of India with sizable cattle population

State	Indigenous		Exotic/crossbred		Total cattle	
	per km2	Per 1000 households	per km2	Per 1000 households	per km2	Per 1000 households
Madhya Pradesh	55.3	1130.0	5.5	112.3	60.8	1242.3
West Bengal	176.7a	769.6	38.2d	166.5	215.0a	936.1
Uttar Pradesh	53.5	385.6	25.4	183.0	78.9e	568.6
Rajasthan	33.9	913.7	6.8	182.8	40.7	1096.5
Bihar	120.0d	597.3	43.5b	216.8	163.5b	814.1
Jharkhand	132.9b	1694.2b	7.9	100.1	140.8c	1794.3a
Assam	129.3c	1582.8d	9.8	120.0	139.1d	1702.8c
Chhattisgarh	71.9e	1719.6a	2.0	47.3	73.9	1766.8b

State	Indigenous		Exotic/crossbred		Total cattle	
	per km ²	Per 1000 households	per km ²	Per 1000 households	per km ²	Per 1000 households
Maharashtra	30.5	384.3	15.0	188.7	45.5	572.9
Odisha	53.5	863.6	10.1	164.0	63.6	1027.6
Gujarat	31.7	508.3	17.4	278.2	49.1	786.5
Karnataka	23.8	341.5	20.4	292.6e	44.2	634.0
Telangana	32.3	433.3	5.4	73.1	37.8	506.4
Andhra Pradesh	14.6	184.6	14.1	178.6	28.7	363.2
Tamil Nadu	13.8	96.8	59.4a	417.0c	73.2	513.8
Uttarakhand	23.8	620.0	10.8	280.4	34.6	900.4
Jammu & Kashmir	4.9	517.1	6.5	680.9b	11.4	1197.9
Haryana	21.5	195.5	22.1	201.6	43.6	397.1
Meghalaya	38.8	1587.7c	1.5	61.0	40.3	1648.7d
Himachal Pradesh	13.6	511.8	19.2	720.7a	32.8	1232.4
Tripura	58.2	713.2	12.3	150.6	70.5	863.8
Punjab	8.5	77.2	41.8c	381.9d	50.3	459.2
Arunachal Pradesh	4.0	1227.9e	0.1	25.8	4.1	1253.7e
Manipur	9.3	370.2	0.8	32.1	10.1	402.4
Kerala	2.1	10.5	32.4e	160.3	34.5	170.9
Nagaland	3.6	151.2	1.1	46.5	4.7	197.7
India	43.2	569.7	15.6	205.9	58.9	775.5

^aFirst, ^bsecond, ^cthird, ^dfourth and ^efifth highest value under the respective column heading.

Among the states and union territories (UT) that have indigenous cattle population of less than 50 thousand, Dadra & Nagar Haveli (D & NH) has the largest population (39 thousand) of indigenous cattle, followed by Goa (33 thousand), Sikkim (31 thousand) and Delhi (25 thousand). D & NH also has maximum density per km² of indigenous cattle of 78.5, followed by Lakshadweep (43.2), Chandigarh (38.9) and Delhi (17.2). As regards total cattle population, Sikkim has the largest population (0.148 million), followed by Delhi (86 thousand), Puducherry (72 thousand) and Goa (60 thousand). Puducherry has maximum density per km² of overall cattle population of 146.9, followed by Chandigarh (117.9), Lakshadweep (83.1) and D & NH (80.9).

In terms of density per 1000 overall households, that gives an idea about the density of cattle population *vis-à-vis* the density of human population, our country has 569.7 and 775.5 indigenous and total cattle per 1000 total households, respectively. Among the states with indigenous cattle population of more than 50 thousand, Chhattisgarh (1719.6) has the highest density of indigenous cattle followed by Jharkhand (1694.2), Meghalaya (1587.7) and Assam (1582.8). Arunachal Pradesh (1227.9) and Madhya Pradesh

(1130.0) also has more than 1000 indigenous cattle per 1000 households. These six states along with Himachal Pradesh, Jammu and Kashmir, Sikkim, Rajasthan and Odisha has the overall cattle density of more than 1000 per 1000 households.

As regards exotic/CB cattle, Tamil Nadu holds the largest population (7.725 million) followed by Uttar Pradesh (6.123 million), Maharashtra (4.608 million) and Bihar (4.100 million) (Table 2). As regards density per km², Tamil Nadu has the highest density per km² of exotic/CB cattle (59.4) followed by Bihar (43.5), Punjab (41.8) and West Bengal (38.2). Although Delhi has the indigenous cattle population of less than 50 thousand, it has exotic/CB cattle population of 61 thousand with a density of 41.1 exotic/CB cattle per km². In terms of density per 1000 households Himachal Pradesh (720.7) has the highest density followed by Jammu & Kashmir (680.9), Tamil Nadu (417.0) and Punjab (381.9). Sikkim though has the indigenous cattle population of less than 50 thousand, it has exotic/CB cattle population of 0.117 million with a density of 905.8 exotic/CB cattle per 1000 households. Overall, India has 51.356 million exotic/CB cattle with density of 15.6 and 205.9 exotic/CB cattle per km² and per 1000 households, respectively (Table 5).

