

Assessing Contribution of Livestock to the Livelihood of Farmers of Western Maharashtra

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ABSTRACT Animal husbandry has been an integral part of Indian agriculture. It assumes greater significance in India's socio-economic development. Livestock system is known to enhance sustainable livelihoods for farmers. The present study assessed contribution of livestock system to farmers' livelihood in terms of six dimensions. The study was taken up in western Maharashtra covering 5 taluks of Satara district and 100 livestock farmers. The percent contribution of livestock to the household income ranged from 18.60 to 33.90 percent. The livestock contributes 34.61g protein, 52.32g fat and 1690.5 mg calcium to the daily diet of the farm household. The average nutrients required to is 42.57 g protein, 64.35 g fat and 2079 mg calcium. Farm yard manure obtained from the livestock annually adds an average of 89.33 kg nitrogen, 44.69 kg phosphorous and 178.76 kg potash to the fields of each farm household. Livestock generated annual employment of 140.79 man- days for adult women and 95.35 mandays for adult men. Twelve percent of the households used livestock for mitigating uncertainties of farming. Sixty-three percent of respondents opined livestock farming is a symbol of higher social status. The study concludes that livestock system contributes economically and socially to enhance sustainable livelihoods.

INTRODUCTION

Animal husbandry development in India has assumed a much broader role in the overall economy than so far envisaged (Srichand 1995). Demand for animal food products in India is also rising owing to population increase; urbanization and sustained rise in per capita income (Bithal and Taneja 2006).

Bovine population of India is 196 m cattle and 80 m buffaloes accounting for about 81 per cent of Asia and about 19 per cent of world bovine population. In global scenario, India ranks first in cattle and buffalo population, second in goat, third in sheep and seventh in poultry. The contribution of livestock sector to agricultural GDP has been steadily growing. It was about 22.51 per cent in 1999-2000 and has increased to 31.70 per cent in 2006-07.

Livestock farming represents the only way by which the large parts of natural vegetation can be converted into economic products. Livestock products play an important role in export earnings. Livestock sector helps in augmenting farm family income, narrowing down the protein gap, providing draught power and manure for crop cultivation and in earning foreign exchange. In Maharashtra, animal husbandry mostly provides subsidiary means of livelihood to the farmer and livestock rearing is an integral part of agriculture. Its share in gross state domestic product of agriculture sector during 2009-10 was about 7.8 per cent (Anonymous 2011).

Livestock is an integral part of Indian agriculture. Livestock will continue to play a key role in farming system even in the future. To date, research in the livestock production system emphasized much on its production parameters and there is a paucity of information on its contribution to the livelihood of farmers. In view of this, the present study was taken up with the objective to assess the extent of contribution of livestock production system to the livelihood of farmers of western Maharashtra.

MATERIAL AND METHODS

The study was conducted during the year 2008-09 in Satara district of Maharashtra. The

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study was purposively confined to the western region of Maharashtra as it had relatively large livestock population. Based on livestock population, seven districts of this region were arranged in descending order. Pune district though topped the list owing to its industrialization, Satara district, second in the list was selected. On the similar lines, among the 11 *taluks* of this district arranged in descending order based on the livestock population, the first five *taluks* namely Karad, Patan, Phaltan, Khataw and Satara were selected. Two villages each from these *taluks* were selected randomly, covering 10 villages of the district. The respondents were selected randomly in each village based on the criteria of livestock ownership. However, due care was taken to select the households possessing adequate number and types of livestock. In each selected village, 10 farmers were identified randomly and were interviewed. Thus, the study covered a sample of 100 respondents.

Milk and farm yard manure were the two important products considered to measure the livestock production system. Livestock numbers were expressed as Adult Cattle Units (ACUs). Data on average milk production (liters/day/household) of cow and buffaloes and average production of farm yard manure (ton/year/household) were collected. The households were then grouped into three main categories as low, medium and high for total milk yield, milk yield of cows and buffaloes; and production of farm yard manure based on mean and standard deviation.

