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A Review on Livestock Sector in Rajasthan: An Appraisal and Performance

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ABSTRACT

The Livestock Census has been conducted in the country periodically since 1919-20. The Livestock Census covers all domesticated animals and its headcounts. So far 19 such censuses have been conducted in participation with State Governments and UT Administrations. The 20th Livestock Census was conducted in participation with all States and Union Territories. The enumeration was done both in rural and urban areas. Various species of animals (Cattle, Buffalo, Mithun, Yak, Sheep, Goat, Pig, Horse, Pony, Mule, Donkey Camel, Dog, Rabbit and Elephant)/poultry birds (Fowl, Duck, Emu, Turkeys, Quail and other poultry birds) possessed by the households, household enterprises/non-household enterprises and institutions have been counted at their site. Animal husbandry is a major economic activity of the rural people, especially in the arid and semi- arid regions of Rajasthan. Development of livestock sector has a significant beneficial impact in generating employment and reducing poverty in rural areas. Livestock is the best insurance against drought and famine and generate gainful employment in rural areas of Rajasthan. Rajasthan is the largest state of the country with geographical area of 3.42 lack sq. km. The state has about 11.27 per cent of country's total livestock population and contributes over 81.50 per cent of camel population, 16.03 per cent of goat population, 13.95 percent sheep population, 11.94 per cent of buffalo and 6.98 percent of cattle population during 19th livestock census in the country. Contribution of buffalo in total milk production is 52.71 per cent with a net increase of 0.77 percent over the previous milk production, followed by indigenous cattle (28.63 per cent), goat (12.22 percent) and cross bred cow (6.44 per cent). Livestock rearing is an integral component of the economic and social fabric of the rural masses in Rajasthan. Since crop farming is constrained by erratic rains and limited irrigation facilities, livestock is an adjunct farm enterprise in most parts of the state especially in arid areas. About 55 percent of the total area of the state is under Thar Desert. Animal husbandry comes to the rescue as a measure to alleviate the effects of frequent droughts and by providing sustainable year-round income to the farmers.

Keywords*: Livestock, Milk, Animal husbandry, Dairy JEL: Q11, Q13.*

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INTRODUCTION

Livestock sector is an important sub-sector of agriculture of the Indian economy. It forms an important livelihood activity for most of the farmers, supporting agriculture in the form of critical inputs, contributing to the health and nutrition of the household, supplementing incomes, offering employment opportunities, and finally being a dependable "bank on hooves" in times of need. It acts as a supplementary and complementary enterprise. The animal husbandry and livestock sectors are critical for the rural Indian economy, especially the small and marginal farmers. They not only contribute to their income but also provide the best insurance against any natural calamity. The livestock sector alone contributes nearly 25.6 percent of the value of output at current prices of total value of output in Agriculture, Fishing and Forestry sectors. The overall contribution of livestock sector in total gross domestic product (GDP) is nearly 4.86 percent at current prices during 2020-21 in India. The livestock sector contributed about 3.88 percent of total gross value added of the country at current prices and about 3.92 percent at constant prices (2011-12). As per the provisional estimate of ministry of statistics and programme implementation, Government of India, the real GDP of all india at contant 2011-12) price for the year 2019-20 reached to a level of Rs.145.66 lakh crore, as against Rs. 139.81 lakh crore in year 2018-19, the growth in GDP during 2019-20 is estimated at 4.2 as compared to growth rate of 6.1% in 2018-19. The real GSDP of Rajasthan at content (2011-12) prices as per the advance estimates for the year 2018-19, the growth in GSDP during2019-20 is estimated at 5.05% as compared to growth rate of 6.97% in 2018-19. The GSDP is approximately 4.89% of country's GDP. The nominal GSDP or gross state domestic production of Rajasthan at current Price for year 2019-20 is likely to attain a level of 10.21 lakh cror ,as against 9.43 lakh crore in the year 2019-19 showing an increase of 8.32%.

