

## **Potential of Small Ruminants in Andhra Pradesh for promoting rural livelihoods: Institutional and policy gaps to be addressed**

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### **Introduction**

Small ruminants play an important role in the food and nutritional security of millions of rural people especially the landless, marginal and small farmers in rainfed regions in India as well as in Andhra Pradesh. The socio-economic value of small ruminant rearing as compared to other livestock species, for poor farmers in rainfed and dry areas is immense. They produce a variety of products, mainly meat, milk, skin, wool and manure. Goat and sheep are also among the main meat-producing animals in Andhra Pradesh as well as in the whole country, whose meat (chevon/ mutton) is readily preferred palate irrespective of caste, creed and religion. Small ruminants are especially suitable for the semi-arid and arid eco regions, where they can sustain on sparse vegetation and extreme climatic conditions. Further, wherever irrigation facilities are poor and farm holdings are marginal or landless, small ruminants enable effective utilization of common property resources and wastelands as major part of their fodder. It has been revealed that these rural households have often developed highly efficient agricultural and livelihood systems that make the most rational and conservative use of the scarce resources available to them (Barbier, 1989). The rural poor who cannot afford to maintain a cow or a buffalo find goat/ sheep as the best alternative source of milk and supplementary source of income. Unlike a cow or buffalo, a few goats can be easily maintained and can be easily sold in the years of drought. They provide a stable source of income and nutrition for large number of rural people in the arid and semiarid regions which suffers from low agricultural productivity on account of frequent droughts, moisture deficit, poor resource base and low adoption of technologies. Sheep and goats act as cash buffer and reduce the income risk from crop failure in mixed farming systems (Ramesh et al., 2012). Therefore this sector assumes critical importance for improving rural livelihoods rural resource poor people in Andhra Pradesh. This paper assesses the

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potential of small ruminant sector in terms of its contribution towards sustainability of rural livelihoods and potential for commercialization in Andhra Pradesh.

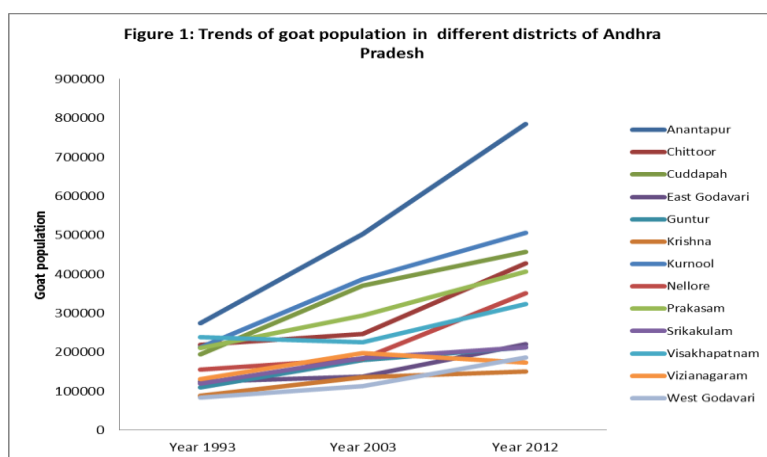
### Importance and current scenario

The small ruminants during the last few decades have become steadily important in the rural economy of India as well as of Andhra Pradesh. In 1951, the total number of livestock in the country was 292.80 million. The sheep and goats constituted 29.47 per cent of the total livestock population. By 2012, the number of sheep and goats, interestingly, had increased to 200.3 million, forming 39 % of the total livestock population in the country. However the importance of small ruminants is much greater in Andhra Pradesh where it constitutes 61.5% share of the total livestock population (Table 1).

Table 1: Population growth rate of major livestock species in India and Andhra Pradesh

