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Review Article

Present Scenario and Role of Livestock Sector in Rural Economy of India: A Review

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Abstract

Livestock is an important component of farming system in India. It is more popular among the marginal and small farmers as more than 62 per cent of marginal household directly associated with livestock sector. It has the potentiality to overcome poverty, household which are associated with livestock has less chance to fall into poverty. Rearing cattle and poultry also help to improve nutrition among children of the household as the output has great nutritive value and mainly use for consumption purpose. Gini coefficient of livestock sector was lesser than agricultural labourers and non-farm occupation, which supports the fact that livestock sector reduces income inequality. An increasing trend of different livestock population in recent years implies its popularity and support in providing sustainable income to farm families. Adoption of livestock population depends on a like farmer's experience, occupation, land, labour endowments and the surrounding socio-economic environment such as social group, access to credit, media, etc. The present study is made an effort to review the literature to understand the impact of livestock on poverty, income, employment and factors determining the adoption of the livestock.

Keywords: Income, Livestock, Nutrition, Poverty

Introduction

Livestock influence the socio-economic development of rural people in several ways. Marginal and small farmers as well as landless labourers hold 70 per cent of the total livestock population as the absorption capacity of other economic sectors ~~is~~ are low in rural areas (Ali, 2007). Gini index for livestock was 0.16 in the year 2006-07 and reduced to 0.09 in the year 2011-12, whereas the index value for land was 0.58 and 0.51 for the respected period. Thus, livestock wealth did not only continue to be more equally distributed than land rather its distribution became more equal during 2011-12 (Birthal and Taneja, 2012). In different production systems, livestock provides multi-faceted contribution for providing security and insurance (Kitalyi *et al*., 2005). A great promise can be seen through this sector for increasing farmers' income. As many parts of the country largely rely on this sector as one of the major sources of income, it is important to go through how the livestock incomes in different regions could be enhanced. Due to proximity of livestock with crop, sustainability problems can be seized by integrating livestock in the system (Sere and Steinfeld, 1996; Hann *et al*., 1997; Patel, 1993; Singh *et al*., 2005). Thus, this study compiled different kinds of literature~~s~~ to understand the impact of livestock on poverty, income, employment and also factors determining the adoption of the livestock.

Present Status of Livestock Population

According to the 20th livestock census, the total livestock population had increased from 512.06 million in 2012 to 536.76 million in 2019, showing 4.82 per cent growth rate (Table 1). Cattle and buffalo depicts relatively low growth rate of 1.34 and 1.06 per cent respectively. The number of small ruminants like sheep and goat had shown a significant increase with 14.1 per cent and 10.1 per cent growth rate respectively. The Population of pig, yak, horses & ponies, mule, donkey and camel had shown a negative growth rate.

Table 1: Livestock population of major species in census 2012 and 2019

Category	Population (in million) 2012	Population (in million) 2019	% Change
Cattle	190.9	193.46	1.34
Buffalo	108.7	109.85	1.06
Sheep	65.07	74.26	14.13
Goat	135.17	148.88	10.14
Pig	10.29	9.06	-12.03
Mithun	0.3	0.39	29.52
Yak	0.08	0.06	-24.9
Horses & Ponies	0.62	0.34	-45.22
Mule	0.2	0.08	-57.09
Donkey	0.32	0.12	-61.23
Camel	0.4	0.25	-37.05
Total Livestock	**512.06**	**536.76**	**4.82**

Source: 20th Livestock Census, 2019

Figure 1 depicts the distribution of the major livestock population. The share of cattle among total livestock population was highest (35.94%)~~.~~ followed by goat, buffaloes, sheep and pigs with share of 27.80, 20.45, 13.87 and 1.69 per cent respectively.

