



Intervention points for small ruminant development in India: Insight from a field level survey

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Received: 18 April 2015; Accepted: 28 May 2015

ABSTRACT

The present study was undertaken to identify the intervention points for small ruminant sector development, assess socio-economic status of small ruminant farmers as well as reach of institutions and technology in small ruminant development. The study was undertaken by using field level information collected through primary survey from 400 farmers of Andhra Pradesh (undivided) and Rajasthan. The technologies with regard to vaccination have exhibited larger level of adoption compared to other technologies. The most important constraints faced by farmers were with regard to veterinary care, feed and fodder and live animal marketing. The institutional sources, as epitomized by veterinarians of state government turned out to be the most important source of treatment (67%). Self-treatment without consultation is practiced by almost 100% farmers. Farmers heavily depend on the common pastures for feed and fodder requirement. Penetration of insurance was very low. The credit absorption was only about 7%, and that too from money lenders. Another major constraint was with respect to marketing systems- the live animal markets are highly under developed- the farmers continue to rely on traditional market channels. The study points to the need to improve efficacy of institutional mechanisms including reforming livestock markets, strengthening veterinary care systems with improved man power, efforts to conserve pasture land and improve its productivity, and, channeling greater credit and insurance coverage for the small ruminant sector.

Key words: Goat, India, Institutions, Sheep, Small ruminants

The role of livestock in driving agricultural growth in India is getting more and more pronounced with the passage of time. The value of output from livestock sector has increased from ₹ 1.8 lakh crore in 2004–05 to ₹ 2.6 lakh crore as on 2012–13 at a growth rate of 7.0%, a rate higher than that of the agricultural sector (5.8%). With such a growth rate, the share of livestock sector in the total value of output of agricultural sector also is on rise- from 28.2% to 30.1% during the above period (CSO 2014). Among the major livestock groups, small ruminants (SRs) group carries an important role, as they are reared mostly by the resource poor and marginalized section of the society. They often function as a liquid asset which can be encashed at short notice (Birthal and Taneja 2012). Further, they form the basis of a thriving woollen industry. The domestic price of small ruminant meat is higher compared to most of the other meat items. The total value of output from mutton/ chevon in India during the year 2012–13 at national level was ₹ 15,071 crore (at 2004–05 prices). This constituted nearly one-third of the value of total meat produced in India. Further, the SR meat is performing well in the export

markets also (Suresh *et al.* 2012). The incremental export of mutton/chevon was more than the incremental production (Suresh and Kavita 2012) during the period of 1990–2010.

As per 2012 livestock census, India possesses about 200 million small ruminants. Among the major states in India, Andhra Pradesh (undivided) and Rajasthan owns the highest number of small ruminants (GOI 2013). Both of these states together accounted for about one-third of total small ruminants in India.

Research and development activities were undertaken by both the central and state governments to increase the productivity and production of small ruminants. Consequently, there are many technology advancements and institutional interventions. Despite this, the small ruminant sector in India is underdeveloped and needs attention of planners and policy makers (Kumar and Pant 2003, Planning Commission 2011). An insight into the production practices would help greater targeting of technologies. In this context, the present paper identifies the intervention points in technology and institutional realms to boost the small ruminant production.

MATERIALS AND METHODS

The study is solely based on primary data collected from Andhra Pradesh (undivided) (AP) and Rajasthan, 2 states having the largest number of small ruminants. From each

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state, 2 districts were selected purposely based on the highest small ruminant density calculated as the number of small ruminants per hectare of land. Accordingly, Ananthpur and Mahbub Nagar were selected from Andhra Pradesh and Nagour and Sikar were selected from Rajasthan. From each district, 5 villages and from each villages 10 farmers each were randomly selected for collecting the detailed information. The survey was carried out in the year 2012 by using pre-tested survey schedule. Thus, the total sample size was 400 consisting of 100 farmers from each district. The survey schedule carried questions regarding the socio-economic background; holding size of various livestock; adoption of improved management practices, access to veterinary facilities; constraints in the small ruminants farming and the income and expenditure pattern.

