



The Spatial Distribution Of Livestock Concentration In Satara District, Maharashtra

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Abstract

India is agricultural country, where, agriculture becomes from growing crops as well as raising livestock. With agriculture, livestock plays a vital role in Indian economy which contributes 4.11 % GDP of India. Above 2 crore human population of India is engaged in livestock. In rural India, livestock is an adjunct to agriculture which offers best livelihood to two-third of rural society. It also affords worker job to about 8.8 % of the population. According to Livestock Population, 2019, there are 3.3 crore number of livestock in different district of Maharashtra, it has seventh largest livestock population between all states and union territories in India. The Satara district has taken for research study which is placed in the western part of the Maharashtra. As report of Livestock Population, 2019, about 1209202 number of livestock is observed in Satara district. The two mountainous tahsils of district- Jaoli and Mahabaleshwar are distributed lower population of livestock in district. The present paper is an attempt to assess the spatial distribution of livestock in Satara district. The analysis reveals that the region has random to regular distributional pattern of livestock.

Key Words: Agriculture, Livestock, Distribution, Rural, Satara.

Introduction

India is agricultural country, where, agriculture becomes from growing crops as well as raising livestock. With agriculture, livestock plays a vital role in Indian economy which contributes 4.11 % GDP of India (Livestock Sector Brief, India 2020). As report Livestock Sector Brief, India, 2021, above 2 crore human population of India is engaged in livestock. Also, in rural India, livestock is an adjunct to agriculture which offers best livelihood to two-third of rural society. It also affords work or job to about 8.8 % of the population. According to Livestock Population, 2019, there are 3.3 crore number of livestock in different district of Maharashtra, it has seventh largest livestock population between all states and union territories in India.

The Satara district is important and highly developed by agriculture in western part of the Maharashtra. As report of Livestock Population, 2019, about 12,09, 202 number of livestock is distributed in Satara district. Among that, cattle livestock has highly reared 348996 number of cattle and

sheep is less reared 182700 number of sheep in district. The tahsils of district- Jaoli and Mahabaleshwar are distributed lower population of livestock in district.

Objective

Following are the specific objectives of the present research

1. To analyze the spatial distribution of livestock.
2. To analyze the livestock relationship to physiography, area, population, household, inhabited village, net sown area etc.
3. To analyze the concentration of livestock in district

Database And Methodology

Present research work is based on extensive field work supplemented by the secondary data sources from district livestock census (2019). The suitable questionnaire and interview technique has been applied for collection of data relating all aspects of livestock. The statistical techniques like-mean, standard deviation, concentration etc. are used for investigate attributes of

livestock and spatial distribution respectively. The all results are shown with the help of maps as well as tables.

Study Area The Satara district selected as a study area for the present research, which is located in Sahyadri Mountain and south-western part of Maharashtra. It occupies 10,484.0 Sq. k.m. geographical area with its elevation of 742 m (2,434 ft) from the sea level. It supports total population of 30,03,922 persons according to 2011 Census. the

district involving 1739 inhabited villages in 11 tahsils like Khandala, Karad, Wai, Mahabaleshwar, Phaltan, Man, Koregaon, Khatav, Jaoli, Satara, Patan etc..Satara district is well irrigated and agriculturally developed area of Maharashtra state. There are observed several landforms like Krishna River, Mahadeo hill ranges, Bamnoli hill ranges, Sitabai hills, Agashive hills etc. in the district. This district receives 305.6 mm to 3450.7 mm of normal annual rainfall.



Analysis Of Livestock

Geography is concerned mainly with the spatial distribution of geographical phenomena. In case of livestock, their types, growth, concentration, development and spatial distribution are the results of combined effects of several factors. In study area, livestock is unevenly distributed and

varied to tahsil level. Especially, Cattle, Buffalo, Sheep, Goat etc. livestock's are reared in the district. Among that, Goat population is highly reared (355789) which is followed by, Cattle (348996), Buffalo (321717) and Sheep (182700) in district. The factors like, geographical, social, economic, cultural etc. have affected directly and indirectly on

the distribution of livestock. The correlation between number of livestock with physiography, area, population, household, inhabited village, net sown area etc. are observed in study region. Such correlations are analyzed below.