Livestock sector makes multifarious contribution to overall welfare in terms of generating more employment opportunities, especially for the marginal and small farmers and landless labourers, alleviating poverty and stabilising farm income in Rajasthan. The livestock sector is more labour intensive than crop production and accounts for a major share in rural employment with 4.5 per cent annual growth as compared to 1.75 per cent for all sectors and 1.1 per cent for agriculture (Bohra et al., 2012). Livestock is the best insurance against drought and famine and generate gainful employment in rural areas of Rajasthan. This sector has also the highest potential for rural self-employment generation at the lowest possible investment per unit. Development of livestock sector, therefore, is critical for rural prosperity. As per the livestock census of 2012, there are 577.32 lakh animals and over 80.24 lakh poultry in the State. Rajasthan has about only 11.27 per cent of the country's livestock population and contributes about 11 per cent of the total milk production, 30 per cent of the mutton and 31 per cent wool produced in the country. Rajasthan ranks first in wool production followed by milk production. The state has rich and diverse genetic resources with nine well defined cattle breeds. The important breeds of cattle in the state are Tharparkar, Rathi, Gir, Kankrej, Nagouri, Haryana, Malvi, Sanchori and Mehwati. Murrah buffalo is the most preferred breed found in Rajasthan although Surti is also popular in the southern parts of Rajasthan.

Milk is the major source of nutritious food to millions of people and only acceptable source of animal protein for large vegetarian segment of population in Rajasthan. The per capita availability of milk increased from 371 gm per day in 2003- 04 to 870 gm per day in 2018-19. Modern animal breeding technologies for faster multiplication of genetically superior germ plasm have contributed significantly to increase in milk production. The annual average growth rate in milk production in Rajasthan stood at 4.3 per cent during 2008-09 to 2012-13 with the milk production rising from 11.9 million MT to 13.9 million MT in 2012-13. More than 80 per

cent rural families keep livestock in their households in Rajasthan. The contribution of animal husbandry sector to the gross domestic product (GDP) of the State has been estimated to be around 9.16 per cent. About 35 per cent of the income to small and marginal farmers comes from dairy and animal husbandry and in arid areas the contribution is as high as 50 per cent. The sector has potential to create employment in rural areas with least investments as compared to other sectors. In the light of the potential contribution and role of livestock sector in the State, a policy needs to be followed for the desired growth of this sector.

MATERIALS AND METHODS

The study is based mainly on secondary data collected from various published sources such as published reports of Department of Animal Husbandry, Government of Rajasthan, Department of Animal Husbandry, Dairying and Fisheries (Ministry of Agriculture, Government of India), state/UT Animal Husbandry, *Economic Survey Rajasthan* 2019-20, *Statistical Handbook Rajasthan 2019*. The tabular analysis and compound growth rates were computed to indicate the status of livestock population and production of different livestock products in the state. In the case of livestock population annual compound growth rates of inter-census period was computed using the formula: Pt/Po = (1 + r) t/100, where Pt is population in the 1^{th} period, Po is population in the base period; r is the compound growth rate (Bhowmick et al., 2005). In the present study, compound annual growth rate (CGR) analysis was used to estimate the growth of production of the livestock products. CGR was computed by using the formula CAGR = Antilog (b) - 1× 100, where, 'b' is the co-efficient and which was derived by using the formula $Y = ab^t$ or lnY = ln a + t ln b, where, Y= Time series data on production of livestock products, a= Intercept, t= Time in years, b= co-efficient. The compound growth rate was worked out as CAGR (r) = (b-1) ×100, where, b = antilog of b.

RESULTS AND DISCUSSION

Livestock sector is an important sub-sector of Indian agriculture with significant contribution towards national economy and employment of rural populace. Livestock sector plays an important role in providing nutritive food, in supplementing family incomes and generating gainful employment in the rural sector. Livestock sector grew at an annual rate of 5.3 per cent during 1980s, 3.9 per cent during 1990s, 3.6 per cent during 2000s and 4.1% during 2021. Despite deceleration, growth in livestock sector remained about 1.5 times larger than in the crop sector which implies its critical role in cushioning agricultural growth in the country. The growth in livestock sector is demand-driven, inclusive and pro-poor. Incidence of rural poverty is less in states like Punjab, Haryana, Jammu & Kashmir, Himachal Pradesh, Kerala, Gujarat, and Rajasthan where livestock accounts for a sizeable share of agricultural income as well as employment.