To know the average herd size, density of cattle per cattle-rearing household, was also calculated at the state and national level. Overall India has 3.0 cattle per cattle-rearing household. Meghalaya has the largest overall herd size of 7.1 per household followed by Jharkhand (4.3), Assam (4.0) and Chhattisgarh (4.0). For indigenous cattle, again Meghalaya has 6.8 indigenous cattle per cattle-rearing household followed by Jharkhand (4.0), Chhattisgarh (3.9) and Assam (3.7). For Exotic/CB cattle, Tamil Nadu has highest 2.3 exotic/CB cattle per cattle-rearing household, followed by Punjab (2.3), Kerala (2.1) and Jammu and Kashmir (1.5).

Some clusters of districts hold large proportion of the indigenous cattle of the respective state and the country. For example, cluster-I in Madhya Pradesh comprising fourteen districts of Rewa, Sidhi, Singroli, Satna, Shahdol, Anuppur, Dindori, Umaria, Tikamgarh, Chhatarpur, Panna, Katnai, Jabalpur and Mandla in the Eastern region of the state has 34.2 and 4.1 percent of the

indigenous cattle population of the state and the country, respectively, with a density per km² of 70.5 (Table 6). Similarly, seven Southern-central districts (Murshidabad, Birbhum, Bardhaman, Paschim-Bardhaman, Bankura, Purulia, Nadia) of cluster-I of West Bengal hold 37.3 and 4.1 percent population of indigenous cattle of the state and the country, respectively with a density per km² of 172.3. Cluster-III in West Bengal comprising three North-central districts of Dinajpur Uttar, Dinajpur Dakshin and Maldah, has 15.6 and 1.7 percent indigenous cattle population of the state with a very high density of 269.4 per km². Likewise, Cluster-I in Bihar comprising eight North-Eastern districts of Purnia, Arariya, Supaul, Kishangaj, Madhubani, Madhepura, Saharsa and Darbhanga, has 37.8 and 3.0 percent indigenous cattle population of the state and the country, respectively, with a density of 217.8 per km². Clusters II and IV of West Bengal, cluster II of Bihar, cluster I of Jharkhand and cluster I and II of Assam also has indigenous cattle density of more than 150 per km².

Table 6: Clusters of districts holding major proportion of population of indigenous cattle in the states of India with about 1 million indigenous cattle

State	Clusters of districts with sizable population of indigenous cattle
Madhya Pradesh	Cluster I: Rewa, Sidhi, Singroli, Satna, Shahdol, Anuppur, Dindori, Umaria, Tikamgarh, Chhatarpur, Panna, Katnai, Jabalpur, Mandla (5830351a, 70.5b, 34.2c, 4.1d) Cluster II: Khargone, Dhar, Barwani, Jhabua, Ratlam, Alirajpur, Dewas, Sehore, East Nimar (3572503, 65.9, 20.9, 2.5) Cluster III: Sagar, Damoh, Vidisha, Raisen, Guna, Rajgarh, Ashoknagar, Shivpuri, Sheopur (3110706, 45.2, 18.2, 2.2) Cluster IV: Chhindwara, Betul, Seoni, Balaghat, Hoshangabad, Narsimhapur (2658379, 51.4, 15.6, 1.9)
West Bengal	Cluster I: Murshidabad, Birbhum, Bardhaman, Paschim-Bardhaman, Bankura, Purulia, Nadia (5849600, 172.2, 37.3, 4.1) Cluster II: Medinipur West, Medinipur East, Hooghly, Jhargram, 24 Paraganas South, 24 Paraganas North (4814232, 153.9, 30.7, 3.4) Cluster III: Dinajpur Uttar, Dinajpur Dakshin, Maldah (2449638, 269.4, 15.6, 1.7) Cluster IV: Coochbehar, Jalpaiguri, Alipurduar (2266820, 235.8, 14.5, 1.6)
Uttar Pradesh	Cluster I: Pratapgarh, Jaunpur, Rae-Bareilly, Unnao, Ghazipur, Amethi, Azamgarh, Sultanpur, Faizabad, Ballia (2881634, 84.5, 22.3, 2.0) Cluster II: Sitapur, Kheri, Hardoi, Bahraich, Barabanki, Gonda, Shahjahanpur (2269086, 60.6, 17.6, 1.6) Cluster III: Sonbhadra, Allahabad, Mirzapur, Chitrakoot, Banda (1726588, 70.7, 13.4, 1.2) Cluster IV: Latitpur, Jhansi, Jalaun (753537, 51.5, 5.8, 0.5)
Rajasthan	Cluster I: Jodhpur, Barmer, Nagaur, Jaisalmer, Pali, Jalore (3390335, 26.0, 29.2, 2.4) Cluster II: Udaipur, Banswara, Dungarpur, Pratapgarh, Chittourgarh, Rajsamand (2712815, 73.4, 23.4, 1.9) Cluster III: Bikaner, Ganganagar, Hanumanagar, Churu (2286324, 35.3, 19.7, 1.6) Cluster IV: Jaipur, Ajmer, Bhilwara (1185044, 39.4, 10.2, 0.8) Cluster V: Baran, Jhalawar, Kota (745557, 40.5, 6.4, 0.5)