RESULTS AND DISCUSSION

The small ruminant rearing is mostly undertaken by the socially backward section of the society. The distribution of the small ruminant farmers indicated that close to three-fourths belongs to the other backward communities (OBCs). The Scheduled caste (SC) and scheduled tribe (ST) farmers together accounted for over 10% of the total farmers. The average size of operational holding for SRs varied significantly between AP and Rajasthan- as low as 0.65 ha in AP to as high as 9.2 ha in Rajasthan. There was high level of variability distribution of operational holding. The distribution of small ruminant farmers into various land owning categories indicated that at the aggregate level about 35 % SR farmers were landless; about one-fourth was marginal and small holders; 18% were semi-medium and medium and the rest (13%) constituted the large land holdings who operated more than 10 ha of land

Livestock ownership: On an average, the farmers of AP

Table 1. Distribution of livestock holding across states (no.)

Livestock	Andhra Pradesh	Rajasthan	Average
Sheep	78.5	52.2	68.6
Goat	7.8	39.2	23.5
Cow	0.43	0.52	0.48
Buffalo	0.38	1.23	0.85
Ox	0.35	0.48	0.43

Source: Field data.

owned 87 SR in the flock consisting of 79 sheep and 8 goats (Table 1). The average flock size of Rajasthan farmers' was 92 with 53 sheep and 39 goats. Thus, the major difference in the flock composition between the two states is the large dominance of sheep in AP.

An analysis of the flock composition revealed that sheep, both states put together, close to one-third composed of adult females (ewes); and 3.7% adult males. The recommended proportion of the adult males and females in a flock for healthy reproduction is 1:30. Broadly this ratio is maintained in both the states. In case of goats, close to 46% of the flock is composed of adult females (does).

The distribution of the size of flocks varied across farmer categories (Table 2). On an average, size of sheep flock was 78 in farmers of general caste, 72 in OBC and 59 in SC/ST farmers. The average flock size of sheep in Rajasthan was significantly higher with general caste farmers, compared to OBC; whereas it was almost equal between general and OBC farmers (there was only 1 SC/ST farmer). On the otherhand, the distribution of goat did not show any significant trend.

Compared to caste-wise distribution of SRs, the land category-wise distribution exhibited more consistent pattern of increasing livestock holding size with higher land category. Such a pattern was more prominent in Rajasthan.

Pattern of adoption of improved technologies: One important strategy to enhance the productivity is breed improvement. One of the major constraints reported by farmers is the lack of elite rams/ bucks. In sheep, for both the states put together, close to 71 % farmers use own rams. However, in bucks, it is low at 59% (Fig. 1). Mostly farmers use a superior breeding male for quite a long period of time. Therefore, exchange of the breeding male is advocated to improve flock performance. However, adoption of this practice is quite low. The new technologies with regard to the breed improvement, viz crossbreeding and artificial insemination were not adopted. Only a few farmers (15% on an average) purchase concentrate feed (Table 3). The concentrate feeds are given mostly to the breeding rams, and occasionally to pregnant ewes. The technologies with regard to animal protection are often adopted. For example, about 60% farmers of Rajasthan have reported adoption of vaccination against at least one disease.

Animal mortality: One of the major problems with

Table 2. Distribution of SR across caste and land category groupings (mean number)

State	Livestock	Caste group			Land category					
		General	OBC	SC&ST	Landless	Marginal	Small	S-Medium	Medium	Large
Andhra Pradesh	Sheep	84.1	84.8	102.0	99.0	77.0	66.2	57.0	-	-
	Goat	3.1	8.3	0.0	7.0	9.3	10.1	0.3	-	-
Rajasthan	Sheep	74.3	55.3	58.0	23.5	0.0	19.8	71.1	124.5	71.8
	Goat	42.0	37.8	42.6	17.6	0.0	20.2	50.7	78.3	45.9
Overall	Sheep	78.3	72.1	59.2	67.4	75.0	56.3	67.1	124.8	71.8
	Goat	26.1	21.0	41.5	11.5	9.1	12.3	36.1	78.4	45.9

-, Indicates data not available. Source: Field data.

