DISTRIBUTION, GROWTH AND DENSITY OF MILCH ANIMALS IN MAHARASHTRA: A GEOGRAPHICAL ANALYSIS

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ABSTRACT: Livestock plays a vital role in the rural as well as urban Indian economy. After the agriculture, animal husbandry is the most important economic activity particularly in rural areas. In the dairy activity cows and buffaloes plays a crucial role, in all parts of the Indian subcontinent. The present paper based on the 2003, 2007 and 2012 Animal Census Data and insights into the distribution of milch animal population and intends to identify the core and peripheries of milch animals, in the state of Maharashtra. For the comprehension and identification of core of particular cattle along with its periphery, the composite index has been computed for the year 2007 only. The three major milch cattle's viz. Local cows, exotic cows and Buffaloes are considered in the identification of their core and periphery in the state. Apart from this, the percentage and distribution of milch cattle population have also been worked out and depicted on the map to highlight their concentration in different districts of the state, for 2003, 2007 and 2012. It is found that the proportion of milch cattle population in the state as a whole, barring two districts of Mumbai (including sub-urban) has declined from 48.22 % in 2003 to 37.48 % in 2012, and Sangli and Kolhapur Districts have increased near to 35 %. The only Gadchiroli district has a constant at the span of 10 years.

KEYWORDS: Milch Cattle Population, Distribution, Concentration, Proportion, Animal Husbandry, Organic Farming, Indian Economy.

INTRODUCTION: *Livestock plays a vital role in the rural Indian economy. After to the agriculture, animal husbandry is the most important economic activity in rural areas of Indian subcontinent.(**S. N. Mishra, R. K. Sharma, 1989**).* Animal husbandry is generally considered as an activity allied to agriculture. This activity actually supplementary to agriculture as both supports each other. Historically, both activities developed together. The organized farming and demonstration of animals developed together. The agro-farming was completely dependent on the animal power till industrial revolution. Use of animals is still common in various developing countries for farming related activities. The Indian farm economy has a special place for animal husbandry. It has also a rich historical background in Mahabharata. The dairy activity is associated with agriculture by the people as a secondary occupation. Within the dairy sector cows and buffaloes are plays a crucial role. The dairy provides not only fresh milk, but also number of milk by-products as butter, cheese, ghee, chocolate, pasteurized milk, milk powder etc. and wool as well as leather. This activity is a good option for small, substantial, landless and marginal farmers to playing life's match. Besides this, the compost fertilizers are provided to agriculture, which is unhelpful and beneficial to the soil as well as our nature and environment. We can compare the animal husbandry to agriculture as the animal mostly consumes the non-

useful part of plants (like straw, leaves, grass etc.) and produce a fresh food for us. Animal are supported to the organic farming.

STUDY AREA: For the present study, the entire state of Maharashtra was selected to look into their distribution and concentration of milch animals in Maharashtra. Geographically, the state of Maharashtra is located in the western part of India. It forms the part of the Deccan plateau. It is the second largest both in terms of population and area in the country, which came into existence on 1st May 1960. From a location point of view, it extends from 15°46' to 22°6' North latitude and 72°36' to 80°54' East longitude (Figure:1). Maharashtra has an area of 3, 07,713 sq. km. and population of 11,23,74,333 (2011). The density of population was 365 persons/sq. km. as per the 2011 Census. There are six administrative divisions of the state with 35 districts, 353 thesis and 378 towns and cities. The Maharashtra State is bounded by the Arabian Sea in the west, the state of Gujarat in the north-west, Madhya Pradesh in the northeast, Andhra Pradesh in the southeast, Karnataka in the south and Goa in the south-west.