State	Clusters of districts with sizable population of indigenous cattle
Bihar	Cluster I: Purnia, Arariya, Supaul, Kishangaj, Madhubani, Madhepura, Saharsa, Darbhanga (4274468, 217.8, 37.8, 3.0) Cluster II: Katihar, Banka, Jamui, Bhagalpur (2310910, 196.8, 20.5, 1.6) Cluster III: Gaya, Aurangabad, Navada, Rohtas (1839803, 125.5, 16.3, 1.3) Cluster IV: Pashchim-Champaran, Purbi-Champaran, Gopalganj, Siwan (1082540, 80.5, 9.6, 0.8)
Jharkhand	Cluster I: Giridih, Dumka, Godda, Deoghar, Jamtara, Pakur, Sahibganj, Bokaro, Dhanbad (4718365, 196.0, 44.5, 3.3) Cluster II: Gumla, Ranchi, West-Singhbhum, Simdega, East-Singhbhum, Khunti, Saraikhela-Kharsawan (2865635, 94.9, 27.0, 2.0) Cluster III: Palamu, Garhwa, Hazaribagh, Chatra, Latehar (2621855, 130.8, 24.7, 1.8)
Assam	Cluster I: Lakhimpur, Dhemaji, Sonitpur, Jorhat, Tinsukia, Biswanath, Dibrugarh, Sibsagar, Majuli (3439092, 154.0, 33.9, 2.4) Cluster II: Kamrup, Darrang, Barpeta, Udalgori, Baksa, Nalbari (2251954, 180.3, 22.2, 1.6) Cluster III: Golaghat, Nagaon, Morigaon, Hojai, Karbi-anglong (1884407, 114.7, 18.6, 1.3) Cluster IV: Goalpara, Dhubri, Kokrajhar, South-Salmara (1132745, 155.3, 11.2, 0.8)
Chhattisgarh	Cluster I: Rajnandgaon, Baloda-Bazar, Bemetara, Balod, Kabirdham, Raipur, Durg, Mahasamund, Gariyabad, Dhamtari (3756043, 89.2, 38.7, 2.6) Cluster II: Bilaspur, Janjgir-Champa, Korba, Rajgarh, Mungeli (2030905, 78.7, 20.9, 1.4) Cluster III: Balrampur, Jashpur, Korea, Sarguja, Surajpur (1952389, 69.3, 20.1, 1.4) Cluster IV: Sukma, Kondagaon, Kanker, Bastar, Bijapur (1601041, 49.9, 16.5, 1.1)
Maharashtra	Cluster I: Yavatmal, Nanded, Gadchiroli, Amravati, Buldhana, Chandrapur, Nagpur, Parbhani, Gondia, Wardha, Akola, Hingoli (4230377, 38.5, 45.1, 3.0) Cluster II: Nashik, Jalgaon, Ahmednagar, Jalna, Beed, Aurangabad, Dhule, Nandurbar, Solapur, Latur, Palghar, Pune (3931658, 30.5, 41.9, 2.8)
Odisha	Cluster I: Mayurbhanj, Kendujhar, Baleswar, Jajpur, Sundargarh, Bhadrak, Dhenkanal, Anugul, Cuttack, Kendrapara, Khordha, Sambalpur, Nayagarh (4924284, 72.0, 59.2, 3.5) Cluster II: Koraput, Ganjam, Nabarangpur, Malkangiri, Kandhamal, Rayagada, Kalahandi (2191344, 42.9, 26.3, 1.5)
Gujarat	Cluster I: Rajkot, Surendranagar, Bhavnagar, Amreli, Gir-Somnath, Botad, Ahmedabad (1623542, 35.2, 26.1, 1.1) Cluster II: Dahod, Panchmahals, Chhotaudepur (1204798, 116.3, 19.4, 0.9) Cluster III: Kachchh, Banskatha (1031480, 18.3, 16.6, 0.7)
Karnataka	Cluster I: Kalaburagi, Yadgir, Bellary, Raichur (1059037, 32.0, 23.2, 0.7) Cluster II: Shivamoga, Uttara-Kannada, Belagavi (959993, 29.8, 21.0, 0.7)
Telangana	Cluster I: Adilabad, Kumuram-Bheem-Asifabad, Nirmal, Mancherla (922055, 54.6, 25.5, 0.6)
Andhra Pradesh	Cluster I: Visakhapatnam, East-Godavari, Srikakulam, Vizianagaram, West-Godavari (1230783, 29.2, 52.6, 0.9) Cluster II: Kurnool, Anantapur (610126, 16.6, 26.1, 0.4)
Tamilnadu	Cluster I: Kanchipuram, Villupuram, Thiruvallur, Vellore (548235, 25.9, 30.6, 0.4) Cluster II: Pudukkottai, Sivaganga, Thanjavur (385085, 31.3, 21.5, 0.3)
Uttarakhand	Cluster I: Pauri-Garhwal, Chamoli, Almora (499615, 30.3, 39.2, 0.4)
Jammu & Kashmir	Cluster I: Udhampur, Kathua, Doda, Ramban, Reasi, Kishtwar, Rajauri, Jammu, Poonch (836301, 32.9, 79.6, 0.6)
Haryana	Cluster I: Hisar, Sirsa, Jind, Bhiwani, Fatehabad, Kaithal (505350, 26.4, 53.2, 0.4)