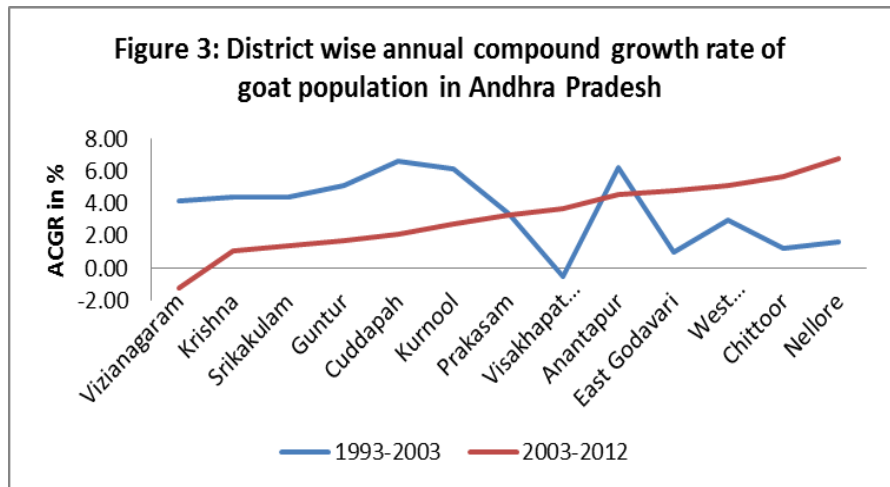
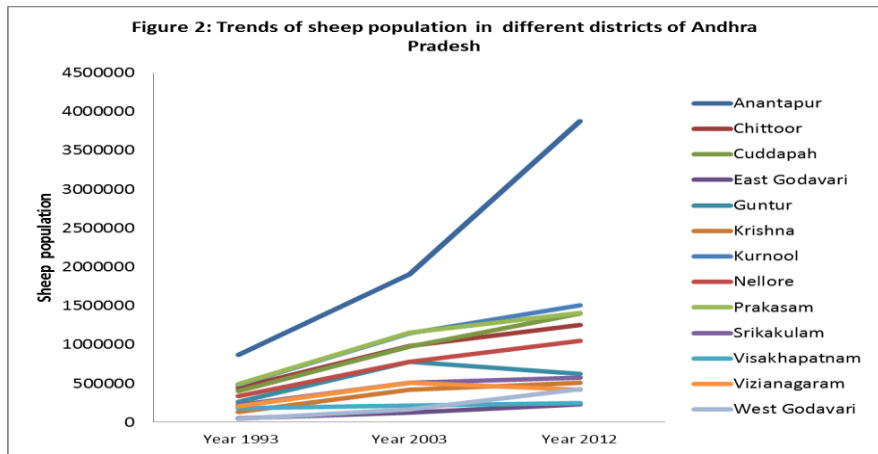
Livestock Species	India				Andhra Pradesh	
	Population, in million		Share in total livestock, %		Total Population, in million	Share in total livestock, %
	1951	2012	1951	2012	2012	2012
Cattle	155.3	190.9	53.0	37.3	4.6	15.8
Buffalo	43.4	108.7	14.8	21.2	6.4	21.9
Goat	39.1	135.2	16.1	26.4	4.4	15.1
Sheep	47.2	65.1	13.4	12.7	13.54	46.4
Total livestock	292.8	512	100.00	100.0	29.2	100.0

Despite little attention given to the Small Ruminants sector, their population has been steadily increasing in most of the districts of Andhra Pradesh (figure 1 & 2). The annual compound growth rate of goats in Andhra Pradesh during 1993-2003 and 2003-2012 has been 3.86% and 3.4% respectively and the respective figures for sheep were still higher at 8.8% and 3.4%. These rates of increment in small ruminant population are significantly higher than the national average as well as many other states in the country. The low



investment needs, high prolificacy, ability to survive in harsh environment and preference for goat and sheep meat are the main factors contributing to their continuous growth. In view of the availability of assured market for the meat from Small Ruminants without any religious barriers, the sector has got greater scope for inclusive growth where in the resource poor can participate.

The district level analysis shows that the goat population over the past few decades has increased steadily. The annual compound growth rate (ACGR) of goat population during 1993-2003 and 2003-2012 was positive in all the districts of Andhra Pradesh except Vizag and Vishakhapatnam districts.



The growth rate in goats during 2003-2012 has been comparatively stable and higher with Nellore, Chittoor and West Godavari recording more than 5% of ACGR (figure 3).

Though the base population of sheep was three times higher than the goat population, but its comparative annual compound growth rate was much lower during the recent past (2003-2012) as compared to 1993-2003 with Vizag and Guntur recording a decline in the population (figure 4). Combining the annual growth rate with mean annual slaughter rate in goat and sheep of around 40% and 33% respectively and mortality rate of about 15 percent, goat and sheep have shown the potential of population growth of about 58 % in goats and more than 53 % per year in sheep. In case of goats this growth rate is not much higher than the national average but the growth rate in sheep is comparatively much higher. This is the single most important factor that makes small ruminants as most desired species of animal for meat production.