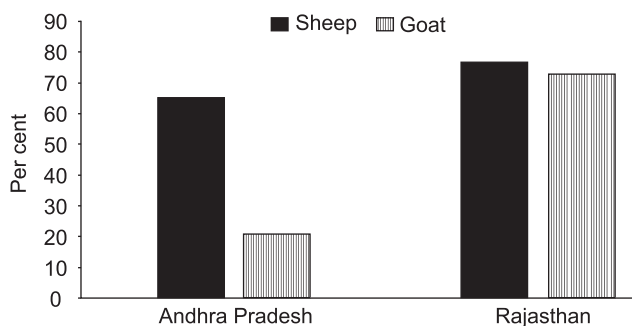


Fig. 1. Extent of possession of elite breeding rams of sheep and goat.

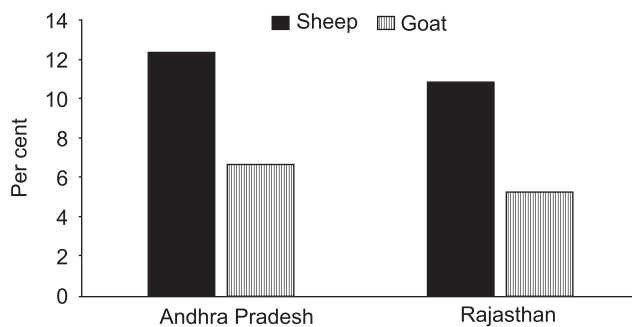


Fig. 2. Extent of animal mortality in small ruminants.

respect to the SR farming is higher level of mortality. The average mortality was to the tune of 8.6% and 7.7% for sheep and goat respectively (Fig. 2). The higher level of

mortality due to diseases is a serious concern and warrants concerted efforts to reduce it through vaccination and other measures. The extent of mortality was slightly higher for AP compared to Rajasthan.

Institutional support for small ruminant farming

Veterinary care: The development of livestock sector needs active institutional support. One major area that is needed to be focused is the veterinary care system. The lack of accessibility to the veterinary care was reported as a major constraint in livestock sector in general and small ruminant sector in particular. Farmers generally access multiple sources for treatment of the animals (Table 4). Overall, it has emerged that almost two-third farmers availed the home service of veterinarian employed with the state department. In Rajasthan, almost 96% farmers resorted to this mode of treatment. A considerable proportion of farmers self-treat the animals without the consultation of qualified veterinarians. This was to the extent of 100% in Rajasthan and almost one-quarter in AP. The service of private veterinarians was adopted by as high as 45% farmers. Other sources were the advices from the fellow farmers (56%) and sellers of the chemists shop (43%). The ethnic healers were not a major source. Overall, it could be concluded that the farmers depends largely on institutional mechanisms like government veterinarians by either visiting the government operated clinics (35%) or availing their services at home (67%). It highlights the need to strengthen the institutional facilities for veterinary care and to encourage

Table 3. Level of adoption of technology in SR management (% of farmers)

Technology	Sheep		Goat	
	Andhra Pradesh	Rajasthan	Andhra Pradesh	Rajasthan
Crossbreeding	0	3.00	0	3.50
Artificial insemination	0	1.50	0	1.50
Vaccinations against any diseases	11.5	60	4.0	58.5
Purchased livestock feed	26.0	26.5	25.0	31.0

Source: Field data.

Table 4. Major source of veterinary service availed by the farmers

Sources	(% of farmers)		
	Andhra Pradesh	Rajasthan	Overall
Self-treatment (without consultancy)	26.00	100.00	63.00
Fellow farmer	15.50	96.00	55.75
Ethnic healers	9.50	1.75	5.63
Visit to government veterinary clinic	38.00	30.75	34.38
Home service by government veterinarian	34.00	99.50	66.75
Private veterinary service	45.50	44.25	44.88
Seller in chemist's shop	60.00	27.75	43.88
Others	13.00	12.50	12.75

Source: Field data.

Table 5. Farmers' access to different source of information regarding animal husbandry practices

Sources	(%)		
	Andhra Pradesh	Rajasthan	Overall
News paper	73	67	70
Radio	72.5	95.5	84
Television	71	81	76
Farmer leader	73	15.5	44.3
Fellow farmer	70.5	81	75.7
NGOs	71.5	10.5	41.0
Veterinary clinics	29.5	95	62.3
Research station/university	20.0	14	17.0
Chemists shop	26.5	46	36.3
Others	80	13	46.5

Source: Field data

farmers to avail the services of qualified veterinarians.