Livestock's contribution to the livelihood of respondents was assessed in terms of six dimensions and were quantified/ expressed as mentioned below-

- i. *Contribution of Livestock to the Total household Income:* Percentage contribution of livestock income to the total household income was computed.
- ii. *Nourishment to the Family:* Based on the daily average milk consumed by the family, the nutrients were computed in terms of protein, fat and calcium as suggested by Gopalan et al. (1971), the main nutrients present in milk and milk products.
- iii. *Nutrients to the Farm:* The average farm yard manure applied to their respective farm was converted in terms of N, P and K by following the conversion factors suggested by Gautam (2007), that is, one ton of FYM was equivalent to 8 Kg N, 4 Kg P_2O_5 and 16 Kg K_2O .
- iv. *Employment Generation:* Number of hours engaged in livestock rearing for one year was collected both for family labour and hired labour. Further in each category split up was made as women and men. Total hours spent in a year was divided by 8 hours to convert them in to man-days. Total number of man-days contributed by each category of labour was expressed as mean values.
- v. *Security for Uncertainties:* Number of households having used livestock to face the uncertainties in the past 2 years was collected and presented in the table.
- vi. *Status Symbol:* The number of households who regard keeping livestock to symbolize their wealth was collected and presented in the table.

Pre-tested and standardized schedule was used to collect the data. Data was collected by personal interview technique and analyzed using appropriate statistical tools.

RESULTS AND DISCUSSION

Livestock Production System of Livestock Owners

More than half (55.00%) of the respondents possessed medium herd size ranging from 4.06 ACUs to 15.45 ACUs. This was followed by small (less than 4.06 ACUs, 31.00%) and large (above 15.45 ACUs, 14.00%) herd size (Table 1). The average size of the herds possessed by the respondents was 9.8 ACUs. This could be related with the large land holdings of the respondents (average land holding was 8.68 ha) as it provides adequate dry fodder, if not green fodder, to feed the livestock. Correspondingly, 51 per cent of the respondents obtained medium level of milk yield ranging from 14.27 to 70.66 liters/day. Further, it was found that 51 per cent and 55 per cent households obtained medium quantity of milk from cow and buffalo, respectively. Many of the respondents possessed improved breeds of the cattle. Along with this the availability of adequate quantity of fodder would have helped them to obtain medium level of milk yield. The above findings were in accordance with findings of Mundhwa and Padheria (1998), Senthil-kumar et al. (2005) and Pushpa (2006).

Table 1: Livestock production system of respondents' families (n=100)

S.No.	Particulars	Categories	Respondents No. / %
1	Herd Size (ACUs)	Small [<4.06]	31
		Medium [4.06-15.45]	55
		Large [>15.45]	14
		Mean = 9.8, SD = 13.4	
2	Total Milk Yield (liter/day/household)	Small [<14.27]	36
		Medium [14.27-70.66]	51
		Large [>70.66]	13
		Mean = 42.47, SD = 66.36	
3	Cow Milk Yield (liter/day/household)	Low [<2.46]	35
		Medium [2.46-39.17]	51
		High [>39.17]	14
		Mean = 20.82, SD = 43.20	
4	Buffalo Milk Yield (liter/day/household)	Low [<2.49]	35
		Medium [2.49-45.71]	55
		High [>45.71]	10
		Mean = 24.1, SD = 50.85	
5	Farm Yard Manure (t/year/household)	Low [<9.19]	41
		Medium [9.19-13.15]	26
		High [>13.15]	33
		Mean = 11.17, SD = 4.68	

More than 50 per cent of the respondents obtained cow milk in the range of 2.46 to 39.17 lit/day/household and buffalo milk in the range of 2.49 to 45.79 lit/day/ household. The average daily cow milk and buffalo milk obtained by a household was 20.82 liters and 24.10 liters, respectively. This might be due to the possession of cross bred cows, improved breeds of buffaloes, better management and care of milch animals and increased use of concentrates. The above findings were in accordance with findings of Bhasin (1980) and Wadear et al. (2005).

Majority per cent of the household produced low (41.00%, <9.19 tons) and medium (26.00 %, between 9.19 to 13.15 tons) quantities of FYM expressed in terms of tons/year/household. Poor management of farm waste coupled with the system of using open pits for composting could be the reasons for the above finding. Introducing simple and farmer-friendly modifications such as hybrid pits (both heap and deep pit), construction of earth bunds to protect pits from inundation with runoff water, or the use of pits with thatched roofs facilitate good quality and quantity of FYM production (Sammi Reddy et al. 2010).