^aTotal population in the cluster, ^bdensity per km², ^cproportion of state population and ^dproportion of national population of indigenous cattle

Similarly, some clusters of districts also have exceptionally high population of exotic/CB cattle. For example, cluster 'A' of Tamil Nadu comprising eight districts of Villupuram, Tiruvannamalai, Salem, Vellore, Dharmapuri, Krishnagiri, Cuddalore, Erode hold 48.1 and 7.2 percent population of exotic/crossbred cattle of the state and the country, respectively with a density of

84.8 per km² (Table 7). Similarly, cluster 'A' of Bihar comprising six Southern districts of Samastipur, Begusarai, Bhagalpur, Khagaria, Lakhisarai, Darbhanga hold 37.9 and 3.0 percent population of exotic/CB cattle of the state and the country, respectively with a high density of 125.3 per km².

Table 7: Clusters of districts holding major proportion of exotic/CB cattle in the states of India with sizable number of exotic/CB cattle

State	Clusters of districts with sizable population of exotic/CB cattle
Tamilnadu	Cluster A: Villupuram, Tiruvannamalai, Salem, Vellore, Dharmapuri, Krishnagiri, Cuddalore, Erode (3714291a, 84.8b, 48.1c, 7.2d) Cluster B: Tiruchirappalli, Dindigul, Tiruppur, Thanjavur, Pudukkottai, Coimbatore, Namakkal, Karur (1922181, 55.2, 24.9, 3.7) Cluster C: Tirunelveli, Madurai, Virudhunagar (679627, 46.4, 8.8, 1.3)
Uttar Pradesh	Cluster A: Azamgarh, Ballia, Mirzapur, Gorakhpur, Jaunpur, Deoria, Allahabad, Varanasi, Chandauli, Ambedkar-Nagar, Sultanpur, Pratapgarh Ghazipur, Mau (2272405, 51.5, 37.1, 4.4) Cluster B: Muzaffarnagar, Meerut, Bijnor, Bulandshahr, Saharanpur, Aligarh, Baghpat, Amroha, Shamli, Ghaziabad, Hapur, G.B.-Nagar (1637888, 56.5, 26.8, 3.2)
Maharashtra	Cluster A: Pune, Solapur, Satara, Sangli, Osmanabad, Kolhapur (2044929, 31.5, 44.4, 4.0) Cluster B: Ahmednagar, Nashik, Aurangabad, Jalgaon, Beed (1798088, 27.6, 39.0, 3.5) Cluster C: Bhandara, Nagpur (239336, 17.1, 5.2, 0.5)
Bihar	Cluster A: Samastipur, Begusarai, Bhagalpur, Khagaria, Lakhisarai, Darbhanga (1552109, 125.3, 37.9, 3.0) Cluster B: Muzaffarpur, Saran, Vaishali, Siwan, Gopalganj (858847, 71.0, 20.9, 1.7) Cluster C: Patna, Buxar, Bhojpur, Rohtas (657862, 58.8, 16.0, 1.3)
Karnataka	Cluster A: Hassan, Mysore, Mandya, Tumkuru, Ramanagara, Kolar, Chikballapur, Chamarajanagar, Bengaluru-Rural, Bengaluru-Urban (2259110, 44.7, 57.8, 4.4) Cluster B: Dakshin-Kannada, Davangere, Udupi, Shivamogga, Chikmagalur, Haveri (855567, 24.5, 21.9, 1.7)
Gujarat	Cluster A: Banas-Kantha, Sabar-Kantha, Arvali, Mahesana, Anand, Mahisagar, Kheda, Gandhinagar (2315552, 68.5, 68.0, 4.5) Cluster B: Navsari, Surat, Tapi, Valsad (678741, 52.4, 19.9, 1.3)
West-Bengal	Cluster A: Medinipur-West, Nadia, Hooghly, 24 Paraganas-North, Medinipur-East, 24 Paraganas-South (1554844, 48.3, 45.8, 3.0) Cluster B: Bardhaman, Murshidabad, Bankura, Maldah, Birbhum (1258729, 48.6, 37.1, 2.5)
Rajasthan	Cluster A: Jaipur, Sikar, Jhunjhunu, Alwar, Nagaur (1011574, 19.9, 43.5, 2.0) Cluster B: Ganganagar, Hanumangarh, Bikaner (467493, 9.2, 20.1, 0.9)
Andhra Pradesh	Cluster A: Chittoor, Anantapur (1055747, 30.8, 46.7, 2.1) Cluster B: Srikakulam, Vizianagaram, Visakhapatnam, East-Godavari (1026044, 29.9, 45.4, 2.0)
Punjab	Cluster A: Amritsar, Gurdaspur, Jalandhar, Hoshiarpur (617215, 54.5, 29.3, 1.2) Cluster B: Ludhiana, Sangrur, Patiala (418028, 39.7, 19.9, 0.8)