Figure: 1
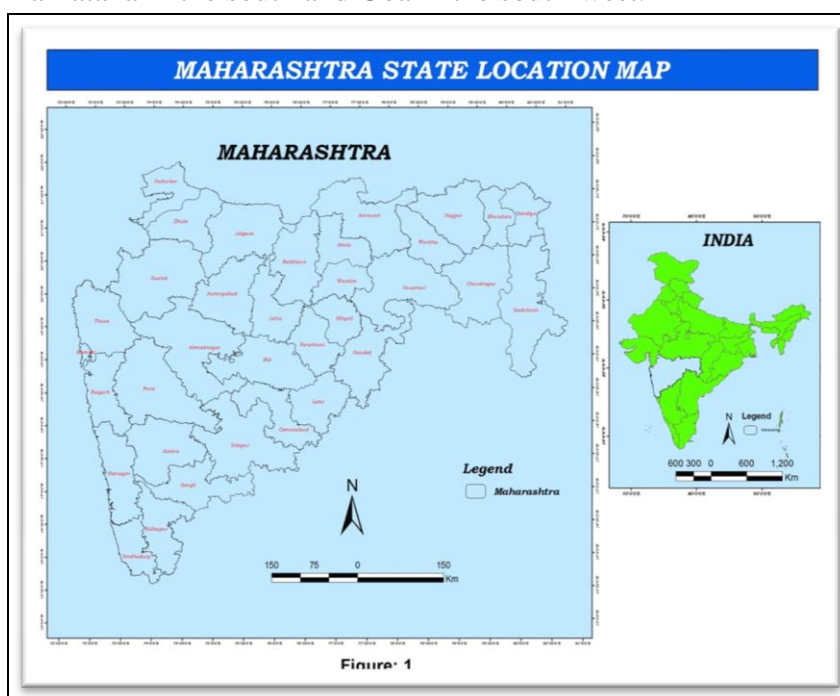
OBJECTIVES:

The objective of the study is to look into the distribution, concentration and growth of milch animal's population in Maharashtra.

DATABASE AND METHODOLOGY:

The study is mainly based on the secondary sources of data. To study the distribution and concentration of milch cattle's and their decennial growth rate, the data were obtained from the 2003, 2007 and 2012 Animal Censuses. In order to measure the present distribution of milch animal population in Maharashtra, a simple percentage has been calculated at district level.

For the growth rate at district level, the simple growth rate formula has been employed:

$$Growth\ Rate = (P2-P1)/P1*100$$

Where, P1 is the milch cattle population of the previous decade and

P2 is the milch cattle population of the current decade.

For the calculation of density we use the following formula

TA

Density = Milch Animal Population of District/Geographical Area of District *100

As a geographical point of view, Maharashtra covers an area of 3, 07,713 sq. km. extending from Mumbai to Gadchiroli. A far as the milch animal population concerned, the milch animal population was 30.66 lakh, amounting 22.28 percent of the total population of the state according to 2003 animal census.

DISTRICT WISE DISTRIBUTION OF MILCH CATTLE POPULATION 2003, 2007 AND 2012.
(Number in percent)

Sr. No	Name	2003	2007	2012
1	Mumbai	48.18	46.32	84.95
2	Thane	27.05	45.27	48.67
3	Raigarh	25.17	39.84	41.31
4	Ratanagiri	25.19	38.41	36.61
5	Sindhudurg	18.62	38.21	34.29
6	Nashik	25.83	39.39	38.70
7	Dhule	24.79	39.40	36.66
8	Nandurbar	21.33	33.35	34.34
9	Jalgaon	19.37	42.17	40.50
10	Ahmadnagar	34.38	41.88	42.88
11	Pune	33.47	47.71	46.69
12	Satara	19.56	43.87	43.80
13	Sangli	12.70	44.10	43.82
14	Solapur	23.35	42.69	42.07
15	Kolhapur	13.07	55.00	53.53
16	Aurangabad	29.73	42.51	38.87
17	Jalna	19.10	40.33	35.91
18	Parbhani	19.92	40.43	37.67
19	Beed	22.20	40.07	37.36
20	Latur	18.12	39.51	38.37
21	Osmanabad	20.31	43.01	42.69
22	Nanded	20.38	39.29	37.45
23	Hingoli	23.08	41.76	37.67
24	Amravati	20.51	37.26	35.25
25	Akola	26.35	39.13	36.35
26	Washim	24.47	26.51	37.42
27	Buldana	22.70	39.94	36.56
28	Yavatmal	20.41	30.66	30.89
29	Nagpur	23.19	34.95	34.59
30	Wardha	9.41	32.43	31.53
31	Bhandara	17.17	33.09	28.92
32	Gondiya	20.44	33.22	28.93

33	Chandrapur	18.94	30.87	31.45
34	Gadchiroli	23.19	29.95	27.48
	State Average	**22.46**	**41.49**	**40.12**

Source: Compiled by the researcher based on the Animal census of India, 2003, 2007 and 2012.