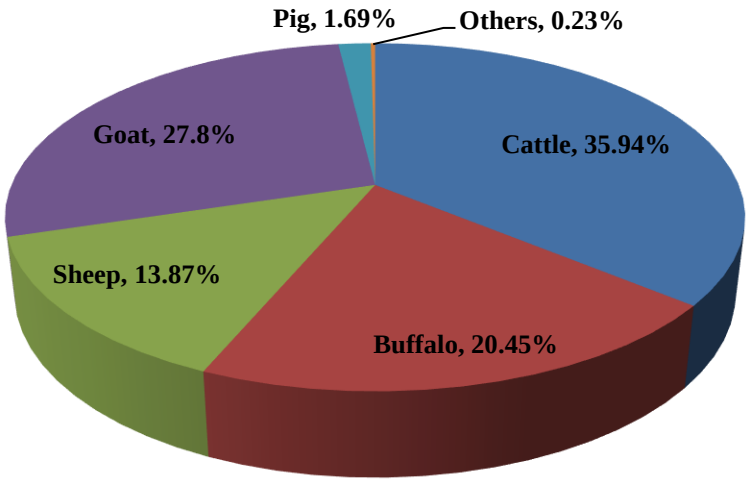

Figure 1: Distribution of livestock population (*Source:* 20th livestock census, 2019)

Status of Livestock Rearing Across Different Sizes of Households

More than 62 per cent of the marginal farm households are directly associated with the livestock sector and receive 15 per cent of their income from livestock as compared to 12 per cent by the large farm households (Table 2).

Table 2: Share of livestock in the income of farm households

Landholding size	% households income from livestock	% share of livestock in total income
Marginal (≤1.0 ha)	62.4	14.9
Small (1.0-2.0 ha)	65.8	15.7
Medium (2.0-4.0 ha)	70.3	13.8
Large (>4.0 ha)	78.1	12.2
All	64.9	14.4

Source: Birthal et al., 2008

Recently Satyasai and Bharti (2016) conducted their study on the same field, they further divided marginal land holders into lower and upper marginal land holders and found that share of income from livestock in total income in case of upper marginal land holders was 12 per cent but for lower marginal land holders it was 15 percent. Share of other size of the households decreased, and on an average 12 per cent of the total income came for livestock sources (Table 3).

Table 3: Diversification of income sources from farmers

Size class of land possessed (ha)	Share of income from different sources				
	Wages/salary	Cultivation	Livestock	Non-farm business	Total
Landless <0.01	64	1	26	10	100
Lower marginal (0.01-0.40)	57	17	15	11	100
Upper marginal (0.41-1.00)	38	41	12	9	100
Small (1.01-2.00)	24	57	11	8	100
Semi- Medium (2.01-4.00)	15	69	11	5	100
Medium (4.01-10.00)	10	78	8	4	100
Large (>10.00)	3	86	6	4	100
All sizes	32	48	12	8	100

Sources: Satyasai & Bharti (2016)

According to Jumrani and Birthal (2015), 64 per cent households in rural India owned one or the other species of

livestock and incidence of ownership increase with increase in landholding size (Table 4). For example, only 36 per cent of the landless household owned livestock as compared to 88 per cent of the large farm household (>4 ha). However, as society is dominated by smaller landholders, they owned a greater share of livestock population. Marginal farm households hold 47 per cent of poultry, 40 per cent of sheep, and more than 35 per cent of cows, goats, and draught animals, as against their share of 16 per cent of land (Table 4). Farmers with less amount of land usually preferred small animals like sheep, goat and poultry.

Table 4: Ownership and distribution of livestock across landholding size classes

Landholding-size class	Households owning (%)								
	Share in land area	All or any livestock species	Cow	Buffalo	Draft animal	Sheep	Goat	Poultry	Other livestock
Landless	0	36.47	12.94	13.95	7.18	20.22	16.41	17.31	14.51
Marginal (<1 ha)	15.66	74.93	37.49	28.51	35.87	40.86	35.32	47.34	33.21
Small (1-2 ha)	17.43	82.72	17.99	18.67	22.2	14.57	17.58	16.36	18.42
Medium (2-4 ha)	23.15	86.21	16.6	18.46	19.36	13.06	15.02	11.08	16.66
Large (>4 ha)	43.76	88.2	14.98	20.41	15.39	11.28	15.68	7.9	17.2
Total		64.13							