^aTotal population in the cluster, ^bdensity per km², ^cproportion of state population and ^dproportion of national population of exotic/crossbred cattle

Likewise, some of the districts have appreciably high population of indigenous cattle. Medinipur-West district in West Bengal has the highest population (1.379

million) of indigenous cattle followed by Bankura (1.245 million), Bardhaman (1.142 million) and Coochbehar (1.115 million) districts of the same state.

The Medinipur-West (1.758 million), Bardhaman (1.532 million) and Bankura (1.492 million) districts also hold the largest population of total cattle followed by Banaskantha (1.390 million) in Gujarat. Ahmednagar district (0.973 million) in Maharashtra holds the largest population of exotic/CB cattle followed by Banaskantha

(0.912 million) in Gujarat, Chittoor (0.830 million) in Andhra Pradesh and Villupuram (0.744 million) in Tamil Nadu. Top twenty five districts holding largest population of indigenous, exotic/CB and total cattle are given in table 8.

Table 8: Districts of India with highest population of indigenous, exotic and total cattle.

Indigenous	Exotic	Total
Medinipur-West (WB*, 1378809#)	Ahmednagar (Mah, 973803)	Medinipur-West (WB, 1758443)
Bankura (WB, 1245271)	Banas-Kantha (Guj, 912180)	Bardhaman (WB, 1532669)
Bardhaman (WB, 1141753)	Chittoor (AP, 829852)	Bankura (WB, 1491831)
Coochbehar (WB, 1115088)	Villupuram (TN, 744260)	Banas-Kantha (Guj, 1390357)
Birbhum (WB, 1071898)	Tiruvannamalai (TN, 684838)	Ahmednagar (Mah, 1378303)
Bikaner (Raj, 1064552)	Pune (Mah, 639289)	Coochbehar (WB, 1226670)
Dinajpur-Uttar (WB, 1023736)	Salem (TN, 576705)	Murshidabad (WB, 1199817)
Jodhpur (Raj, 980639)	Solapur (Mah, 511987)	Bikaner (Raj, 1194729)
Giridih (JH, 942937)	Vellore (TN, 502285)	Birbhum (WB, 1185333)
24-Paraganas-South (WB, 927887)	Samastipur (Bihar, 478147)	Medinipur-East (WB, 1093499)
Maldah (WB, 917496)	Begusarai (Bihar, 442162)	Dinajpur-Uttar (WB, 1091590)
Barmer (Raj, 903639)	Srikakulam (AP, 411067)	Jodhpur (Raj, 1069027)
Purulia (WB, 897199)	Bardhaman (WB, 390916)	Maldah (WB, 1038763)
Medinipur-East (WB, 873465)	Murshidabad (WB, 386551)	24-Paraganas-South (WB, 1019495)
Murshidabad (WB, 813266)	Medinipur-West (WB, 379634)	Giridih (JH, 973869)
Purnia (Bihar, 790065)	Jaipur (Raj, 375902)	Chittoor (AP, 950026)
Gaya (Bihar, 778505)	Nadia (WB, 365076)	Purulia (WB, 915274)
Udaipur (Raj, 751285)	Hassan (Ktk, 356245)	Hooghly (WB, 912745)
Rajnandgaon (CG, 740486)	Nashik (Mah, 345324)	Barmer (Raj, 905199)
Dumka (JH, 730884)	Vizianagaram (AP, 337327)	Nashik (Mah, 895050)
SAGAR (MP, 716340)	Dharmapuri (TN, 336000)	Villupuram (TN, 873822)
Araria (Bihar, 715596)	Mysore (Ktk, 317061)	Pune (Mah, 846745)
Katihar (Bihar, 680419)	Patna (Bihar, 316836)	Udaipur (Raj, 831496)
Godda (JH, 671427)	Krishnagiri (TN, 310443)	Gaya (Bihar, 830383)
Jalpaiguri (WB, 670061)	Tiruchirappalli (TN, 305754)	Nadia (WB, 816780)

