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Commercial Goat Farming in India: An Emerging Agri-Business Opportunity

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Abstract

The status, economics and prospects of commercialization of goat production in the country have been analyzed using primary data from 18 commercial goat farms in different states. It has been revealed that several large and progressive farmers, businessman and industrialists have adopted commercial goat farming. The entry of large farmers, who have better access to technical knowledge, resources and market, into this activity would help in realizing the potential of goat enterprise. A majority of commercial goat farms have been found operating with positive net returns. Goat rearing has been found equally rewarding under both intensive and semi-intensive systems of management. Intensification and commercialisation of goat enterprise has been recorded important because of shrinking of resources for extensive grazing. Commercialisation would help in increasing the goat productivity and bridging the demand-supply gap. However, use of improved technologies, 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.

Introduction

Goats are among the main meat-producing animals in India, whose meat (chevon) is one of the choicest meats and has huge domestic demand. Besides meat, goats provide other products like milk, skin, fibre and manure. Goats are important part of rural economy, particularly in the arid, semi-arid and mountainous regions of the country. With more than 124 million population,

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goats account for more than 25 per cent of the total livestock in the country and contribute Rs 1,06,335 million annually to the national economy. They provide food and nutritional security to the millions of marginal and small farmers and agricultural labourers. However, the productivity of goats under the prevailing traditional production system is very low (Singh and Kumar, 2007). It is because they are maintained under the extensive system on natural vegetation on degraded common grazing lands and tree lopping. Even these degraded grazing resources are shrinking continuously. Moreover, adoption of improved production technologies/ management practices in the farmers' flock is very low. Therefore, rearing of goats under intensive and semi-intensive system using improved technologies for commercial production has become imperative not only for realizing their full potential but also to meet the increasing demand of chevon (goat meat) in the domestic as well as international markets.

Of the total meat production, more than 70 per cent comes from cattle, buffalo and pig and for that preference is limited due to socio-religious factors. Therefore, burden lies on goat and sheep meats. Rising per capita income, growing urbanization and unfolding globalization are boosting the demand for high-value commodities including meat (Birthal and Joshi, 2006). Due to these fast socio-economic changes in the recent past, a rapid shift has taken place in the dietary habits in favour 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 60 per kg to Rs 130-160 per kg over a decade. Moreover, huge expected increase in the demand for meat in developing countries (by 100%), 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 (Dalgado *et al.*, 1999).

Responding to the market signals, the goat production system in India has been slowly moving from extensive to intensive system of management for commercial production. However, in the absence of any systematic study, there have been questions from the entrepreneurs, progressive farmers and even researchers on the economic viability and sustainability of commercial goat farming under intensive system. No information was available on the socio-economic aspects of commercial goat farming under semi-intensive and intensive systems of production in the country. This study, probably for the first time, was planned to address issues related to commercialization of goat farming in the country and to evolve a suitable policy framework for this otherwise neglected sector of the livestock economy. The present paper has thus analyzed the status, economics and prospects of commercialization of goat production in the country.

Methodology

The goat rearing using improved management practices undertaken for maximization of returns from the enterprise was considered as 'commercial goat farming' in the present context. This paper has used primary data collected from the commercial goat farms spread in different states of the country. No information was available on the commercial goat farms operating in different parts of the country; however during the past one decade, a number of such commercial farms have come into existence. Therefore, initially, the efforts were made to identify commercial goat farms operating in different states and develop rapport with them. Information on the extent and process of commercialization, marketing and constraints was solicited from all the identified farms through questionnaire mode. The questionnaire responses could be collected from 61 commercial goat farmers in 11 states of the country. Based on the preliminary analysis of data of these 61 farms, an initial view on commercial goat farming in the country was formed. Finally, 18 commercial goat farms from different states were selected randomly for an in-depth study (Table 1).