Purpose of Livestock Keeping

Fifty- eight per cent of the families ranked milk to sell as the first purpose, 27 per cent and

Table 2: Matrix showing the purposes for which livestock were kept (n=100)

Purposes	Rank					
	1	2	3	4	5	6
Milk to sell	58	27	10	1	3	1
Milk to family	33	24	38	5	0	0
Dung for fuel	0	1	3	71	23	2
Dung for Manure	7	44	40	7	0	2
Use as draft power	2	2	7	15	71	3
Gobar gas	0	1	1	0	1	97

Figures in terms of respondents' number / percentage

10 per cent respondents assigned second and third ranks to it, respectively (Table 2). Milk to the family was ranked as first by 33 per cent of the respondents. Twenty- four and 38 per cent of the respondents assigned second and third ranks to it, respectively. Dung for fuel secured 4th place by 71 per cent and 5th place by 23 per cent of the respondents. On the contrary, dung for manure secured 2nd place by 44 per cent and 3rd rank by 40 per cent of the respondents. It shows that almost all the respondents expressed that their purpose of livestock keeping is a commercial purpose followed by subsidiary purpose. The respondents were highly educated so they might be aware of the fact that livestock rearing provides additional income, improves their living conditions and provide additional employment to the family members. The findings were in line with the findings of Prasad et al. (2001) and Rao et al. (2002).

Contribution of Livestock to Livelihood of Farmers

Household Income

Trend analysis of livestock contribution for the period 1988 to 2008 indicated that 87 % farmers expressed that its contribution to the household income increased in the period (Table 3). Only 5 percent and 8 percent households reported that it was decreased and constant, respectively. This could be due to the increase in the number of crossbred cows and buffaloes as observed in the present study. Correspondingly, it was found that there was slight increase in the herd size possessed by the respondents. Similar findings were reported by Samal et al. (2006). At farm level, the importance of livestock as an income source and the actual sources of income vary across ecological zones and production systems, which in turn determines the species raised and the products and services generated. Cash can be generated from sales of livestock products regularly (milk, eggs) or sporadically (live animals, wool, meat, hides) or from services (draught, transport). Dairy produce is the most regular income generator. Dairy development has been shown to increase income, consumption and repayment capacity in India (Kulkarni et al. 1989; Saini et al. 1989). Percent contribution of livestock to the household income was presented taluka wise in Figure 1, which ranged from 18.63 percent to 33.9 percent.

Nourishment to the Family

The livestock was daily contributing to 34.61 g of protein, 52.32 g of fat and 1690.5 mg of calcium to respondent's families (Table 3 and Fig. 2). However, daily requirement of these nutrients to the family was 42.57g protein, 64.35g fat

and 2079mg calcium. Therefore, the livestock was contributing 81.30 per cent of protein, 81.30 per cent of fat and 81.31 per cent of calcium to the diet of the family. Majority of the respondents belonged to good economic condition and hence they might retain adequate quantity of milk to their family consumption due to the awareness of its nutritional value.

Nutrients to the Farm

Livestock convert crop residues and fodder/forage to soil nutrients through manure. Application of manure helps to improve soil texture and decompose litter more easily. It also contributes to increased productivity. The livestock was contributing 89.33 kg N, 44.69 kg P and 178.76 kg K every year to the farm of the respondents in the form of FYM (Table 3). It is greatly acknowledged in the science that organic manure adds foundation to the sustainable and eco-friendly farming. The quantity of FYM available with the farmer depends on his herd size, livestock species, type of feed, housing system, feeding system and manure storage and spreading practices. Bajracharya (1999) reported that using the traditional feeding system and farm yard manure (FYM) preparation method, a large adult ruminant provides approximately 1,140 kg of FYM and potentially approximately 29 kg of nitrogen (N) per year. Going through this report, if we compare the mean herd size in the present study (9.8 ACUs) with the nutrients contribution, it is less thus indicating that the farmers could be poorly managing the FYM.

Employment Generation

Increased production implies higher employment. Livestock production system is labour intensive at farm level and labour typically amounts