The number of milch animal population increased from 22.46 to 40.12(17.66) percent. In 2003, the milch animal population ranged from a minimum 9.41 percent in Wardha District to maximum of 48.18 percent in Mumbai (including sub urban). In 2007, the milch animal population ranged from a minimum 26.51 percent in Washim District to maximum of 46.32 percent in Mumbai (including sub urban). In 2012, the milch animal population ranged from a minimum 27.48 percent in Gadchiroli District to maximum of 84.95 percent in Mumbai (including sub urban).
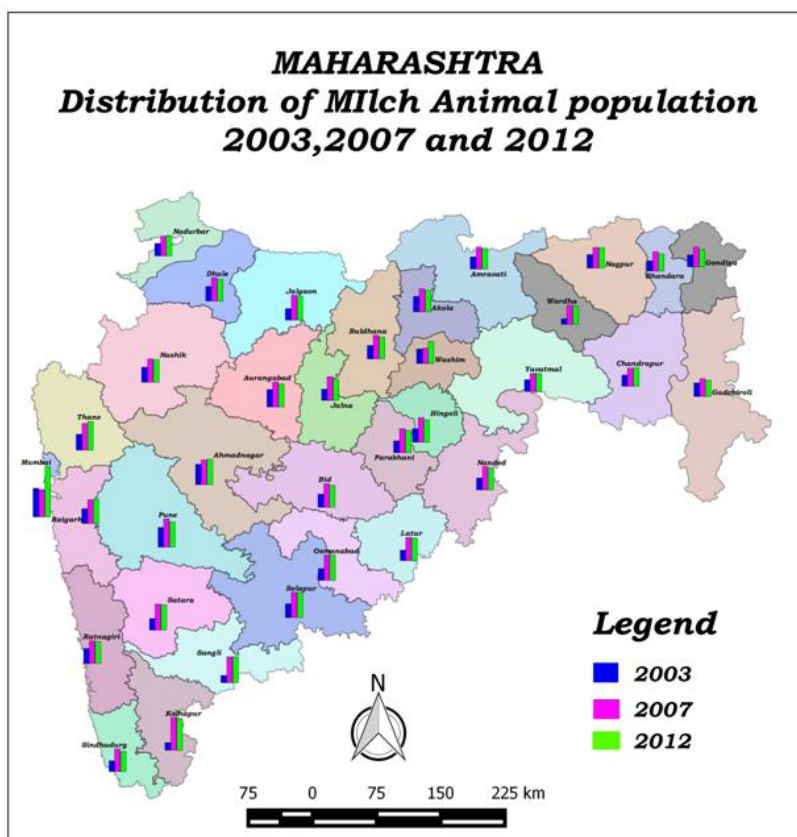

Figure: 2

TABLE 02 MAHARASHTRA GROWTH OF MILCH ANIMAL IN 2003, 2007 AND 2012 (Growth rate in percent)

Sr. No	Name	Growth 2003-07	Growth 2007-12	Growth 2003-12
1	Mumbai	-70.28	161.30	-22.33
2	Thane	49.23	3.93	55.10
3	Raigarh	7.17	-13.76	-7.57
4	Ratanagiri	25.47	-22.91	-3.28
5	Sindhudurg	80.29	-19.56	45.03
6	Nashik	50.21	12.59	69.12
7	Dhule	76.38	-4.70	68.09

8	Nandurbar	35.64	-16.54	13.20
9	Jalgaon	98.56	-6.58	85.49
10	Ahmadnagar	37.98	9.62	51.25
11	Pune	52.44	2.45	56.16
12	Satara	122.01	8.15	140.10
13	Sangli	308.63	12.31	358.92
14	Solapur	94.99	15.23	124.69
15	Kolhapur	318.95	0.18	319.70
16	Aurangabad	49.11	5.98	58.02
17	Jalna	63.07	-8.68	48.92
18	Parbhani	110.34	-20.47	67.29
19	Beed	99.89	-15.68	68.55
20	Latur	124.84	-3.82	116.24
21	Osmanabad	74.64	-0.30	74.12
22	Nanded	78.90	-8.91	62.96
23	Hingoli	65.92	-12.50	45.18
24	Amravati	63.44	4.45	70.71
25	Akola	45.21	-12.87	26.52
26	Washim	6.93	25.67	34.38
27	Buldana	88.33	-18.40	53.68
28	Yavatmal	57.85	-12.79	37.65
29	Nagpur	55.45	-9.95	39.99
30	Wardha	50.88	-15.43	27.60
31	Bhandara	88.73	-13.17	63.88
32	Gondiya	54.91	-17.15	28.34
33	Chandrapur	45.61	-9.98	31.07
34	Gadchiroli	40.06	-30.18	-2.21
	State Average	**75.39**	**-1.08**	**73.49**