The goat and sheep although are well adapted to a variety of agro-ecological regions, there is marked variation in their density among different districts of the state. Among the small ruminants, sheep has much higher density as compared to goats in the districts except East Godavari (figure 5). The density of sheep was highest in Anantapur district (200 sheep per sq km) followed by West Godavari and Cuddapah districts and the lowest was in Srikakulam (50). Though the density of goats was comparatively lower but it was also highest in Anantapur districts indicating higher importance of small ruminants for drier districts. At the district level both the species are spread throughout the state, but at household level and village level the sheep is reared in fewer large flocks whereas the goats are more equitably distributed across households. As reflected from the population density Anantapur, West Godavari, Cuddapah, Vizag, Prakasam, Guntur, Kurnool and Krishna districts appear to be more important for the development of small ruminant sector. However there is need also to give special attention to the districts achieving highest population growth rates for example Nellore for goat and West Godavari for sheep. A study on understanding the factors affecting the density of goats in different states conducted by Kumar and Pant, 2003 demonstrates that average size of holding and percent net irrigated area were negatively associated with density of goats (Table 2), validating the general perception that goats are associated with marginal and small farmers and provide livelihood to the people in rainfed regions. The association between goat density and area under pasture/wasteland was positive and highly significant, which highlights the role of common property resources in small ruminant production system.

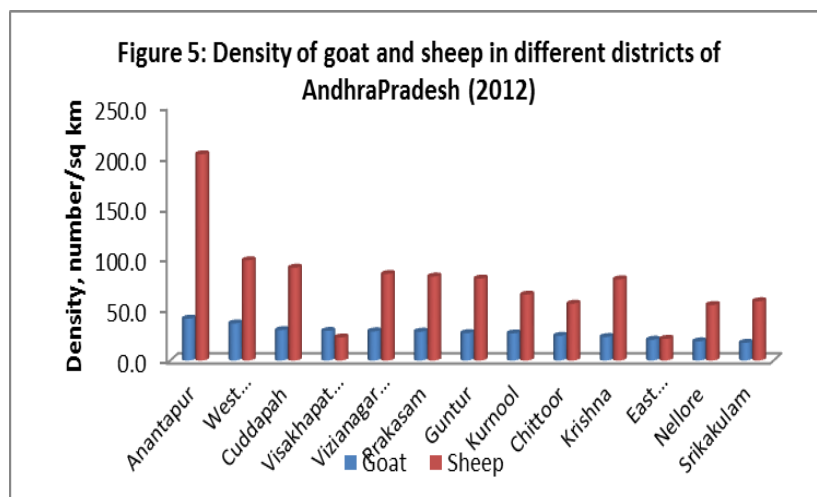
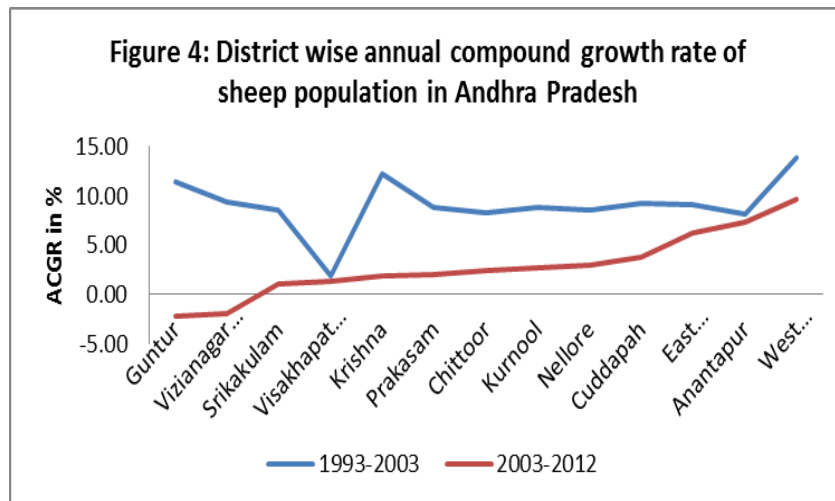


Table 2 Linear estimates of determinants of goat density.