Table 1. Details of commercial goat farms selected for study

State	Districts	No. of selected goat farms
Maharashtra	Ahmednagar, Baramati, Beed, Sangali, Kolhapur, Pune and Amrawati	10
Uttar Pradesh	Kanpur Dehat and Gorakhpur	3
Madhya Pradesh	Dhar, Badwani and Bhopal	3
Rajasthan	Jaipur and Nagaur	2

Most of the districts where selected commercial goat farms were operating fall in the semi-arid and arid regions, except 2 farms in the eastern Uttar Pradesh and 2 in flood-affected areas of Maharashtra. The selected commercial goat farms were post-stratified into three flock size categories as given in Table 2.

Data from the selected commercial goat farmers were collected for the year 2005-06 on the following aspects: socio-economic information;

Table 2. Distribution of goat farms into flock size categories

Category	Flock size group	No. of breeding goats	Flock size (All goats)	No. of farms
I	< 100 goats	33	63	10
II	100 – 500 goats	144	273	6
III	> 500 goats	610	1169	2

source of information for commercial goat farming; level of technology adoption; type of business-production/ trading; supports and opportunities in commercialization; marketing strategy; felt-needs for commercialization of goat farming; and constraints and opportunities in marketing of goats.

The costs and returns from commercial goat farming were worked out in detail. Since the mortality of breeding goats caused a permanent loss of productive asset, therefore these losses were also considered as a part of depreciation on assets. In order to understand the factors affecting the net returns of commercial goat farms, a linear regression model in the form of Equation (1) was fitted.

$$Y = f(X_1, X_2, X_3, X_4, X_5) \quad \dots(1)$$

where, Y is the annual net returns per goat; X₁ is the flock size (No. of does); X₂ are the annual losses due to disease per doe; X₃ is the dummy for system of management (Intensive system= 1, otherwise 0); X₄ is the dummy for training acquired by the entrepreneur (Training acquired= 1, otherwise 0); and X₅ is the 'live goats' average price realized (Rs/kg body weight). Since the level of technology adoption does affect the productivity and profitability, the farmers, who acquired training on commercial goat farming, could better adopt technologies; the dummy for training acquired was supposed to take care of the impact of technology on returns.

Results and Discussion

Due to its good economic prospects, goat rearing under intensive and semi-intensive systems for commercial production has been gaining momentum for the past couple of years. High demand for goat and its products with potential of good economic returns have been deriving many progressive farmers, businessmen, professionals, ex-servicemen and educated youths to take up the goat enterprise on a commercial scale. The emerging favourable market conditions and easy accessibility to improved goat technologies are also catching the attention of entrepreneurs. Using different methods of information collection such as published and Internet sources, Animal Husbandry Departments, farmers, NGOs, key informants and other agencies through personal contact and questionnaire, a total of 157 commercial goat farms spread over 16 states were identified. The trend of commercialisation of goat production was especially prominent in the states of Maharashtra, Madhya Pradesh, Bihar, Uttar Pradesh and West Bengal.

Traditionally, goat rearing has been a subsistence activity of resource-poor rural people (Kumar and Deoghare, 2002); its commercialization has taken place only recently. Seventy-five per cent of these farms have started

operating in the past six years. All these commercial farmers were well educated and had a good access to technical and market information. The size of operational landholding of commercial farmers in all the categories was found large, from 26.0 acres to 78.5 acres. The entry of large farmers, who have better access to knowledge, resources and market, into this activity would help in realizing the potential of goat enterprise. Interestingly, the people having major income from business and salaried jobs (33 % of the total farmers) had taken up commercial goat farming as their subsidiary occupation. These people might be able to better arrange the required capital and skills for semi-intensive and intensive systems of goat production.

The popular belief is that goats can be economically maintained only under semi-intensive and extensive systems with a provision of grazing in commons. However contrary to that, the goats were being successfully reared under intensive system of management on 46 per cent of the commercial goat farms. In the large category, all the farms were maintaining their goats under intensive system. This finding would encourage the aspirant commercial goat farmers who do not have access to grazing resources. Traditionally rural people of higher social and economic status have shown inhibitions in undertaking the goat keeping activity due to social stigma (Kumar, 2007). However, it was observed that caste was not a barrier in commercial farming of goats now. Seventy-one per cent of the commercial goat farmers belonged to the general caste. All the commercial goat farmers were educated, with 50 per cent of them as postgraduates.