It is observed that, the more number of tahsils fall in the classes above mean (\bar{X})

109927. Among that Karad and Khatav come in the class mean (\bar{X}) +1S.D.(Standard Deviation) and Phaltan tahsil come in the class \bar{X} +2S.D..Remaining three tahsils are below \bar{X} , of them Jaoli tahsil come in the class \bar{X} -1S.D. and rest of tahsils fall in the \bar{X} -2S.D..

Table No. I
SATARA DISTRICT: LIVESTOCK- DISTRIBUTIONAL RELATIONSHIP

Sr. No.	Tahsil	Livestock \bar{X} =109927 S.D.=71015	Livestock Per 100 Km ² \bar{X} =10473 S.D.=5022	Livestock Per 10 Popu. \bar{X} =4.19 S.D.=2.44	Livestock per household \bar{X} =2 S.D.=1.28	Livestock Per 1 Inhabited villages \bar{X} =838.1 S.D.=668.39	Livestock Per 10 Hect. Net Sown Area \bar{X} =14.91 S.D.=7.26
1	Karad	146349	12827	3	1	668	13
2	Patan	100131	6984	3	1	298	12
3	Koregaon	87184	9243	3	2	627	11
4	Khatav	150787	10892	5	3	1109	14
5	Man	219062	14201	10	5	2106	25
6	Jaoli	23993	4113	2	1	155	7
7	Wai	57932	9271	3	1	487	13
8	Phaltan	246882	20752	7	3	2007	31
9	Khandala	83303	15657	6	3	1262	21
10	Satara	81637	9005	2	1	392	10
11	Mahabale.	11942	2254	2	1	108	7
	Total	1209202	11538	4	2	695	16

Source: Compiled by Researcher

Area And Livestock Ratio

The number of livestock per 100 sq. km. area is 11538 for the all district. Hence, this spatial variation at tahsil level is notable. In Phaltan tahsil, the ratio is 20752 which considerably decreased to 2254 in Mahabaleshwar and 4113 in Jaoli tahsil. It is also seen that five tahsils come in the classes above \bar{X} among that Khandala, Man and Karad come in the class \bar{X} +1S.D. and Phaltan fall in the class \bar{X} +2S.D.. Remaining six tahsils are below \bar{X} . Among that, Mahabaleshwar and Jaoli tahsil come class \bar{X} -1S.D.. However, correlation between these two variable is significant (0.8405). It is simple because the area is significant to support the livestock.

Human Population And Livestock Ratio

The number of livestock per 10 population comes to 4 for the district as a whole. However, the spatial variation at tahsil level are remarkable. This ratio fall to 10 in Man tahsil which decreases to 2 in Jaoli, Satara and Mahabaleshwar tahsil. The three tahsils have their value the mean 4.19. Among that, Phaltan and Khandala come in the class \bar{X} +1S.D. and only one tahsil Man comes in the class \bar{X} +3S.D. The remaining

tahsils are below the mean. Also, Jaoli, Satara and Mahabaleshwar tahsil come in the class \bar{X} -1S.D. the correlation analysis between the two variables indicates very high positive relationship (0.80). It is important because adequate threshold population has provided required demand to sustain the livestock.

Human Household And Livestock Ratio

The number of livestock per 1 human household comes to just 2 for the district. However, the spatial variation at tahsil level are important. This ratio fall to 5 in Man tahsil which decreases to 1 in Karad, Patan, Jaoli, Wai, Satara, Mahabaleshwar etc. tahsils. The Koregaon tahsil has their value the mean 2. Among that, Khatav, Phaltan and Khandala come in the class \bar{X} +1S.D. and only one tahsil Man comes in the class \bar{X} +2S.D. The remaining tahsils are below the mean 2. Also, Karad, Patan, Jaoli, Wai, Satara, Mahabaleshwar etc. tahsils come in the class \bar{X} -1S.D. the correlation analysis between the two variables indicates very high positive relationship (0.72). It is important because human household has supplied essential demand to sustain the livestock.