Source: Jumrani and Birthal (2015)

Number of female workers are much higher than male workers in terms of livestock rearing and amongst females, more involvement in animal husbandry was seen by illiterate ones and out of the total adult workers engaged in animal husbandry, 52 per cent were females and out of them 59 per cent had no formal education (Jumrani and Birthal, 2015). The study also found that activities such as animal husbandry are labour intensive thus it was not preferred by literate women, thus women who were illiterate, engaged more in livestock rearing. Illiterate men were more engaged in strenuous works, where it demands more physical labour. Thus, more engagement of illiterate women compare to men could be seen in livestock rearing.

Nexus Between Poverty Reduction and Livestock Ownership

A proposed relationship between the needs, consequences and increased costs for poor livestock-keeping households is presented in Figure 2. As the figure illustrates, the poor have both wider needs of food security, health and housing and more specific need related to livestock-related livelihoods such as access to markets, livestock drugs and extension advice. It is obvious that wider needs which are related to own food security, housing etc. must be fulfilled before livestock related needs. In addition, households must maintain subsistence needs against the costs of livestock production such as expenses for feed/medicines/housing and both direct and indirect costs of labour. With any of these elements missing, households depended on livestock are more vulnerable to the consequences of poverty such as increased livestock morbidity and morbidity due to poor management and loss of the productive assets of the herd. Projects and programs which support the capacity and agency of the poor with respect to livestock production may break the cycle and benefit the household engaging in livestock production.

Chand *et al.* (2011) reported that the majority of households will remain to indulge in poverty if their livelihood solely depends on agriculture. This was supported by the study of Bijla, (2018), who found that the largest share of the escaping poverty was from those groups who had owned livestock in 2011-12 but not in 2004-05 (22.56 %), by using Indian Human Development Surveys (IHDS) data. The reason behind this could be a higher rate of escaping poverty by the previously poor than the rate of falling into poverty by the previously non-poor. Further, the group that owned livestock throughout i.e. 2004-05 to 2011-12 had the highest proportion of the total non-poor (82%) as owning livestock prevent them to fall in poverty. The percentage of poverty declined was higher among those who owned sheep and goat (23%) than those who owned cows and buffaloes (17%). The study also ran a lagged logistic regression with poverty status in 2011-12 on household characteristics in 2004-05, controlling for location, caste, education and occupation and revealed that those who own milch cows and buffaloes have 17 per cent less chances of becoming poor compared to those who do not. Interestingly, livestock has more strong response against poverty than land resources. This confirms the observation of Birthal and Taneja (2006) and Birthal *et al.* (2014) who found that at similar rate of growth, compared to agriculture the livestock has a larger effect on poverty reduction. Another study by Pandey (2018) depicting the negative and significant impact of the number of milch animals on the

incidence of poverty further ascertains the fact.