Flock Size, Breed and Investment Pattern

The size of initial flock of goats for the new entrepreneurs was observed to be an important factor for the success of a commercial goat-farming project. The initial flock size of goats in the categories I, II and III was 39, 53 and 300, respectively which has subsequently increased to 63, 271 and 1169 (Table 3). The new entrepreneurs, who started with a large flock of over 100 goats without gaining experience of managing small flocks, mostly failed and suffered losses and some of them even left the business. The exceptions were only those farmers who started with a very big goat unit (>500 goats) and managed to hire an experienced professional or veterinary doctor to look after and supervise the management of the farm. Quite a few farmers (44%) wanted to increase their flock sizes to 218, 400 and 3500 goats in the categories I, II and III, respectively. They sought support in terms of easy access to low-cost credit, technical knowledge, market information and remunerative prices for their products. The minimum number of breeding goats in a commercial unit should be 50 to make it a self-sustaining unit that can provide livelihood to at least one household.

Table 3. Size and composition of the goat flock

Category	Initial flock size	Current flock size						Total
		Adult goats		6-12 month goat		<6 month goats		
		Male	Female	Male	Female	Male	Female	
I	39.10	3.30	33.00	2.80	7.50	6.20	10.60	63.40
II	53.33	6.42	155.67	14.08	14.00	40.67	40.17	271.00
III	300.00	109.00	610.00	75.00	75.00	125.00	175.00	1169.00
Pooled	72.83	16.08	138.00	14.58	17.17	30.89	38.72	255.44

There are 20 well-defined breeds of goat in the country. The Sirohi, Barbari, Osmanabadi and Black Bengal were the important breeds of goats reared by the commercial goat farmers (Figure 1). Sirohi and Barbari breeds were spread most widely. Osmanabadi was exclusively reared in Maharashtra, but has recently started spreading to other states like Karnataka, Andhra Pradesh and Madhya Pradesh. The Sirohi remained the most sought after breed, particularly in the semi-arid and arid parts of the country. A considerable number of goats of commercial farms in Madhya Pradesh (78%), Chhattisgarh (40%) and Uttar Pradesh (36%) were non-descript. These farmers need to switch over to some suitable breeds such as Sirohi, Osmanabadi and Barbari to make their business more productive. Some commercial farms in Maharashtra, Madhya Pradesh, Rajasthan and Tamil Nadu also reared South African Boer-cross goats. The Boer was crossed with Osmanabadi and Sirohi breeds and non-descript goats. It was observed that the cross of Boer and Osmanabadi gained a body weight of 24-30 kg at the age of 6 months, which is higher than that of the average Osmanabadi goat. However, a well-maintained pure Osmanabadi kid obtained from a good quality parents on the commercial goat farms also gained a body weight of 21-25 kg at the age of six months. The farmers informed that colour and meat of local breeds was preferred over the Boer-cross by the domestic consumers. Moreover, the Boer-cross was not a good grazer. Therefore, the local pure breed animals should not be crossed with the Boer breed for such a small gain. Such crossing may only be experimented with the non-descript animals.

The major initial investment was found on the purchase of breeding stock and construction of sheds and structures, which accounted for 47 per cent and 48 per cent of the total capital investment, respectively. In the traditional flocks, 75-80 per cent of the total investment was made in acquiring the breeding stock (Kumar and Deoghare, 2002). The total investment per breeding goat in categories I, II and III was estimated to be Rs 5083, Rs 3419 and Rs 6015, respectively (Table 4). The investment in category II was made appropriately. The higher investment per goat in category I was