Rajasthan is the largest state in the country and large part of the state is arid or semi-arid and fall under Thar Desert. The climatic conditions are adverse with scarcity of water for irrigation and erratic rains with very low average annual rainfall. These conditions leave a little scope for crop production and enhance the importance of animal husbandry over the crop production especially during recurrent droughts. About 35 per cent of the income to small and marginal farmers comes from dairy and animal husbandry in the state. The main strengths of livestock sector in the State are which produces 10 per cent milk, 35 per cent wool and 10 per cent meat of the country and ranks first in goat and camel production, ranks second in buffalo population followed by sheep population of the country. The state has about 11.27 per cent of country's total livestock population and contributes over 81.37 per cent of camel population, 16 per cent of goat population, 13 per cent sheep population, 11.94 per cent of buffalo and 6.98 per cent of cattle population in the country (Table 1).

TABLE1. LIVESTOCK CENSUS OF INDIA AND RAJASTHAN – 2012

S.N. (1)	Species (2)	India in million (3)	Rajasthan (4)	%of India (5)	Rank of Rajasthan in India (6)
1	Cattle	193.46	13937630	7.2	5th
2	Cross Breed		2323033		10th
3	Indigenous (total cattle)		11614597		5th
4	Buffalo	109.85	13693316	12.45	2nd
5	Sheep	74.26	7903857	10.63	4th
6	Goat	148.88	20840203	13.99	1st
7	Pigs	9.06	154808	1.66	17th
8	Horse & Ponies	0.04	33679	7.5	4th
9	Mules	0.08	1339	1.62	11th
10	Donkey	0.12	23374	19.16	1st
11	Camel	0.25	212739	84.0	1st
Total Livestock		**342.54**	**56800945**	**16.58**	
1	Poultry	851.81	14622975	1.72	18th

Source: Department of Animal Husbandry, Rajasthan

Rajasthan does not have any economically important breeds of livestock except the indigenous bullock on which most of the agricultural operations depend. The indigenous cows are of poor reproductive efficiency. Almost all the breeds of livestock are native to Rajasthan. The state of Rajasthan has proud possession of 9 cattle breeds, 8 sheep breeds, 6 goat breeds, 4 camel breed and also endowed with thorough breed horses. The important breeds of cattle traded in the State are Rathi, Kankrej, Nagour, Tharparkar, Haryana, Malvi, Gir, Sanchori and Mehwati. Regarding buffalo breed, Murrah buffalo is the only preferred breed found in Rajasthan. Sheep also occupy an important place in animal husbandry sector of the state. The important breeds of sheep are, Nali, Magra, Chokla or Shekkavati, Marwadi, Jaisalmeri, Malpuri, Sonari, or Chanother, Pugal and Bagdi. The important goat breeds in the state are Jamnapari, Badwari, Alwari and Sirohi breeds, which are reared for milk and meat while, Lohi, and Jhalwadi breeds are mainly for meat purpose. Rajasthan has the monopoly in breed in camels i.e. Alwari Bikaneri, Kachhi and Jaisalmeri breeds are considered as the best breeds of camels.

Rajasthan ranks first in wool production while third in milk production. Animal husbandry contributes about 13 per cent in the GDP of the State. This sector has a great potential for rural self employment at lowest possible investment per unit. Therefore, livestock development is a critical pathway to rural prosperity (Singh & Niwas, 2012). There is an increase in livestock population over 2007 to 2012 from 56.66 million to 57.73 million registering a growth of 1.89 per cent in the total number of animals of various species. This increase has been observed substantially or marginally in all the districts of Rajasthan.

Among the total livestock, mules contribute highest growth rate with 280.93 per cent followed by poultry 62.24 per cent, rabbits 45.60 per cent, horses and ponies 42.89 per cent, Buffalo 16.99 per cent, cattle 9.94 per cent and goat 0.76 per cent besides negative contribution was attributed by other livestock species such as sheep, donkeys, camel and dogs in 2012 over 2007. There was positive growth in cattle with 22.76 per cent, Buffalo with 24.60 per cent, bovines with 23.67 per cent, goat with 28.89 per cent, horses and ponies with 51.12 per cent, mules with 12.67 per cent and poultry with 29.59 per cent in 2012 over 2003, while negative growth rate were found in sheep with -9.69 per cent, donkey with -43.03 per cent, camels with -34.60 per cent, pigs with -29.68 per cent, dogs with -75.98 per cent and rabbits with -41.13 per cent per annum (Table 2).