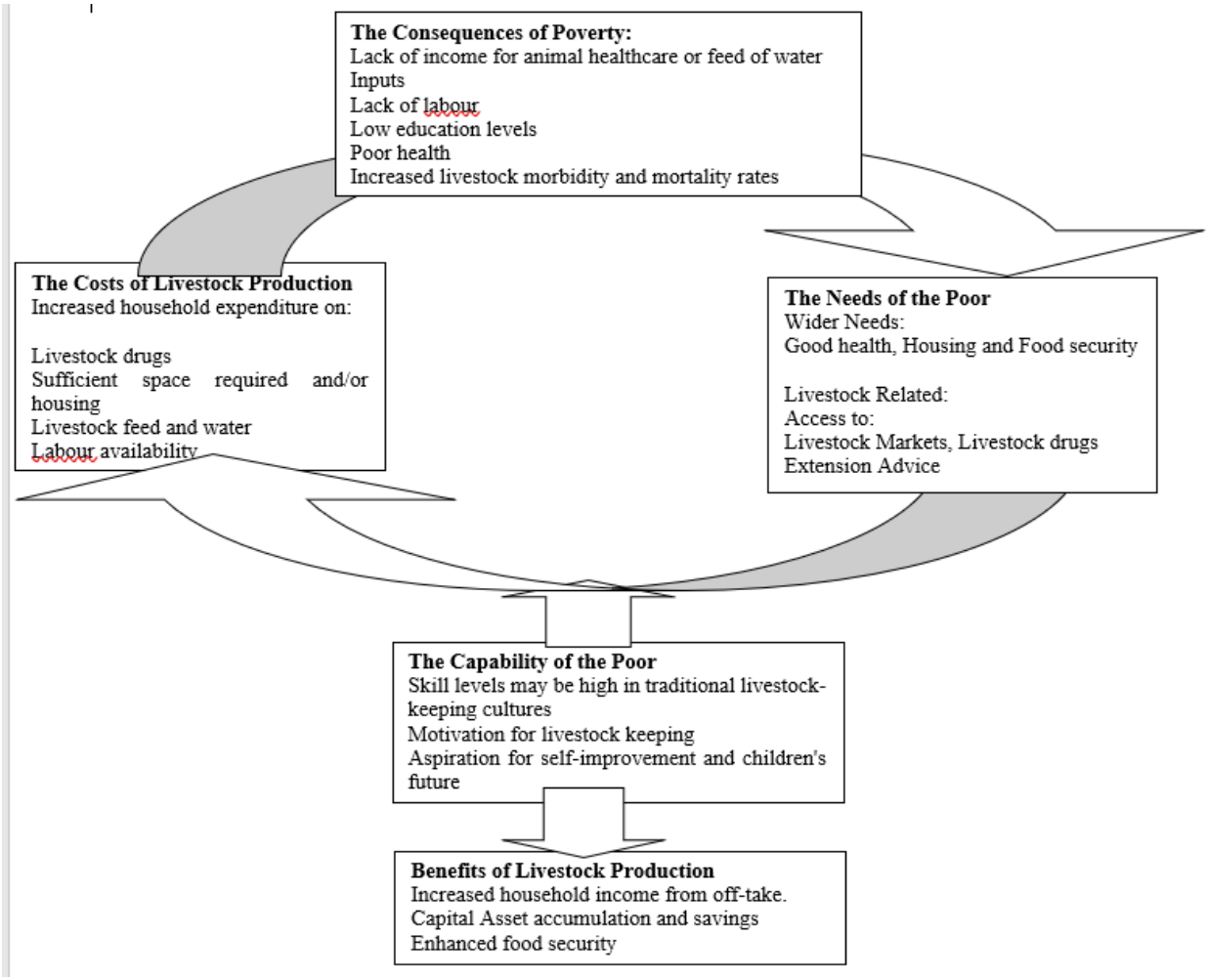

Figure 2: The cycle of Poverty of poor livestock keepers (*Source:* Heffernan ;2004))

Nexus Between Child Nutrition and Livestock

In general, the ownership of livestock has a mixed effect on the nutritional status of children (Jumrani and Birthal, 2015). Owning dairy animals lowers the probability (0.9%) of an underweight child, particularly in the case of children in the age group of 2-5 years. On the contrary, there was a positive association between ownership of small ruminants and children's underweight (0.2%) and wasting (0.1%). The main reason for this was that dairy animals and poultry generated a flow of outputs, which was consumed at home. On the other hand, small ruminants were mostly raised for marketing purposes and were rarely slaughtered for home consumption, once they attain slaughtering age, they were sold to Itinerary traders or distant urban market. Thus, it was obvious that owning livestock is not a sufficient condition for enhancing nutrition. It was intra-household consumption that matters. Another interesting fact that came out from their study was that if female engage in livestock rearing then stunting, underweight and wasting between 0 to 2 years of children reduced 3.4, 3.6 and 3.4 percent respectively. Households with higher women participation in animal care had less probability of having stunted, underweight and wasted children between 0 and 2 years. This was previously supported by Rogers (1996) who had reported that with ~~a~~ greater control over household resources, the consumption preference of women generally in favour of basic needs and child welfare. Few studies in different countries was conducted to find the effect of livestock derived food on child nutrition. Lien *et al.* (2009) supplemented daily diets with 500 ml of plain milk for six months among seven–eight-year-old Vietnamese children and found that a significant improvement in weight-for-age, showing a 13% reduction in the prevalence of underweight children in comparison to the control children.