*State, #Population, WB-West Bengal, Raj- Rajasthan, JH-Jharkhand, CG-Chhattisgarh, MP-Madhya Pradesh, Guj-Gujarat, Ktk-Karnataka, Mah-Maharashtra, AP-Andhra Pradesh, TN-Tamil Nadu

In terms of density per km² Coochbehar (329.2) and Dinajpur-Uttar (326.0) in West Bengal has the highest density of indigenous cattle followed by Kishanganj (307.6) in Bihar and Godda (296.3) in Jharkhand. These four districts also have the highest density of overall

cattle population. For exotic/CB cattle, Kulgam (256.5) in Jammu & Kashmir, Begusarai (230.5) in Bihar, Shopian (220.0) and Ganderbal (166.7) again in Jammu & Kashmir has the highest density (Table 9).

Table 9: Districts of India with highest density per km² of indigenous, exotic and total cattle

Indigenous	Exotic	Total
Coochbehar (WB*, 329.2#)	Kulgam (JK, 256.5)	Coochbehar (WB, 362.2)
Dinajpur-Uttar (	WB, 326.0)	Begusarai (Bihar, 230.5)Dinajpur-Uttar (WB, 347.6)
Kishanganj (Bihar, 307.6)	Shopian (JK, 220.0)	Kishanganj (Bihar, 311.7)
Godda (JH, 296.3)	Ganderbal (JK, 166.7)	Godda (JH, 302.1)
Darrang (Assam, 275.0)	Samastipur (Bihar, 164.7)	Hooghly (WB, 289.9)
Lakhimpur (Assam, 269.4)	Bandipora (JK, 157.2)	DARRANG (Assam, 288.6)
Deoghar (JH, 265.3)	Ghaziabad (UP, 154.7)	Bardhaman (WB, 282.7)
Supaul (Bihar, 253.4)	Khagaria (Bihar, 131.2)	Deoghar (JH, 279.7)
Araria (Bihar, 252.9)	Varanasi (UP, 115.1)	Maldah (WB, 278.3)
Biswanath (Assam, 248.2)	Tiruvannamalai (TN, 110.7)	Medinipur-West (WB, 277.2)
Maldah (WB, 245.8)	Salem (TN, 110.1)	Lakhimpur (Assam, 276.3)
Purnia (Bihar, 244.7)	Jagatsinghapur (Odisha, 106.8)	Kulgam (JK, 269.3)
South-Salmara (Assam, 243.0)	Hapur (UP, 105.2)	Madhepura (Bihar, 264.4)
Birbhum (WB, 235.8)	Vaishali (Bihar, 105.2)	Supaul (Bihar, 264.2)
Jamtara (JH, 234.4)	Villupuram (TN, 103.5)	Araria (Bihar, 263.9)
Jorhat (Assam, 234.1)	Bhagalpur (Bihar, 102.5)	Birbhum (WB, 260.8)
Dinajpur-Dakshin (WB, 229.1)	Badgam (JK, 102.0)	Biswanath (Assam, 256.0)
Madhepura (Bihar, 224.1)	Patna (Bihar, 98.9)	Saharsa (Bihar, 254.6)
Katihar (Bihar, 222.6)	Navsari (Guj, 95.2)	Purnia (Bihar, 252.9)
Saharsa (Bihar, 220.5)	Nadia (WB, 93.0)	South-Salmara (Assam, 249.9)
Medinipur-West (WB, 217.3)	Sheikhpura (Bihar, 91.8)	Bhagalpur (Bihar, 247.8)
Jalpaiguri (WB, 216.8)	Chennai (TN, 89.7)	Jorhat (Assam, 246.0)
Banka (Bihar, 214.4)	Pulwama (JK, 89.1)	Nagaon (Assam, 245.6)
Dhubri (Assam, 213.6)	Saran (Bihar, 85.8)	Dinajpur-Dakshin (WB, 239.8)
Morigaon (Assam, 211.1)	Banas-Kantha (Guj, 84.9)	Jamtara (JH, 238.3)

*State, #Population, WB-West Bengal, JH-Jharkhand, Guj-Gujarat, JK-Jammu & Kashmir, UP-Uttar Pradesh, TN-Tamil Nadu

In Chhattisgarh, 92.6 percent districts have more than 0.2 million indigenous cattle. Similarly, 87.5, 82.6 and 75.8 percent districts of Jharkhand, West Bengal and Assam, respectively, has more than 0.2 million cattle. Two hundred sixty-six districts in India has about 0.2

million indigenous cattle. Similarly, two hundred thirty-nine districts in India has more than 50 indigenous cattle per km². All the districts in Jharkhand has more than 50 indigenous cattle per km² followed by West Bengal (91.3 %), Assam (90.9) and Bihar (81.6) (Table 10).