Explanatory Variables	Regression Coefficient	t value
• Percentage of people below poverty line in the state	-2.01	0.403
• Average size of holding (ha.)	-64.84	1.275
• Percentage of Pasture and cultivable waste and fallow land to the total	26.38*	3.446
• Percent Net irrigated area	-11.35*	3.696
• Bovine density per 100 ha.	0.92*	5.534
Coefficient of determination (R <sup>2</sup> )	0.82	

\* Significant at one percent level (< 0.01); Note: Analysis uses state wise time series secondary data

### Small ruminants' production system as means of livelihood

Goats and sheep rearing is an important means of income and employment generation for the millions of resource poor rural households and significantly contribute in ensuring food and nutritional security for their families. Thus help alleviate poverty and smoothen income distribution. The goat and sheep are mainly dependent on common property resources (CPRs) for meeting their feed and fodder requirements. The CPRs comprise barren and uncultivable lands, cultivable wastes, permanent pastures and other grazing land and land under miscellaneous trees, crops and other fallow land. In spite of their critical role in livelihood security of rural poor, the CPRs are declining continuously (Jodha, 1986; Murthy and Patra, 2011) threatening the fodder security of small ruminants.

The erroneous stigmatization of goats and sheep as the major culprits for environmental degradation is unfortunate, because available evidence shows that when managed properly, especially in mixed species grazing, goats contribute to sustainable natural resource management (Rege and Agyemang, 1992 and Schwartz, 1983). The reality is that poverty and demographic pressures on the land drive environmental degradation through deforestation, overgrazing, overstocking and indiscriminate exploitation of fragile marginal ecosystems. It has been observed that goat and sheep are reared mainly under extensive system of production wherein they were grazed on common property resources (CPRs), open access grazing resources and private fallow lands. The goat rearing has been found to be well integrated with other components of the farming system (Kumar et al., 2010).

In arid and semi-arid regions with poor irrigation, opportunity of agricultural employment for landless rural people is not available throughout the year. Moreover the large ruminant rearing is a less preferred option for the landless people as it demands relatively large investment and higher maintenance cost. Hence, these landless households are particularly dependent on small ruminant rearing as source of income and nutrition. The initial investment requirements for small units of goat/sheep are modest and there is quick pay-off due to fast multiplication. Studies in the past (Kumar et al., 2010; Kumar, 2007; Suresh et al. 2005) have shown that goat and sheep are economical in arid and semi-arid and rainfed

regions. At present under extensive system of production the net returns are estimated to be about Rs 2500 to Rs 3500 per goat and that of a sheep Rs 2000 to Rs 3000 per productive cycle of 8-9 months. However there is high inter-year variability in the net returns mainly on account of mortality and morbidity in the animals due to diseases and parasites infestation. The studies indicate that the net returns from goats are higher than the sheep. However the returns from small ruminants are much lower than the potential and have high risk mainly because of high morbidity and mortality due to diseases and parasites.

Due to feed scarcity the farmers sell majority of the male kids at an uneconomic age of 3-5 months. Very low adoption of improved technologies is another major constraint resulting in low productivity of goat and sheep. Though small ruminant research has generated a number of useful technologies (Kumar and Pant, 2003), there are constraints in their dissemination and adoption. Due to lack of awareness and innovativeness, the majority of small ruminant keepers do not seek improved package of practices and had aimed at low input and low output system. On the one hand, institutions imparting practical training on small ruminant-rearing are very few and on the other the traditional rearers are not keen to attend training programmes. Inadequacy of veterinary facilities is another major constraint in adoption of health related technologies. The limited available veterinarians are largely involved in curative care of large animals.

Moreover, many of the technologies are suitable for large commercial farms but are not for small traditional units. The small and large/commercial farmers should be provided with separate technological options suiting their respective needs and resources. Non-availability of recommended inputs like vaccines, fodder seeds, area specific mineral mixture and cost effective complete feeds is one of the most critical constraints in adoption of improved technologies for both small as well as large commercial goat and sheep farms. Poor access to credit from institutional sources was a constraint in promotion of goat farming.

### **Commercial Goat and sheep Farming**

Of the total meat production, more than 70 per cent comes from cattle, buffalo and pig and for that preference in India is limited due to socio-religious factors. Therefore, burden lies on goat and sheep meat (15%) as well as poultry (12%). Rising per capita income, growing urbanization and unfolding globalization are boosting the demand for high-value commodities including meat (Birthal and Joshi, 2006, Parthasarathy Rao et al 2005). Due to these fast socio-economic changes in the recent past, a rapid shift has taken place in the dietary habits in favor of non-vegetarian diet. As a result, the demand for goat and sheep meats has swiftly increased and the domestic market price for chevon/mutton has risen from Rs 150 per kg to Rs 400-450 per kg over a decade. Moreover, huge expected increase in the demand for meat

in developing countries, especially in the East and South-East Asia in the next 20 years presents an excellent opportunity for enhancing export of live goat/sheep and their meat from India (Delgado *et al.*, 1999) and hence intensification of their production.