Impact of Livestock Rearing on Income

The livestock sector is being deemed as one of the promising sectors for boosting farmers' incomes. As many pockets/clusters in the country largely rely on this sector as one of the key sources of income, livestock income at the district level varies significantly across regions and states; thus, different strategies are required for each and every state (Saxena *et al.,* 2017). The study used K means clustering technique and identified four broad zones based on district level livestock income *i.e.*- 1) Least performing zone (LPZ), 2) Average performing zone (APZ), 3) Good/Moderate performing zone and 4) Well performing zone. The farm income level in well performing zone was supported by crop cultivation as well as animal husbandry. This zone comprises of well-endowed districts from ten states of the country; within this zone Odisha, Tamil Nadu and Jharkhand showed very high dependency, to the tune of 55 to 74 per cent, on livestock farming. A large number of the districts fell under the least performing zone. In Haryana and Gujarat, livestock farming had the king share in total income, as good and well performing zones comprised about 50 per cent of the total geographical area of the states and area under LPZ (Least Performing Zone) was as low as 14 per cent in Haryana and 16 per cent in Gujarat. The entire state of Chhattisgarh and the majority of the districts (more than 50%) in almost all the eastern and southern states were least performing in terms of livestock income. Further, the study had found that buffalo to cattle ratio, crossbreed to indigenous cattle ratio, crossbred milk yield had a positive and significant effect, whereas crop and non-farm share effect negatively on livestock income. The Negative effect of the variables related to land also can be seen in the study of Birthal *et al.* (2014).

There was a continuously decrease in Gini ratio of bovine holdings from the year 1961 (0.43) to 1971 (0.37) and further decreased in 1991 (0.28) in India (Sharma *et al*., 2003). However, between 1992 and 2002-03 there had been a slight increase in inequity of in-milk bovine ownership (GoI, 2006). Shortage of area and the quality of common grazing lands making rearing of livestock difficult or even unviable for the near-landless and marginal farmers. Increasing opportunities for such land-constrained households in the non-farm sectors could be another possible reason for their exit from bovine husbandry (Birthal and Taneja, 2006). Livestock was more equitably distributed than land (Ali, 2007) and flow of income from livestock was also expected to be more favourable to low income groups comprising the landless, marginal and small landholders (Birthal, *et al.,* 2014), their study found that livestock (Gini coefficient 0.74) was the second most equally distributed income source after agriculture (Gini coefficient 0.68) and contributes least to the overall inequality in total income.

Livestock rearing also minimizes the income inequality (Sendhilkumar *et al.,* 2019). The study was conducted in Tamil Nadu showed that inequality was less in livestock farmers as seen from Gini coefficient ratio (Gini coefficient of 0.23) and agricultural labourers (0.18) compare to non-farm occupation (Gini coefficient of 0.42) and crop cultivators (0.33). The income of agricultural labour was very less in order to overcome the poverty line, thus livestock rearing will be the most viable option for income equality. The study also showed that among different species of livestock cattle had lowest income inequality observed from the Gini coefficient ratio (0.18) followed by buffalo (0.22), goat (0.25) and sheep (0.26). The reason for relatively greater inequality for sheep compare to the other livestock was the irregular and forced sale of animals, larger variation in price levels of rams, ewes and lambs, greater exploitation by middlemen, greater variation in flock size among the sheep farmers might be the reason for higher variation in the income level of sheep farmers leading to higher income inequality.