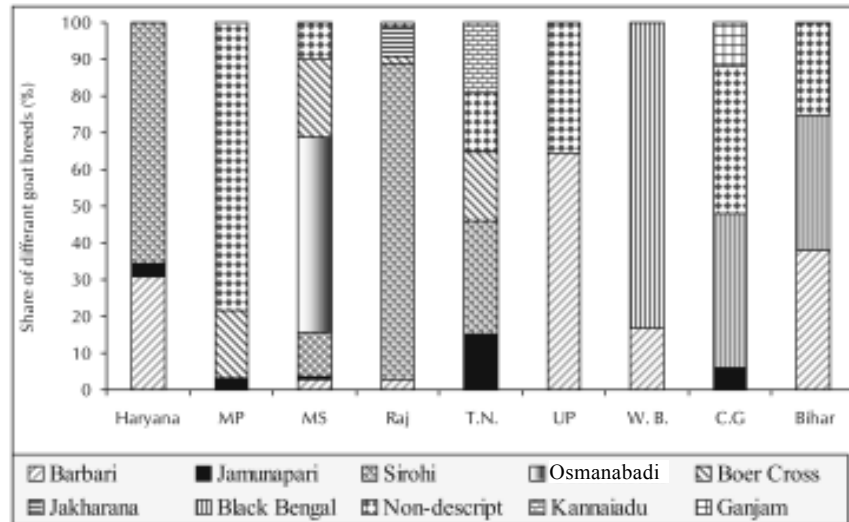


Figure 1. Distribution of goat breeds on commercial farms in different states

due to lower capacity utilization and in category III, it was due to heavy investment on huge sheds and structures. An efficient unit of commercial goat farming should not make very heavy investments on sheds and structures. The total investment at current prices should be around Rs 3,500 per breeding goat.

Unlike traditional flocks, the expenditure on feed and fodder was the major component of the cost of goat rearing on commercial farms and it accounted for 59 per cent of the total variable cost. The concentrate feed and dry fodder accounted for 58 per cent and 25 per cent of the total feed cost, respectively (Table 5). Therefore, it was prudent on the part of farmers to economize on the feed cost to enhance profitability.

Feed was observed highly scarce in Rajasthan, particularly during the summer seasons it became very costly (Rs 4-5 per kg of dry fodder), making the goat production under intensive system unsustainable. Therefore, under such situations, it will be imperative to follow these steps; (i) Efforts to

Table 4. Pattern of capital investment on commercial goat farming unit

Category	Capital investment (in lakh Rs)				Investment per adult got Rs
	Value of animals	Sheds and structure	Equipments	Total investment	
I	0.649	0.967	0.229	1.845	5083
II	2.800	2.542	0.197	5.539	3419
III	21.000	21.000	1.250	43.250	6015
Pooled	3.630	3.720	0.33	7.68	4632

Table 5. Feed cost on commercial goat farms

Particulars	Green fodder	Dry fodder	Concentrate	Mineral mixture	Salt	Total feed cost
Average feed cost (Rs/annum)	17125	33645	77166	4446	504	132858
Percentage of total feed cost	12.89	25.32	58.08	3.35	0.38	100.00

acquire low cost feed through efficient purchases, and (ii) Reduction in the number of animals through pre-summer bulk sale of meat animals on *Eid* and *Holi* festivals. The flock size may be further increased during the rainy season. (iii) As the Sirohi breed of Rajasthan is in high demand in different states for breeding purpose, the sale of pure breed animals at the age of 6-7 months to the breeders (farmers) would be a way out to reduce the cost of feeding in feed-scare regions like Rajasthan. The commercial goat farmers had to make some expenditure on electricity, insurance, prophylaxis and treatment of animals (Table 6). The expenditure on electricity on large farms was quite high and needed to be economized. The average expenditure on the above heads was estimated to be Rs 28,237 per farm and Rs 183 per doe per annum.