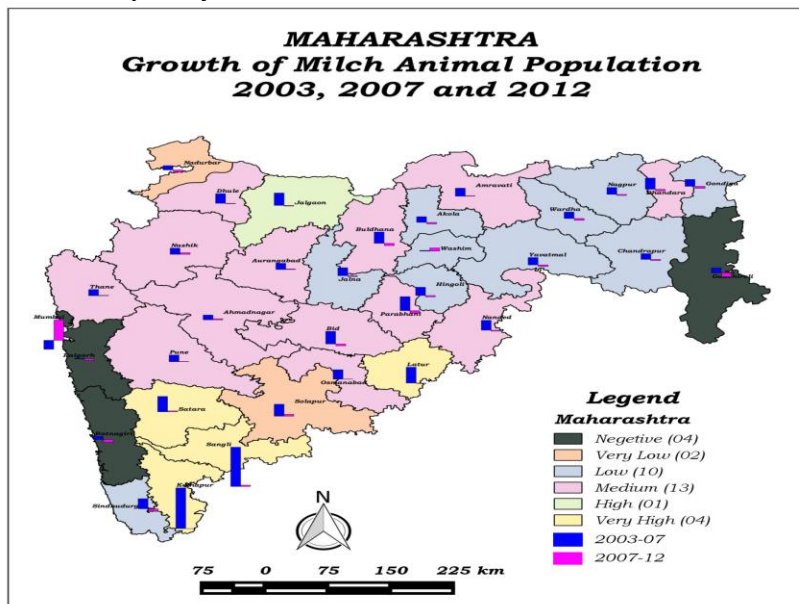**Source**: Compiled by researcher based on Animal census of India, 2003, 2007 and 2012.

Figure: 03

The term growth means the change of an object in the term of quantitative value positive or negative direction of its original position of the previous period of time. Above mentioned table shows the growth of the 2003, 2007 and 2012 census years. The 2003 to 2007 years growth shows the positive trend only, excluding of Mumbai (including sub- urban) district it has a -70.28 percent decline of the milch animals. The average growth of the state is 75.39 percent. Between 2007-12 the growth is declining towards the -1.08 (near about 76 % loss in milch population) percent of the previous census milch animal population. The 22 districts gone through the negative growth and remaining 12 are suffering from positive Growth. The average of the state is declining at the point of -1.08 percent.

The growth of milch animals 2003 to 2012 is positive direction only 4 districts like, Mumbai, Raigarh, Ratanagiri and Gadchiroli was fallen down. Satara, Sangli. Kolhapur, Solapur and Latur are having more than 100 percent growth as comparable to 2003 census years. The average growth of the milch animals 2003 to 2012 is 73.49 percent.

TABLE 03   MAHARASHTRA DENSITY OF MILCH ANIMALS IN 2003, 2007 AND 2012 (Change in number)

Sr. No	Name	2003	2007	2012	change
1	Mumbai	61.00	18.00	127.00	66.00
2	Thane	11.00	16.00	17.00	6.00
3	Raigarh	10.00	10.00	29.00	19.00
4	Ratanagiri	7.00	9.00	7.00	0.00
5	Sindhudurg	5.00	9.00	20.00	15.00
6	Nashik	11.00	16.00	18.00	7.00
7	Dhule	7.00	13.00	33.00	26.00
8	Nandurbar	10.00	14.00	11.00	1.00
9	Jalgaon	9.00	17.00	42.00	33.00
10	Ahmadnagar	22.00	30.00	33.00	11.00
11	Pune	16.00	24.00	65.00	49.00
12	Satara	10.00	23.00	25.00	15.00
13	Sangli	8.00	33.00	77.00	69.00
14	Solapur	12.00	23.00	27.00	15.00
15	Kolhapur	13.00	54.00	121.00	108
16	Aurangabad	9.00	13.00	14.00	5.00
17	Jalna	7.00	12.00	30.00	23.00
18	Parbhani	8.00	18.00	14.00	6.00
19	Beed	10.00	20.00	47.00	37.00
20	Latur	9.00	21.00	20.00	11.00
21	Osmanabad	11.00	19.00	50.00	39.00
22	Nanded	11.00	20.00	18.00	7.00
23	Hingoli	10.00	16.00	41.00	31.00
24	Amravati	7.00	11.00	11.00	4.00
25	Akola	9.00	14.00	35.00	26.00