TABLE2. LIVESTOCK POPULATION IN RAJASTHAN

S.N.	Species (1)	2007 (2)	2012 (3)	2019 (4)	Growth rate %	
					In 2012 Over 2007 (5)	In 2019 over 2012 (6)
1	Cattle	12119.51	13324462	13937630	9.94	4.60
2	Cross Breed					
3	Indigenous (total cattle)					
4	Buffalo	11091.97	12976095	13693316	16.99	5.53
5	Sheep	11189.86	9079702	7903857	-18.86	-12.95
6	Goat	21503.00	21665939	20840203	0.76	-3.81
7	Pigs	208.56	237674	154808	42.89	-34.87
8	Horse & Ponies	26.44	37776	33679	28.93	-10.85
9	Mules	0.89	3375	1339	-20.23	-60.33
10	Donkey	102.13	81468	23374	-22.79	-71.31
11	Camel	421.84	325713	212739	13.96	-34.69
Total		**56664.20**	57732204	56800945	1.89	-1.61
12	Poultry	4946.00	8024424	56800945	62.24	82.23

Source: Author's calculation based on data of Directorate of Animal Husbandry, Jaipur, Government of Rajasthan

Rajasthan's camel population has reduced dramatically during the last ten years. Reasons for the decline of the camel population are shrinking grazing resources; camel breeders have no access to prophylactic health care and medicines, lack of organized markets for camel milk, wool and leather, Low status and backward image of camel breeding, lack of encouragement and moral support for camel breeders and lack of government intervention. Sheep population has also reduced during the last ten years. Reasons for the decline of the sheep population are lack of pasture land, fodder and drinking water and poor market availability at native place forced sheep herders to migrate temporarily or permanently to other locations (Kumar et al., 2015). Milk is a major source of nutritious food to millions of people and only acceptable source of animal protein for large vegetarian segment of population in Rajasthan. Modern animal breeding technologies for faster multiplication of genetically superior germplasm have contributed significantly to increase in milk production.

The annual average growth rate in milk production in Rajasthan stood at 4.3 per cent during 2008-09 to 2012-13 with the milk production rising from 11.9 million MT to 13.9 million MT in 2012-13 (Rajasthan Livestock Development Board). Contribution of buffalo in total milk production was highest at 52.71 per cent, followed by indigenous cattle (28.63 per cent), goat (12.22 per cent) and cross breed cow (06.44 per cent). However, the productivity of cross breed cows was maximum at 7.75 liters per day among all dairy animals. Thus, the indigenous cattle are also contributing significantly in milk production, especially in arid and semiarid areas of the state, though its productivity is much lower than the cross bred cows and buffaloes (Table 3).

TABLE3. MILK PRODUCTION, PER ANIMAL MILK PRODUCTIVITY IN RAJASTHAN (2017-18)

Milch animals (1)	Milk Production (MT) (2)	% Share in total Milk Production (india) (3)	Per Day Productivity (In ltr.) (4)
Cattle	8.24	21.18	8.26
Buffalo	11.88	13.77	7.36
Goat	2.31	37.47	0.845
Total	**22.43**	**72.42**	**16.47**

Source: Department of Animal Husbandry, Rajasthan

Species wise performance of growth in milk production and milk yield during the 2001-02 to 2014-15 is presented in Table 4. The rate of growth in milk production in the state has varied widely from different spices. Cross breed cow has recorded highest growth rate of 24.32 per cent per annum followed by goats 7.30 per cent, desi cow 6.03 per cent and buffaloes 4.88 per cent in the state. Though growth in milk production has been increased in the state but it was it was very less at the national level as compared to state level. During the same year, crossbreed cow also has highest annual growth milk in yield (2.88 per cent) followed by buffaloes (2.72 percent), desi cow (2.69 per cent) and goats (1.09 per cent) per annum in the state. Nagori, Rathi, Tharparkar and Kankrej are some of the cow breeds found in Rajasthan. Among all cow breeds in Rajasthan, Tharparkar has the highest yield of 1800 to 2600 kilograms of milk per lactation.