Table 10: Number of districts with indigenous cattle population of 0.2 million and density of more than 50 per km² in states of India

State*	Total number of districts	No. of districts with about 0.2 million indigenous cattle	No. of districts with > 50 indigenous cattle per km ²
Madhya Pradesh	51	38	26
West Bengal	23	19	21
Uttar Pradesh	75	25	36

State*	Total number of districts	No. of districts with about 0.2 million indigenous cattle	No. of districts with > 50 indigenous cattle per km ²
Rajasthan	33	22	5
Bihar	38	19	31
Jharkhand	24	21	24
Assam	33	25	30
Chhattisgarh	27	25	22
Maharashtra	35	25	Nil
Odisha	30	20	15
Gujarat	33	9	8
Karnataka	30	7	Nil
Telangana	31	3	3
Andhra Pradesh	13	4	Nil
Tamil Nadu	32	1	2
Uttarakhand	13	1	Nil
Jammu & Kashmir	22	Nil	6
Meghalaya	11	1	4
Himachal Pradesh	12	1	1
Tripura	8	Nil	5

*Other states have no district meeting above criteria

Population trend of breeds of indigenous cattle

Indian Council of Agricultural Research has developed a mechanism of registration of diversity of Indian livestock and poultry breeds in 2008. As per the status of breed registration, India is home to more than 50 registered breeds of cattle well adapted to the agro-climatic condition of their habitat (NBAGR 2021). The largest percentage of indigenous cattle of Karnataka (83.75) conform to the registered breeds followed by Gujarat (73.62), Uttar Pradesh (59.81) and Punjab (59.05) (Table 3). Although, the overall population of indigenous cattle, which includes the heads under registered breeds, grades as well as non-descript animals, has decreased by 8.94 percent during 2007-2012. However, the population of registered breeds that were included both in Livestock census (2007) and Breed survey (2013, Table 11) has decreased more than thrice as fast (31.9 %) during this period. Kosali breed has the largest population (2.432 million) followed by

Kankrej (1.945 million), Haryana (1.639 million) and Gir (1.380 million). Eight breeds have population between 1-2 million (Kosali, Kankrej, Haryana, Gir, Hallikar, Malvi, Khillar and Sahiwal), three between 0.5-1 million (Malnad-Gidda, Rathi and Bachaur), twelve between 0.1-0.5 million (Motu, Kenkatha, Nagori, Nimari, Khariar, Red-Kandhari, Tharparkar, Deoni, Gaolao, Dangi, Ongole and Amritmahal), five between 50 thousand-0.1 million (Kangayam, Bijharpuri, Kherigarh, Red-Sindhi and Ghumsuri), five between 10-50 thousand (Umblacherry, Ponwar, Mewati, Bargur and Siri). Four breeds (Pulikulam, Krishna-Vally, Punganur and Vechur) have their population less than 10 thousand. Singh and Sharma (2017) has also analysed the data of Breed survey (2013) with respect to their risk status and reported that Vechur breed of cattle is in critical status, Krishna-Valley, Mewati, Pullikulam and Punganur are in endangered status and Bargur and Siri are in vulnerable status of risk among the indigenous breeds of cattle.

Table 11: Population of major cattle breeds, their share in descript population, percent change during 2007-2013 and major states of their distribution

Breed	Population (Breed survey, 2013)	Percent of descript population of India	Percent change during 2007-2013	State(s) holding major population (Percent of total population of the breed)
Kosali	2431859	13.62	-	Chhattisgarh (99.99)
Kankrej	1945094	10.90	-49.9	Gujarat (76.72), Rajasthan (23.22)
Haryana	1639181	9.18	-37.0	UP (55.82), Haryana (14.55), Rajasthan (14.07)
Gir	1380208	7.73	-35.1	Gujarat (57.53), Rajasthan (23.84), MP (8.85), Maharashtra (6.86)