26	Washim	9.00	10.00	13.00	4.00
27	Buldana	8.00	15.00	35.00	27.00
28	Yavatmal	7.00	11.00	10.00	3.00
29	Nagpur	8.00	12.00	32.00	24.00
30	Wardha	8.00	12.00	10.00	2.00
31	Bhandara	10.00	18.00	44.00	34.00
32	Gondiya	8.00	13.00	11.00	3.00
33	Chandrapur	6.00	8.00	21.00	15.00
34	Gadchiroli	6.00	9.00	6.00	0.00
	State Average	**10.00**	**17.00**	**45.00**	**35.00**

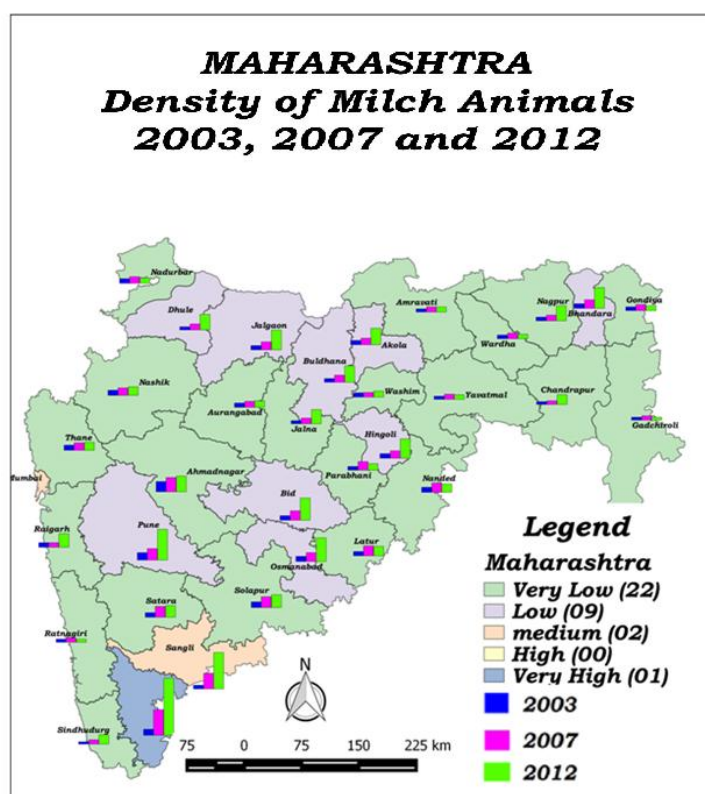**Source**: Compiled by researcher based on Animal census of India, 2003, 2007 and 2012.

Figure: 4

The density means the proportion of any component or object per sq km geographical area of the real world. Above mentioned table shows the density of milch animals in Maharashtra state in the 2003, 2007 and 2012 census years. The average density of the state has a 10 milch animals per sq km. 21 districts are gone less than 10 milch animals/km. Only Mumbai (including sub urban) has highest (61), Sindhudurg (5) have a lowest mark of the density of milch animals. But the density pattern slightly changing on the positive side of the 2007 census year. The density benchmark is varying from 8 (Chandrapur) to 54 (Kolhapur) in the state. The average of the state was 17. Once again Mumbai (including sub urban) is showing the highest (127) of the state and the lowest are 6 in Gadchiroli district with 45 as a state average. Ratanagiri and Gadchiroli districts are have neutral position in 2003-12.

CONCLUSIONS:

DISTRIBUTION:
➢ The distribution of milch animals is uneven in the state between the study period.
➢ Out of the total district 24 districts have a less than 25 percent milch animal population to its total milk able animals in 2003 and between 35 to 50 percent in 2007.
➢ As compare to 2003 the number of milch animal population is increased 17. 66 (40.12) percent   in 2012.

GROWTH:
➢ The average of the state is declining at the point of -1.08 percent; near about we lost 76 percent our milch animal property at 2007-2012.
➢ Satara, Sangli. Kolhapur, Solapur and Latur district having more than 100 percent growth as comparable to 2003 census years

DENSITY:
➢ Kolhapur district has a highest (127) density of milch animal population in the state.
➢ Density of the state is 45 in 2012 and it increased 35 compare to 2003.
➢ Ratanagiri and Gadchiroli district neutral in position in 2003-12.

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