Production of Kids

Kids born from the goats were the major output of the commercial goat farms. There were mainly two kidding seasons: February-April and October-November. However, some goats on few farms kidded in other months also (Table 7). The kid mortality was estimated to range from 5.64 per cent in category III to 12.28 per cent in category I. Thus, contrary to the popular belief, the mortality rate in kids was negatively associated with the flock size. This may be mainly due to better management, feeding and preventive healthcare provided by the large farmers. The mortality rate in kids was well under the permissible limits, except in three commercial farms, which

Table 6. Miscellaneous expenditure on commercial goat farms

Category	Miscellaneous expenditure				Total	Expenditure, Rs/doe
	Electricity	Treatment	Insurance	Prophylaxis		
I	960	1730	1250	744	4684	130
II	1983	3417	5500	5636	16536	102
III	100000	5000	50500	25600	181100	252
Pooled	12306	2656	8139	5136	28237	183

(Rs/ annum)

Table 7. Details of kids born and reared

Category	Number of live kids		Male kids for fattening	Value of kids at year end (Rs)		Value of male kids for <i>Eid</i> (Rs)	Total value (Rs)
	February - April	October - Nov.		February - April	October - Nov.		
I	29.2	17.8	8.5	59620	13950	29750	109520
II	107.8	47.1	0.00	269292	59983	0.00	350608
III	215.5	333.0	100	646500	832500	450000	2099500
Pooled	76.1	62.6	15.83	194719	120244	66528	410992

were not able to spare sufficient time to look after their farms. Some commercial farmers also reared male kids purchased from the market for fattening and selling during the festival of *Eid*. Such special male goats prepared for *Eid* fetched much higher price compared to the kids sold for meat purpose. In inter-breed comparisons, the mortality rate was lower in Sirohi and Osmanabadi than Barbari and Black Bengal. Based on empirical evidences, it has been suggested that the medium and large sizes of goats reared under intensive system for commercial production should attain more than 25-kg body weight at the age of 6-7 months for achieving their full economic potential (Singh, 2006). Therefore, the farmers need to make efforts to further improve the weight gain of their animals through better management and technological interventions.

Awareness and Adoption of Improved Technologies by Commercial Goat Farmers

A number of technologies are available for productivity improvement of goats. Technological and management options are the only alternatives to accelerate growth in the productivity of goats, which is low in the traditional system of production. The farmers had very high level of awareness about improved technologies. There was high level of adoption of recommended package of practices and technologies related to direction and type of shed, feeding and watering devices and mineral mixture, but the adoption of daily management practices and prophylaxis was not 100 per cent. The use of vaccines such as PPR, HS and FMD and medication for internal as well external parasites need to be used as recommended for effective prevention of diseases and improved productivity. On many occasions, farmers could not use vaccines due to their non-availability.

The level of adoption of different technologies by commercial goat farmers, who had received training on scientific goat farming, was found encouraging. An increased level of adoption of technologies and availability of good quality breeding stock would be essential to make the commercial goat farming more profitable. Most of the farmers were eager to adopt the improved technologies, but the absence of any support system to provide quick access to the latest information and technologies and weak input delivery system resulted in poor adoption.

Mortality and Morbidity Losses due to Diseases

Mortality and morbidity losses due to diseases in goats have been a major constraint in the traditional flocks (Kumar *et al.*, 2003). The risk of certain diseases increases in large flocks maintained under the intensive

system. Therefore, losses due diseases in goats on commercial farms were estimated. The major diseases that affected goats on commercial farms were: PPR, enterotoxaemia (ET), pox, FMD, diarrhoea and pneumonia. The other health ailments were abortion, tympani, gidd, external parasites, etc. The overall mortality in kids in different categories ranged from 5.64 per cent to 12.28 per cent and in adults, it was 4.89 per cent. However, few individual farms suffered high mortalities. The four farms, which suffered high mortality of goats, were making losses from the goat farming activity. The mortality and production losses were together estimated to be Rs 8845, Rs 20183 and Rs 124708 per farm per annum in the categories I, II and III, respectively (Table 8). On overall farms, the estimated losses due to diseases in goats were 23.22 per cent of net returns and 5.21 per cent of gross returns. There was a large variation in the magnitude of losses due diseases across the farms. The general belief that larger goat flocks are vulnerable to high disease incidence and losses, was not found true.