Breed	Population (Breed survey, 2013)	Percent of descript population of India	Percent change during 2007-2013	State(s) holding major population (Percent of total population of the breed)
Hallikar	1211242	6.79	-44.7	Karnataka (87.62), Andhra Pradesh ¹ (4.75)
Malvi	1158172	6.49	-23.6	MP (58.93), Rajasthan (41.06)
Khillar	1102359	6.18	-22.4	Maharashtra (79.55), Karnataka (20.43)
Sahiwal	1092459	6.12	139.0	UP (72.79), Bihar (11.95), WB (6.67)
Malnad Gidda	899091	5.04	-29.9	Karnataka (99.87)
Rathi	865921	4.85	-6.3	Rajasthan (9.30)
Bachaur	741432	4.15	63.3	Jharkhand (71.97), Bihar (28.03)
Motu	469320	2.63	-33.0	Odisha (99.94)
Kenkatha	393291	2.20	118.5	Uttar Pradesh (84.28), Madhya Pradesh (15.72)
Nagori	373224	2.09	-55.4	Rajasthan (99.05)
Nimari	341828	1.92	10.5	Madhya Pradesh (100.0)
Khariar	290015	1.62	-	Odisha (100.0)
Red-Kandhari	235058	1.32	33.1	Maharashtra (99.46)
Tharparkar	197291	1.11	-64.6	Rajasthan (67.08), Uttar Pradesh (25.38)
Deoni	151236	0.85	-8.8	Maharashtra (45.83), Karnataka (32.48), Andhra Pradesh ¹ (20.24)
Gaolao	121538	0.68	-45.4	Madhya Pradesh (63.99), Maharashtra (36.01)
Dangi	119373	0.67	-60.7	Maharashtra (54.82), Gujarat (45.18)
Ongole	115905	0.65	-55.0	Andhra Pradesh ¹ (95.15)
Amritmahal	105343	0.59	9.7	Karnataka (99.99)
Others ^{2, 3}	461175	2.62	-70.3	-
Total	17848967	-	-31.94	-

¹Andhra Pradesh includes Telangana.

²Breeds with population of less than 0.1 million (see text).

³Alambari, Gangatiri, Jellicut, Kumauni, Ladakhi, Manapari, Purnea, Terai, Tho-tho, Kasargod-dwarf and new breeds (see text) were not listed in Breed survey, 2013.

⁴Percent change in breeds listed in Breed survey, 2013 excluding Kosali, Khariar and Pullikulum

Although, considering only the breeds listed in Breeds survey (2013), only 11.8 percent of the indigenous cattle population belonged to the recognized breeds. However, in the recent past with the efforts of the ICAR-National Bureau of Animal Genetic Resources, Karnal, many new breeds like Belahi, Gangatiri, Badri, Lakhimi, Ladakhi, Konkan-Kapila, Poda-Thurpu, Nari, Dagri, Thu-tho, Shwet-Kapila, Himachali-Pahari, Purnea has been characterized and registered as new breeds of indigenous cattle (NBAGR 2021). Gangatiri, Ladakhi, Thu-tho and Purnea were listed in Livestock census (2007) but not included in the Breed survey (2013).

Among the breeds that has a population of more than 0.1 million, only six breeds (Sahiwal, Bachaur, Kenkatha, Nimari, Red-Kandhari and Amritmahal) have shown an increase in their population during 2007-2012. Sahiwal breed has shown maximum increase (139.0 %) followed by Kenkatha (118.5), Bachaur (63.3) and Red-Kandhari

(33.1). Tharparkar breed has shown maximum decrease (64.6 %) followed by Dangi (60.7) and Kherigarh (56.2) and Nagori (55.4). Among the five largest breeds, Kankrej, Hariana, Gir and Hallikar (Kosali was not listed in Livestock census, 2007), all have shown decline of 49.9, 37.0, 35.1 and 44.7 percent, respectively (Table 11).

Among the breeds that have population less than 0.1 million, Vechur breed has shown maximum increase (565.6 %) followed by Punganur (278.2), Bnijharpuri (167.0) and Krishna-Valley (49.6), whereas, Red Sindhi breed has shown maximum decrease (89.16 %) followed by Umblacherry (82.08), Mewati (80.41) and Siri (80.29).

CONCLUSION

It is clear from the above discussion that the population of the indigenous cattle has decreased by 8.94 and 6.00 percent and the exotic/crossbred cattle has increased by 20.18 and 29.26 percent, respectively,

during 2007-2012 and 2012-2019. This trend is largely continuing since 1992 onwards since when the data was analysed. Further, during 2007-2012 when data for individual breeds is available, the population of recognized breeds has decreased more than thrice as fast (31.9 %) compared to the decrease in overall indigenous cattle (8.94) population during this period. The indigenous cattle, in general and descript breeds, in particular, are evolved under local agro-climatic conditions, management practices and therefore, their phenotypes and outputs are well adapted to these conditions. Considering their higher milk production, the exotic/CB cattle may be suitable for intensive dairy farming, but under extensive system of management where animals are raised on crop residues and grazing only, the indigenous cattle especially descript breeds are better adapted thus more appropriate. Further, the ability of the draught breeds to work under harsh environmental conditions cannot be substituted by the exotic/CB cattle. So, serious conservation and improvement efforts are required to arrest continuing decline in the population of indigenous cattle especially the descript breeds under threat of extinction.

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