Inhabited Villages And Livestock Ratio

The number of livestock per 100 inhabited villages is 695 in the district. But, there is also, spatial variation at tahsil level. This ratio fall to 2106 in Man tahsil which decreases to 108 in Mahabaleshwar tahsil and 155 in Jaoli tahsil. The four tahsils have their value the mean 838.1. Khandala tahsil come in the class $X+1S.D$. Phaltan and Man tahsil comes in the class $X+2S.D$. The remaining tahsils-Karad, Patan, Koregaon, Wai, Satara are below the mean 838.1. Also, Jaoli, and Mahabaleshwar tahsil come in the class $X-1S.D$. The correlation analysis between the two variables indicates very high positive relationship (0.89). It shows that, number of livestock increases with number of inhabited villages. It has shown relationship between farmland and livestock.

Net Sown Area And Livestock Ratio

The number of livestock per 10 hectares of net sown area comes to 16 for the district whole. But, there is spatial variation at tahsil level. This ratio fall to 31 in Phaltan tahsil which decreases to 7 in

Mahabaleshwar and Jaoli tahsil. The four tahsils have their value the mean 14.91. Khandala and Man tahsil come in the class $X+1S.D$. Phaltan tahsil comes in the class $X+2S.D$. The remaining tahsils-Koregaon, Jaoli, Satara, Mahabaleshwar etc. are below the mean 14.91. Also, Jaoli, and Mahabaleshwar tahsil come in the class $X-1S.D$. The correlation analysis between the two variables indicates very high positive relationship (0.86). Because, the net sown area is source area of fodder which is supplied to livestock and fodder is basic need of all livestock.

Concentration Pattern Of Livestock

According to Livestock Census 2019, about 1209202 numbers of livestock observes in district. The livestock per Agricultural Area comes to 157 for the district whole. But the tahsil level livestock is varies from tahsils to tahsils ranges from 68 livestock per agricultural area to 313 livestock per agricultural area. All 11 tahsils are categorized into three groups as follows: (in table no. II and Fig. 2)

Table No. II**THE CONCENTRATION PATTERN OF LIVESTOCK IN SATARA DISTRICT**

Sr. No.	Tahsil	Cattle In %	Buffalo In %	Sheep In %	Goat In %	Livestock	Livestock per Geographical Area (Hect.)	Livestock per Agricultural Area (Hect.)
1	Jaoli	2.62	2.59	0.12	1.77	23993	41	68
2	Karad	9.9	21.38	6.67	8.67	146349	132	130
3	Khandala	7.11	2.5	16.54	5.68	83303	168	209
4	Khatav	10.19	17.43	8.09	12.47	150787	104	137
5	Koregaon	7.88	8.16	5.77	6.44	87184	97	110
6	Mahabal.	1.9	0.98	0.3	0.45	11942	24	70
7	Man	13.61	10.29	30.11	23.45	219062	151	249
8	Patan	6.5	16.37	1.15	6.38	100131	68	124
9	Phaltan	28.11	5.22	25.77	23.87	246882	201	313
10	Satara	6.53	10.28	2.46	5.98	81637	93	97
11	Wai	5.65	4.8	3.04	4.84	57932	82	134
Total		100	100	100	100	1209202	112	157

Source: Compiled by Researcher



High Livestock Concentration

The taluks which have the livestock per agricultural area above 200 included into high category. High livestock per agricultural area was observed in the taluks of Phaltan (313) Man (249) and Khandala (209). Among that, in Phaltan taluk, 246882 numbers of livestock rearing and observes 201 livestock per geographical area, Out of that dominantly cattle livestock (28.11 percent) is seen which is followed by Sheep (25.77 percent), Goat (23.87 percent) and Buffalo (5.22 percent) respectively.

In Man taluk, 219062 numbers of livestock rearing and observes 151 livestock per geographical area, Out of that dominantly Sheep livestock (30.11 percent) is seen which is followed by Goat (23.45 percent), Cattle (13.61 percent) and Buffalo (10.29 percent) respectively.

In Khandala taluk, 83303 numbers of livestock rearing and observes 168 livestock per geographical area, Out of that dominantly Sheep livestock (16.54 percent) is seen which is followed by Cattle (7.11 percent), Goat (5.68 percent) and Buffalo (2.5 percent) respectively.