The intensification of small ruminant production by involving educated entrepreneurs could help in realizing the potential of this sector through enhanced adoption of best management practices, breeding stock and improved markets. A in other parts of the country a number of commercial goat and sheep farms have been started by young and educated entrepreneurs under semi-intensive as well intensive systems production. The size of these farms varies from 150 animals to 600 animals. Some name of commercial; farmers for examples are: Mr. Naveen kumar, contact No: 9393769393; Mr. V.V. Krishna Reddy contact No: 9848176386; Mr. DV Rama Kotireddy, contact No: 9949192222; Mr. Purna chandra Reddy contact No: 949332343. Many of these farms are earning reasonably good income. These commercial goat and sheep farmers under normal conditions earns about Rs 5000 per animal per production cycle of 8-9 months. The emergence of commercial farms is a positive development not only as a source of income for entrepreneurs and enhanced meat production but it will also have positive influence on traditional goat and sheep production system by proving good quality breeding stock and facilitating in dissemination of improved technologies. These farms could become centers of production for good quality breeding stock. Many of these farms are producing pure bred animals of *Sirohi* and *Osmanabadi* goat breeds and Nellore sheep breed. These breeds are recommended to be some of the most suitable breeds for Andhra Pradesh. Thus these commercial farms can contribute significantly in mitigating a major constraint of availability of good quality breeding animals in the state.

A study of commercial goat and sheep farms across states revealed that a majority of commercial goat farms were operating with positive net returns with 39 per cent of them earning good profit (Kumar, 2007). Goat rearing as an enterprise was found equally rewarding under both intensive and semi-intensive systems of management. Among the farms under intensive system, 22 per cent were in loss, whereas among the farms under semi-intensive system, 33 per cent were in loss. The commercial goat farming under intensive and semi-intensive systems of management may therefore be declared as profitable and promising enterprise. However, the technological intervention, particularly prophylaxis, superior germ plasm, low cost feeds and fodders and innovative marketing of the produce would be the pre-conditions for successful commercial goat production.

Access to low cost credit is essential for the development of any sector. But non-availability of institutional credit is one of the major hurdles in the development of small ruminant (SR) sector. The traditional resource poor SR keepers have almost no access to bank credit due to low awareness and lack collateral security. It is the biggest challenge even to the trained commercial farmers (or aspirants) to get bank loan for this activity. Most bankers give lowest priority to this sector and put all kinds of conditions,

since these farmers have no voice. During the 11<sup>th</sup> five year plan there was a policy to provide subsidized credit to the livestock breeders (including SR breeders), who are involved in producing pure bred animals of different livestock species. Despite efforts and applications from large number of such farmers, no subsidized loans were given by the commercial banks. The SR sector needs to be treated fairly by the financial institutions like any other sub-sector of agriculture. Similarly the insurance companies do not agree to insure the small ruminants. The commercial SR farmers could become the partner in the development of this sector, but relevant department of the state government in past has hardly interacted or collaborated with these enthusiastic entrepreneurs.

### **Implications and Suggestions to address to policy and institutional gaps**

It may be concluded that goat and sheep rearing enterprise play a very important role in providing income, nutrition and gainful employment to the resource poor rural households especially in rainfed areas. The potential for goats and sheep to contribute to the attainment of food security, economic development and environmental sustainability is tremendous. The broad genetic variability of our goat and sheep breeds enables them to survive under stressful environmental conditions such as low rainfall and harsh temperature, high disease incidence and poor nutrition. Environmental pressure also necessitates a wide range of genotypes, each adapted to a specific set of circumstances. Under on-station management, indigenous sheep and goat breeds have shown good growth and reproductive performances, indicating their potential and ability to respond to improvements in management, particularly nutrition and disease control. Besides its significant contribution in the state GDP the small ruminant sector has been playing an important role in providing livelihoods to rural resource poor people. The attractive return from goat and sheep rearing also makes a strong case for its promotion on commercial scale. However there is a need to put a system in place for better disease prevention and proper marketing of small ruminants and their products. The development of fodder resources (CPRs) and economic feeding systems and imparting practical skill on scientific small ruminant keeping is also equally important. Implementing the following specific recommendations would contribute towards sustainable development of small ruminant production as a means of livelihood security of resource poor rural people.