Table 8. Category-wise status and losses due to diseases in goats on commercial farms

Category	No. of goats affected		No. of goats died		Total goats died	Mortality loss, Rs		Production loss	Total loss
	Adult	Kids	Kids	Kids		Kids	Adults		
							Rs		
I	6.5	5.4	3.7	3.8	7.5	1720	6850	275	8845
II	28.0	33.0	6.5	13.0	19.5	6833	11817	1533	20183
III	190.5	155.0	21.0	41.0	62.0	44950	52500	27258	124708
Pooled	34.1	31.2	6.5	11.0	17.5	8228	13578	1414	23220

Advertisement, Publicity and Marketing Strategy

A number of commercial farmers had made efforts to advertise and popularize their goat farms and the quality of their goats through several means (Table 9). One-fifth of the farmers had created their own websites giving details of the farm and the type of goats available for sale. These farmers were getting most of their orders for supplying of goats through e-mails. Some farmers (33 %) had also put hoardings at the main locations near their farms. A few of them were giving advertisements in the local newspapers, especially for sale of males during the *Eid* festival. The other important modes of publicity and extension included publication of pamphlets and organization of trainings for local farmers. The farmers felt that the advertisement and publicity had increased their visibility, resulting in increased demand and better prices for their goats. The future strategy of the commercial goat farmers was to produce better quality breeding animals

Table 9. Advertisement and publicity methods adopted by commercial goat farmers

Modes of dissemination	Farmers, %
Newspapers	22
Internet website/ e-mail	22
Hoardings	33
Publication of pamphlets/ booklets	39
Publication of magazine on goat rearing	6
Organising trainings for local farmers	28

for sale mainly to the goat farmers on live body basis. Those who were raising meat goats, wanted to make available the weekly/fortnightly supply of goats to the processors.

Economics of Commercial Goat Farming

The estimated costs and returns from goat farming, given in Table 10, revealed that unlike the traditional flocks, where fixed cost was 10-15 per cent of the total cost, the fixed cost and variable cost in commercial goat farming constituted 35.36 per cent and 64.64 per cent of the total cost, respectively. The value of died adult goats alone accounted for 11.38 per cent of the total fixed cost. This cost can be minimized through proper management. The feed was the major component (59%) of cost on goat rearing. The total cost per doe per annum in categories I, II and III was worked out to be Rs 2354, Rs 2137 and Rs 2527, respectively (Table 10). However, analysis of the cost on goat rearing on the individual farms, depicted in Figure 2, showed large variations. On one-third of the commercial goat farms, the total annual cost of rearing a goat was between Rs 1124 and Rs 1753 and on another one-third goat farms, it ranged from Rs 2628 to Rs 4311. The latter goat farms must reduce their cost of goat rearing to remain in business by methods like (i) reducing fixed cost through expansion and minimizing mortality of goats; and (ii) reducing feed cost through identifying cheaper sources of feeds and their efficient purchases.

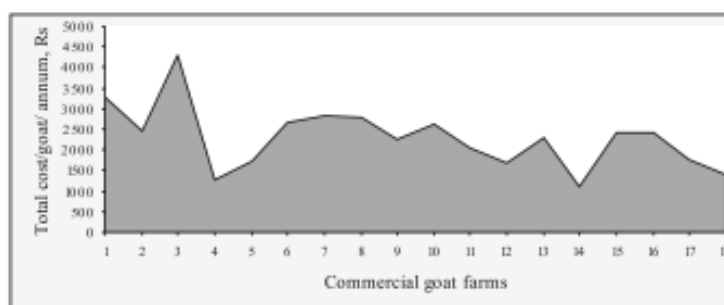
**Figure 2. Annual cost of rearing a goat on commercial farms**

Table 10. Costs and returns from goat farming on different categories of commercial farms
(Rs/ annum)

Category	Fixed cost	Variable cost	Total cost	Cost per goat	Returns from kids	Value of manures	Value of milk	Gross returns	Net returns/ farm	Net return/goat
I	35181	50568	85749	2354	115460	7475	12969	135904	50155	371
II	91417	211552	302969	2137	383942	31400	17167	432508	129540	652
III	650593	1124332	1774925	2527	1888400	117000	30000	2035400	260475	494

Returns

The gross returns from goat farming were maximum from the sale of animals (90 per cent), followed by manure and milk. The sale of milk, which constituted about 25 per cent of the gross returns on the traditional goat flocks, was only a minuscule part of the returns on commercial farms because (i) manual milking of a large number of goats involved huge labour cost and affected other farm operations; and (ii) strategy to make available more milk to the kids up to 3 months to attain proper growth.