Information sources on sheep farming: Access to information influences the attitude and adoption of improved technologies and practices. In this context, an analysis was done to examine the sources of information available to the SR farmers. It has emerged that radio continues to be the most important information source, followed by television, fellow farmers and newspapers. Reliance on institutional agencies like veterinary clinics, research stations/universities, and NGOs were also significant (Table 5).

Credit and insurance: One major concern with respect to the livestock farming is the lack of adequate institutional credit. In SR farming, credit requirement is mainly for starting new ventures and to increase the flock size. The study indicated that in AP only 2% farmers have availed credit facility, whereas in Rajasthan it was 12%. All these farmers availed credit from non-institutional sources. Adequate flow of credit to this sector from institutional

sources would perhaps improve the SR farming situation. Despite the presence of insurance schemes for small ruminants, none among the sample farmers adopted them.

Marketing of live-animals: The major income from SR is by selling the animals for meat purpose. A large number of intermediaries exists in live animal marketing. The most important channel is the small traders visiting the villages regularly, purchasing the animals from farms and selling them in the animal markets. A small proportion of the farmers transport the animal directly to the markets. Information was collected on the marketing system also during the data collection process. The live-animal markets are traditional and suffer from large level inefficiency (Kumar *et al.* 2014). One major factor that affects the inefficiency is element of monopsony in form of limited number of commission agents, price fixation without weighing animals, fixing prices for a group of animals rather than individual basis, fixing the price without open auction (through opaque means like under cover methods), lack of

Table 6. Major constraints faced in sheep farming

Constraints	Score (1–10)					
	Rajasthan		Andhra Pradesh		Overall	
	Score	Rank	Score	Rank	Score	Rank
Scarcity of breeding ram	8.7	9	3.4	2	6.1	8
High incidence of diseases (and parasites)	5.4	6	3.4	1	4.4	2
Scarcity of veterinary services	4.9	4	4.0	3	4.5	4
High cost of veterinary services and medicines	4.7	3	4.1	4	4.4	3
Imperfect markets	5.3	5	5.1	6	5.2	5
Inadequate technical knowledge on sheep farming	5.4	7	6.5	7	6.0	7
Low price of milk	5.8	8	7.9	10	6.8	9
High incidence of infertility problems*	4.6	2	7.0	8	5.8	6
Scarcity of fodder	1.1	1	4.9	5	3.0	1
Lack of credit facilities	9.0	10	7.8	9	8.4	10

*includes cases of abortion as well. Lower scores translate to higher ranks, and indicates higher level of severity

Source: Field data.

Table 7. Gross costs and returns of sheep and goat farming in Rajasthan

Item	Sheep		Goat	
	Amount (₹)	Share (%)	Amount (₹)	Share (%)
Expenditure				
Feed and fodder	29884	89.1	16410	92.6
Veterinary care	3287	9.8	1313	7.40
Shearing and transportation	359	1.1	0	0
Gross cost	33530	100	17723	100
Revenue				
Sale of live animals	74727	91.5	45234	92.9
Sale of wool	2778	4.7	0	0
Sale of dung	3537	3.9	993	2.0
Sale of milk	0	0	2462	5.1
Gross revenue	81642	100	48688	100
Net revenue	48112		30965	

Source: Field data.

Table 8. Gross cost and return of sheep and goat farming in Andhra Pradesh

Item	Sheep		Goat	
	Amount (₹)	Share (%)	Amount (₹)	Share (%)
Expenditure				
Feed and fodder	15199	72.7	2831	83.3
Veterinary care	5700	27.3	566	16.7
Gross cost	20899	100	3397	100
Revenue				
Sale of live animals	60200	94.8	7034	87.0
Sale of wool	0	0	0	0
Sale of dung	3130	5.2	422	502
Sale of milk	0	0	633	7.8
Gross revenue	63330	100	8088	100
Net revenue	42431		4691	

Source: Field data.

facility to keep animals in market places, lack of infrastructure etc., to mention a few. Acharya and Ahuja (1998) have also noted deficiencies of various forms existing in small ruminant markets. Reforms have not penetrated the live-animal markets. This renders both the farmers and consumers in a disadvantageous position. The APMC reforms introduced in agricultural commodities, though is not in sync with the present time realities of an open economy, have helped to improve the marketing scenario. In the light of these experiences, urgent attention is warranted to reform the live-animal markets so as to pass greater benefits to the producers and consumers.