- Small ruminants provide a unique niche in small farm systems and especially rainfed environments. Their value in low input agricultural systems, poverty focus, food security and life of poor people is underestimated, which further justifies increased research and development efforts.
- Scarcity of feed and fodder being the major constraint in the existing small ruminant production system, better management of common feed resources (pastures and waste lands) is crucially important for improved fodder supplies in rainfed areas. In fact, each watershed should essentially



have a component to develop common and private fodder resources as part of the watershed and its compliance by the project implementation agencies (PIAs) should be monitored. Despite the guidelines under watershed programs, most PIAs are not allocating resources for livestock and fodder development.

- Efficient utilization of available fodder resources: Chopping of coarse cereal stover (sorghum / ragi, etc), which is not common in Andhra Pradesh, needs to be promoted to reduce wastage (by at least 50%) and improve digestibility. This particularly important during the lean season under traditional systems and throughout the year for commercial farms under semi-intensive or intensive systems.
- The Panchayats may be given incentives to develop common grazing resources in the village commons through convergence of NREGS (National Rural Employment Guarantee Scheme). Further the SHGs and producer groups may be allowed to develop and utilize the common lands for fodder production
- With the involvement of animal husbandry experts and other major stakeholders (farmers, local veterinary doctor, cooperatives, etc.), the potential indigenous breeds of different species need to be identified at micro level (Mandal) considering the yield potential, resource situation and socio-economic factors and should be used for grading up programmes. Osmanabadi and Siroihi goat and Nellore sheep are some of the most suitable breeds.
- Besides encouraging lamb fattening units, there is need to equally promote breeding unit to ensure supply of good quality lambs for meat production.
- For weeding out poor quality breeding males of small ruminants, Panchayat will have to play an effective role. Once the breeds of animals to be promoted at mandal and village level are decided, the Panchayat may ask its members not to keep breeding males of non-descript poor breeds. The poor breeding males may be replaced as part of breed improvement program.
- For improving fodder availability for the small ruminants, besides development of CPRs by involving panchayats and user groups, there is need to institutionalize linkages between SR farmers in fodder scarce regions and areas with better fodder availability. For example the kids/lambs produced in drier districts (like Anantapuram) could be sold at an early age (3-4 months) and reared in the districts with surplus fodder by rural women more advantageously. Such trade arrangements need to be facilitated.
- Production and mortality losses in small ruminants due to diseases and parasites are huge, hence there is need to run an awareness campaign through mass media (TV, Newspaper, etc.) focusing on importance of prevention program for diseases and parasites in small ruminants.

- Deworming against parasites and vaccination against major diseases should be taken up as campaign at state level continuously for at least for five years. The major diseases in large ruminants are; food and mouth disease (FMD, Hemorrhagic Septicemia (HS), Black Quarter (BQ), etc. and for small ruminants; Enterotoxaemia (ET), Blue tongue, peste des petits ruminant (PPR), FMD, etc.
- The small ruminant markets favour brokers and other intermediaries to the disadvantage of consumers, rearers and sellers of livestock by-products. Poor bargaining power, low awareness, high transaction cost, smaller surplus for sale, low income (distress sale) coupled with lack of infrastructure are the main reasons for lower price realization of the livestock produce of the smallholders.
- A large part of the consumer's costs are due to inefficient slaughter operations and markets and high transportation costs. Inefficient use of small ruminant by-products means the rearers get poor prices for their animals. New players face barriers in entering the market and robust agents' networks and strong resistance to government attempts to introduce change hamper the modernization or relocation of abattoirs.
- There is need to link the smallholder producers directly with the formal market (processors, marketers/retailers and consumers). Local elected bodies and livestock-holders should be encouraged to improve the marketing of livestock. All the markets for live meat animals or even every village should have common weighing machine. That machine may be used to weigh the meat animals at the time of their sale. This would help farmers to know the value of their meat animals and consequently increase their bargaining power.
- Farmers should be encouraged and supported for collective action in livestock production and marketing.
- The insurance of livestock is the best safeguard for minimizing the risk especially for smallholder producers. Its importance is paramount in case of small ruminants because of higher risk of loss of production and animals due to diseases and feed scarcity. Though the insurance companies have provision for insurance of animals throughout the country, only a very small share of small ruminants has been insured. The major reasons of poor coverage of animals under insurance are: high cost of premium (4.5 – 8.25% of the value of animal) besides low awareness among the farmers. Further the insurance companies many times do not entertain request for insurance by the farmers because of the small scale of business and higher transaction cost. Hence, there is need to increase the farmers' awareness and make mandatory provision for the companies to undertake livestock insurance of interested farmers. There should also be mechanisms for sorting grievances.
- Because of the constraints inherent to the situation, the level of technology adoption in small ruminants is very low. Besides specific package of practices suggested above, there is need to