Moderate Livestock Concentration

The taluks which have the livestock per agricultural area ranges from 100 to 200 are included in the moderate category. Moderate livestock per agricultural area was observed in the taluks of Khatav (137), Wai (134), Karad (130), Patan (124), Koregaon (110) etc.. Among that, in Khatav taluk, 150787 numbers of livestock rearing and observes 104 livestock per geographical area, Out of that dominantly Buffalo livestock (17.43 percent) is seen which is followed by Goat (12.47 percent), Cattle

(10.19 percent) and Sheep (8.09 percent) respectively.

In Wai tahsil, 57932 numbers of livestock rearing and observes 82 livestock per geographical area, Out of that dominantly Cattle livestock (5.65 percent) is seen which is followed by Goat (4.84 percent), Buffalo (4.8 percent) and Sheep (3.04 percent) respectively.

In Karad tahsil, 146349 numbers of livestock rearing and observes 132 livestock per geographical area, Out of that dominantly Buffalo livestock (21.38 percent) is seen which is followed by Cattle (9.9 percent), Goat (8.67 percent) and Sheep (6.67 percent) respectively.

In Patan tahsil, 100131 numbers of livestock rearing and observes 68 livestock per geographical area, Out of that dominantly Buffalo livestock (16.37 percent) is seen which is followed by Cattle (6.5 percent), Goat (6.38 percent) and Sheep (1.15 percent) respectively.

In Koregaon tahsil, 87184 numbers of livestock rearing and observes 97 livestock per geographical area, Out of that dominantly Buffalo livestock (8.16 percent) is seen which is followed by Cattle (7.88 percent), Goat (6.44 percent) and Sheep (5.77 percent) respectively.

Low Livestock Concentration

The tahsils which have livestock per agricultural area below 100 are included in low category. Low livestock per agricultural area was observed in the tahsils of Satara (97), Mahabaleshwar (70) and Jaoli (68). Among that, in Satara tahsil, 81637 numbers of livestock rearing and observes 93 livestock per geographical area, Out of that dominantly Buffalo livestock (10.28 percent) is seen which is followed by Cattle (6.53 percent), Goat (5.98 percent) and Sheep (2.46 percent) respectively.

In Mahabaleshwar tahsil, 11942 numbers of livestock rearing and observes 24 livestock per geographical area, Out of that dominantly Cattle livestock (1.9 percent) is seen which is followed by Buffalo (0.98 percent), Goat (0.45 percent) and Sheep (0.3 percent) respectively.

In Jaoli tahsil, 23993 numbers of livestock rearing and observes 41 livestock per geographical area, Out of that dominantly Cattle livestock (2.62 percent) is seen which is followed by Buffalo (2.59 percent), Goat (1.77 percent) and Sheep (0.12 percent) respectively.

Conclusion

The foregoing research analysis reveals that- the spatial distribution of livestock is characterized by their uneven distribution into district. There are 1209202 number of livestock in district, among that, dominantly Goat livestock (355789) is seen which is followed by Cattle (348996), Buffalo (321717) and Sheep (182700) respectively. Due to, most geographical area is covered by mountainous in western part and plateau in eastern part, Goat livestock is highly reared in district. Also, sheep is significant livestock reared in eastern part of district. At district level, different correlation- area and livestock (11538 livestock per 100 km² area), human population and livestock (4 livestock per 10 population), human household and livestock (2 livestock per household), inhabited villages and livestock (695 livestock per 1 inhabited villages), net sown area and livestock (16 livestock per 10 hect. net sown area) etc. observed in study region. Whereas, the high livestock concentration is found in north eastern part of district, especially, tahsils of Phaltan (313), Man (249) and Khandala (209) as per agricultural area. Moderately livestock concentration is reached in tahsils of Khatav (137), Wai (134), Karad (130), Patan (124), Koregaon (110) etc. as per agricultural area. Low livestock concentration is seen in north western part of district, especially, tahsils of Satara (97), Mahabaleshwar (70) and Jaoli (68) as per agricultural area. Due highly mountainous region and minimum plain area, low livestock concentration is observed in north western part of district.

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