Major constraints in small ruminant farming: Based on field experience and on discussion with the experts, 10 most probable constraints faced by sheep farmers were identified. The farmers were asked to rank the constraints based on the severity, with lowest rank represents the severest constraint. In order to prioritize, the mean values were computed over the entire range of farmers (Table 6).

The most important constraints were fodder scarcity, problems associated with animal diseases (high incidence of disease, high cost of veterinary services and medicines, and scarcity of veterinary services) and marketing problems. In Rajasthan, the scarcity for fodder followed by large scale prevalence of infertility problems (abortion) turned out to be the severest constraints. Probably these two issues were inter-connected through the channel of nutrition. Many farmers undertake short duration migration in search of fodder (Suresh *et al.* 2008). High incidence of diseases and lack of good quality breeding rams were reported as the severest constraints in AP. This was followed by issues associated with inadequacies of veterinary care system. The table indicates the need for better institutional support in the areas of veterinary care, livestock markets and ensuring the availability of fodder.

Income generation out of SR farming: The income generation from sheep and goat farming for Rajasthan is provided in Table 7. From sheep, the average gross income generated per household was to the tune of Rs 81,600. The major components of the gross revenue was sale of live animals (91.5%), sale of wool (4.7) and dung (3.9); while the major cost components were feed and fodder cost (89.1%), veterinary care (9.8%) and shearing and transportation of wool (1.1%). The net revenue generated by the average size of goat flock was to the tune of Rs 31,000. The gross return and gross cost were about Rs 48,700 and Rs 17,700, respectively. There were some differences in the composition of the costs and returns. In case of goat, the sale of the live animal accounted 93%, followed by milk (5.1%).

The estimate of the revenue and expenditure for Andhra Pradesh is provided in Table 8. The net revenue per average flock was to the tune of ₹ 42,400 in sheep and ₹ 4,700 in goats. The major items of expenditure were feed and fodder. However, the proportion of expenditure on this account in AP was much less compared to that in Rajasthan. Another noteworthy feature is complete absence of income from

wool, as the sheep in Andhra Pradesh are meat animals and wool is not a commodity of economic value. About 95 % of income from sheep originated from sale of animals, compared to 87% in goats, where the milk accounted for 8% of gross income. Here the average income was calculated for a farm.

The study provided a vivid picture of the intervention points for small ruminant development. The vaccination technologies showed the highest level of adoption. The issues with regard to veterinary care, feed and fodder and markets have emerged as the most important constraints. The major source of veterinary treatment is the (veterinarians of) state government. The radio continues to be the major source of information for the SR farming. Only a very few farmers purchased information from outside. Pastures continue to be a major source of nutrition. Therefore, improving pasture productivity is vital to improve small ruminant production. Institutional innovations and regulations are required to conserve the pastures and improve the productivity. The penetration of insurance for small ruminants was quite low. The livestock markets are highly under developed- the farmers continue to rely on traditional market channels.

Overall, the study points to the need to improve efficacy of institutional mechanisms. They include reforming the livestock markets, strengthening the veterinary care systems with improved man power, efforts to conserve the pasture land and improve its productivity, and, channeling greater credit and insurance coverage for the small ruminant sector.

ACKNOWLEDGMENT

The paper is drawn from a research project titled “Strengthening value chain for economic efficiency: The case of small ruminant meat marketing in India” carried out at National Centre for Agricultural Economics and Policy Research (NCAP), Pusa, New Delhi, India. The authors thankfully acknowledge the financial support of Indian Council of Agricultural Research for the project and Director, NCAP for the facilities provided. Also thankful to Dr. P.S. Birthal and Dr Anjani Kumar, principal scientists at NCAP for the useful discussions. The services rendered by Dr Kavita Balyan and Dr Sunil Kumar Singh, Senior Research Fellows associated with project are thankfully acknowledged. Errors, if any, are the sole responsibility of the authors.

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