Factor Influencing the Adoption of Livestock

Farmers' decisions to keep livestock are influenced by a number of household factors like farmer's experience, occupation, land, labour endowments and the surrounding socio-economic environment like social group, access to credit, media, etc. A study conducted by Kumar and Singh 2007 found that labour had positive and significant effect implying sufficient availability of family labour facilitated the livestock rearing. Occupation of the household also had a significant role in the decision making whether to rear livestock. The coefficient for agricultural labour and other labour households were negative (-0.0981 and -0.226 respectively) as the labourers may face trade-offs between allocation of their labour for wage earning and rearing livestock to supplement their household income. The coefficients for households self-employed in agriculture was positive and significant. These was obvious as self-employed household where agriculture is only source of income would like to enhance its income and to minimize risk by including livestock enterprises. The existence of strong crop-livestock interaction could also be seen by the positive and significant relation between farm size and livestock rearing which was also found in this study. It was anticipated that availability of feed and fodder had direct relationship with size of land holding. This

finding was also supported by Kishore *et al.* (2016). The positive and significant coefficient of tube-well implied that assured irrigation by ensuring the availability of fodders, particularly green fodders induces farmers to keep livestock. Possession of assured irrigation facilities also reduces the risk of fodder shortage (Kumar and Singh 2007, Rao and Birthal, 2008). Share of dairy income to total income had a positive and significant effect on total family income which showed the importance of dairy is much more in marginal and land less household than larger farmers (Yasmeen *et al.,* 2020). The effect of caste (general) had a positive and significant influence on the decision of livestock rearing. It could be because of better resource endowments available to the general caste (Kumar and Singh 2007). The coefficients for state dummies showed different effects. Most of the states showed positive and significant effects, which indicated the role of the state in promoting livestock development. Some states were more proactive to encourage farmers to keep livestock by institutional, technological, and policy interventions, while some of the states lagged behind (Kumar and Singh 2007). After recognising the potentiality of this sector, recently NABARD in cooperation with Tamil Nadu Veterinary and Animal Sciences University (TANUVAS) initiated training programme on latest farming technology to the farmers (20 to 30 persons per batches) which involved in cattle rearing/dairy activities and rearing of sheep/goat, as well as country fowl. They will also be taken for exposure visit to progressive farms with NABARD bearing the cost of exposure visits/training. Besides, the Union Government recently announced setting up of Animal Husbandry Infrastructure Development Fund (AHIDF) amounting to Rs. 15000 crores with an interest subsidy scheme to promote investment by private players and MSMEs in dairy, meat processing and animal feed plants; a move which is expected to create 35 lakh jobs. In order to develop dairy infrastructure, the government had earlier approved Dairy Infrastructure Development Fund (DIDF) worth of Rs 10,000.

Conclusion

Rural economy is greatly depended upon livestock. Livestock plays an important role in socio-economic development of rural household. Sixty two percent of the marginal farmers were associated with livestock and according to the latest data reports, 17 per cent of their total income came from the livestock sector. Besides generating income livestock rearing also provide nutritional security and help the rural household to overcome poverty. Percentage of poverty reduction was higher in case of small ruminant holders than cattle holders but we should remember that rearing livestock is the necessary but not the sufficient condition for enhancing nutritional security. Intra-household consumption which actually matters for enhancing nutritional security. Livestock sector also has the potential to remove the inequality among rural households as Gini coefficient of livestock sector was lesser than agricultural labourers and non-farm occupation. Number of household factors like farmer's experience, occupation, land, labour endowments, and the surrounding socio-economic environment such as social group, access to credit, media, etc. usually responsible for the adoption of livestock across rural households. Both NABARD and Government of India had taken a number of steps to support this sector in order to boost farmers' income.

Conflict of Interests

There is no conflict of interest.

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