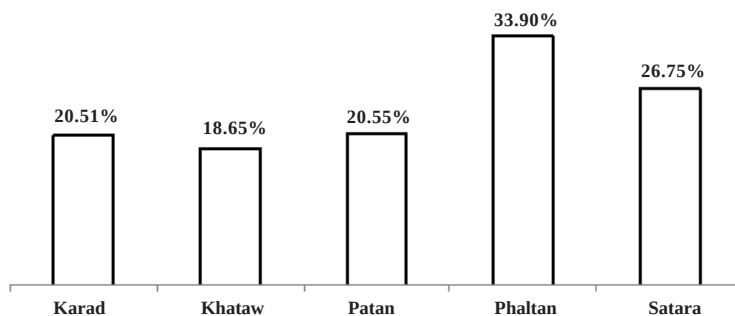
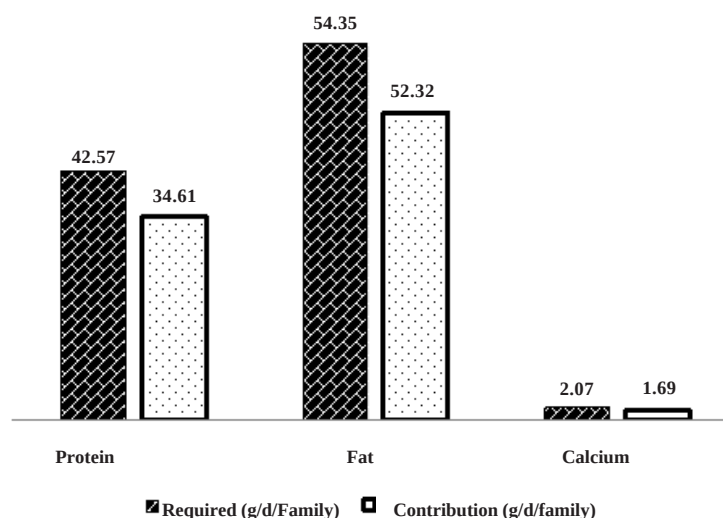


Fig. 1. Contribution of livestock to household income

Table 3: Contribution of livestock to the farmers' livelihood (n=100)

Type of contribution	Units	Values
<i>Total Household Income</i>		
	Percentage Trend (1988-2008)	
	Increased	87
	Decreased	05
	Constant	08
<i>Nourishment to the Family</i>		
	Protein (gm/day/family)	34.61
	Fat (gm/day/family)	52.32
	Calcium (mg/day/family)	1690.5
<i>Nutrients to the Farm</i>		
	N kg/year	89.33
	P kg/year	44.69
	K kg/year	178.76
<i>Generating Employment</i>		
	Man days/year	
	Adult women	140.79
	Adult men	95.35
	Hired adult women	202.05
	Hired adult men	219.82
<i>Security for Uncertainties</i>		
	Percentage	12
<i>Status Symbol</i>		
	Percentage	63

**Fig. 2. Contribution of livestock to household income**

to over 40 per cent of total costs in small herder systems. It is estimated that each 610 kg per day of additional milk processed in India adds one man-day for feeding and care. Goats, sheep and poultry are an important source of part-time work, particularly for landless women and children. In the present study, livestock generated an em-

ployment of 140.79 man-days for adult women and 95.35 man-days for adult men every year within the family (Table 3). When analyzed for the hired labour, it was 202.05 man-days for adult women and 219.82 man-days for adult men. Livestock rearing is labour intensive activity and it requires daily care and regular performance of

certain related activities. In addition to this, most of the respondents were having medium to large herd size that demands more man-days.

Security Against Uncertainties and as Status Symbol

Twelve per cent of the respondent's families used livestock for meeting uncertainties (Table 3). Availing credit from banks would be difficult for the farmers due to the procedures involved and in sudden need for the money, farmers might have felt it easier to rely on the sale of livestock.

Sixty- three per cent of respondent families felt that in society keeping more number of livestock symbolizes wealth (Table 3). This could be due to the fact that in olden days richness of the household was measured in terms of the cattle strength.

CONCLUSION

The average size of the herd possessed by the respondents was 9.8 ACUs, the overall contribution of which to the household is increasing over the years when assessed for the period 1998-2008. More than half of the respondents mentioned that the first purpose to keep the livestock is to obtain milk to sell that provides additional source of income to their livelihood. Milk to the family was ranked as first by 33 per cent of the respondents and correspondingly study indicated that the livestock was contributing 81.30 per cent of protein, 81.30 per cent of fat and 81.31 per cent of calcium to the diet of the family. Obtaining dung for manure secured 2nd place by 44.00 per cent and 3rd rank by 40.00 per cent of the respondents. The farm yard manure generated by the household was helping to add an average of 89.33 kg nitrogen, 44.69 kg phosphorous and 178.76 kg potash every year. The generation of employment due to livestock was encouraging as it generated to the extent of 95.35 to 140.79 man-days in a family and 202.05 to 219.82 man-days when hired. Livestock role, to meet the family uncertainties and as status symbol, was also evident for the study. Contribution of livestock was hitherto measured in terms of income it generated. The present study quantified its contribution even for non food outputs, indicating its greater role in the economy. The holistic contribution of livestock to different dimensions of the rural livelihood should be reflected in the policy aspects and budgetary

allocations for the livestock development in the country.

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