provide a basket of technological options so that livestock holders may choose as per their needs and resources conditions.

- Farmers must be trained and retrained to develop their management skills for proper feeding including fodder development and conservation, proper breeding skills, disease control and prevention, basic on-farm processing methods to add value to their goat and sheep farming, simple record-keeping and the exploitation of synergies between livestock and crops.
- Facilitating slatted floors in the shelter can help in promoting hygienic production, minimizing disease and parasite incidence and labour cost. Many of the diseases and parasites occur because of poor management and poor cleanliness in the goat and sheep sheds. These alleviated floors should be promoted not only on commercial farms but also on small traditional flock of smallholders who do not have sufficient space for housing the animals. This would be rather more important in the coastal districts which receive higher rainfall.
- The focus should be on development of integrated farming system with livestock and other most remunerative activities as its components.
- Goat and sheep farming under semi intensive as well as intensive system of management could be taken up profitably. The entry of resource-rich people, including poultry farmers, who have better access to technical knowledge, resources and markets, into the goat and sheep rearing under intensive and semi-intensive system would help in realizing the potential of this enterprise. It would also encourage the aspirant commercial goat and sheep farmers who do not have access to grazing resources.
- The lack of good quality breeding stock being a major constraint in commercialization of small ruminant production, the farms managed on scientific lines should be encouraged to become the centres of production of superior quality breeding animals. The commercial farmers should be encouraged and be promoted as change agents for production of quality breeding stock and technology dissemination.
- Need for awareness of the concept of production-to-consumption systems. This is important so as to link production, processing, distribution and consumption in the food chain. This link will help promote the development of location of slaughter facilities and post production systems, rural and peri-urban areas and rural growth. The commercial goat and sheep farmers can earn best profit by producing and marketing pure breed animals as breeding stock and meat animals for festive sale during Eid. In the long-run, vertical and horizontal integrations would have to be evolved for achieving sustainability of commercial goat and sheep production and remaining competitive in the global market. Service centers will have to be established to provide technical knowledge, recommended inputs and market information. Small size modern slaughterhouses need to be

established near the production centers (possibly in each mandal particularly those with high density of small ruminants) to support the commercialization of goat and sheep production. The private sector may be encouraged to create such infrastructures through appropriate policy support and incentives. This would enable the farmers to enhance their productivity and reduce cost of their production.

- The governments do provide some compensation to the farmers in case of crop losses due to drought, flood and other weather extremes. But there is no provision/ policy for the livestock farmers to get such compensation. The government should consider supporting the poor livestock/ small ruminant farmers to cope with extreme weather shocks.

The small ruminant rearing has a great promise as source of income and employment and livelihood security of resource poor rural people throughout the state in general and the drier districts in particular. Their rearing under traditional extensive system would shrink because of continuous shrinkage in the common grazing resources, but it will still remain the most important source of small ruminant production. However the demand for their meat is expected to rise at faster pace in domestic and international market. The market demand, price, technology and resource availability would thus decide the direction and shape of the small ruminant industry. Each system of production would require different type of technological, policy and institutional support. Access to low cost credit would be critical for the development of small ruminant sector. The bankers need to be educated about the economic potential of goat and sheep farming. The poor small ruminant farmers hardly have any asset for collateral security except their animals. There is a need for appropriate policy and institutions for dissemination of need based technologies, linking smallholders with the market, value addition and safeguard mechanisms in the face of increased competition due to globalization and climate change.

### **Acknowledgement**

The authors thankfully acknowledge the inputs from Anthony M Whitbread, Deepak Patidar and Subhash Baira in enriching the paper.

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