Milk and milk products are the essential food items of human beings which provide sufficient nutritional supplements especially to the children. The milk production in the Rajasthan was 4146 thousand tonnes during 1985-86. A number of initiatives under taken by the state government helped improving the productivity of milk over the period. The analysis shows that during the year 2001-02 to 2014-15, the average annual growth rate of milk, egg, wool and meat production were 6.36 per cent, 5.19 per cent, -2.23 per cent and 9.86 per cent, respectively.

The milk production increased from 7718 thousand tonnes in 2001-02 to 16934 thousand tonnes in 2014-15. During the period 1985-86 to 2014-15, positive growth rates was recorded in milk, egg and meat production were 5.27 per cent, 5.87 per cent and 8.25 per cent per annum, respectively, while growth rate in wool production was registering negative at -0.86 per cent per annum (Table 5). Per capita availability of milk and egg in Rajasthan and India during the period from 2001-02 to 2012-13 is presented in Table 6. The per capita availability of milk was at 376 gm/day in 2001-02. There has been steady increase in per capita availability of milk since 2006-07 with a marginal fluctuation in the intermittent periods. However, the per capita availability has sharply increased from 501 gm per day in 2008-09 to 555 gm per day in 2012-13. In Rajasthan, per capita milk availability was high as compared to national availability and ICMR recommendation. During the year 2012-13, per capita milk availability was very high 555 gm/day against 299 gm/day of national availability and 208 grams of milk requirement per head per day as per ICMR norms.

TABLE4. PER CAPITA AVAILABILITY OF MILK AND EGG IN RAJASTHAN AND INDIA (2001-02 TO 2019-20)

	Milk (gram/day)		Egg(number/annum)	
Year	Rajasthan	India	Rajasthan	India
(1)	(2)	(3)	(4)	(5)
2001-02	376	222	11	37
2002-03	368	224	11	38
2003-04	371	225	12	38
2004-05	376	233	11	42
2005-06	387	241	11	42
2006-07	408	251	11	45
2007-08	408	260	11	47
2008-09	501	266	10	48
2009-10	509	273	10	51
2010-11	538	281	10	53
2011-12	539	290	14	55
2012-13	555	299	15	58
2013-14	572	307	17	61
2014-15	655	322	18	62
2015-16	704	337	19	65
2016-17	785	355	18	68
2017-18	834	375	19	73
2018-19	870	394	22	79
2019-20	-	-	35	86

Source: State/UT Animal Husbanda655ry Departments, Government of India

Due to low production of the egg in Rajasthan, per capita egg availability was very less as compared to national availability and ICMR recommendations. The normative requirement as per ICMR norms is 180 eggs per head, per annum, whereas in Rajasthan only 35 nos. against national availability level accounting for 56 nos. in the year 2019-20. In fact, per capita egg availability has been increased with at the rate of 11 eggs to 35 eggs during the year 2001-02 to 2019-20, respectively.

CONCLUSION AND SUGGESTIONS

The present study has been undertaken to provide a reflection of the status of livestock and poultry industry in Rajasthan as a subsector of agriculture. Despite large livestock wealth, productivity of the stock is low on account of many factors. The chief among those is dominance of the population with local low yielding breeds, shortage of feed and fodder, improper management and disease control measures etc. Proper emphasis on the mentioned factors along with support from Government and all the stakeholders involved towards framing comprehensive livestock development policies could revolutionize this significant sector of agriculture in the state. The policy is required to cater future demands of the livestock products, particularly, milk, meat, wool and eggs and promote private livestock farms. The Government should encourage establishment of compound feed manufactures unit to exploiting of nonconventional feed resources, land to produce economic ration and make the suitable plan and strategy for cultivation of green fodder in the fallow land. The productivity of indigoes bread is much lower than the cross bred cows. The state has poor breeding policies; therefore, there are needs for upgrading the indigenous buffaloes through improved breeding of animals of Indian origin and also availability of quality breeding animals/birds to the livestock farmers is to be ensured. Development of pastures is a crucial strategy for any approach to livestock development. But growing fodder trees and production of top-feed for browsing species such as goat and camel is a very time-consuming, expensive process that faces considerable logistical hurdles. The Government shall strengthen the existing infrastructure of Veterinary institutions, laboratories, B.P lab, diagnostic centers, education and training, animal and poultry farms etc.

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Author Contribution
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