The annual net returns per farm and per doe were worked out category-wise as well as for individual farm; these have been presented in Table 10 and Figure 3. The annual net returns per goat in categories I, II and III were Rs 371, Rs 652 and Rs 494, respectively; however, it did not reveal the real picture. The individual farm-wise analysis revealed that on 39 per cent of goat farms, the annual net returns per goat were quite satisfactory (Rs 968 to Rs 2069), while on 28 per cent of the goat farms, these were negative. The reasons for negative net returns were higher cost of rearing per doe and realization of low prices for their market surplus. The remaining 33 per cent of the goat farms also had a positive net return but needed to increase them to make their business economically viable and sustainable. Since a majority of the commercial farms have come up only during the past few years, they were learning from their experiences and some of them will have to increase their flock sizes for proper capacity utilization. Most of the farms with below average performance are likely to improve in the next 1-2 years.

The relationship between the annual net returns per doe and some possible related indicators have been shown in Figure 4. The net returns per goat did not appear to have any relationship with the flock size. However, fixed

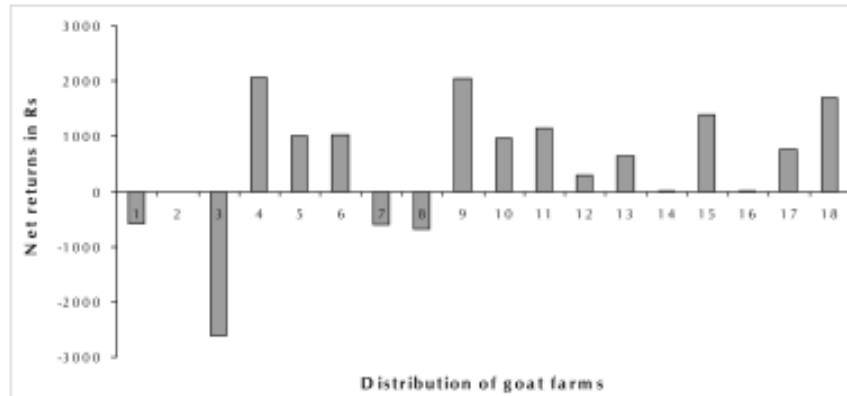


Figure 3. Annual net returns per goat on commercial farms

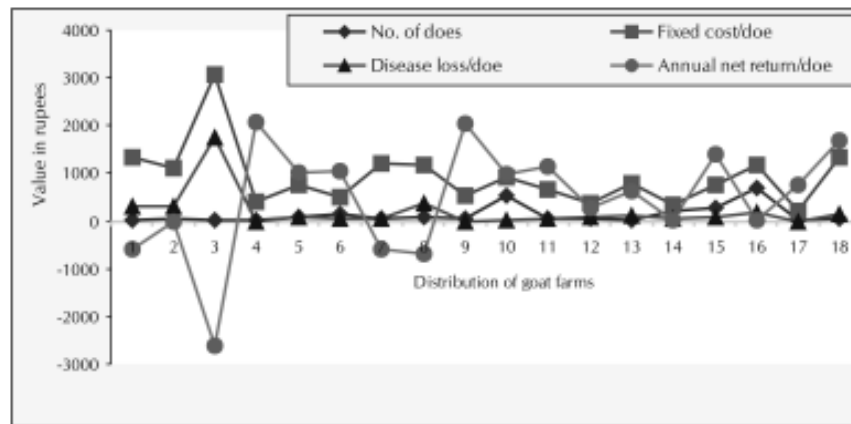


Figure 4. Annual net returns per doe and related indicators

cost and disease losses per doe affected the net returns negatively. A regression analysis was carried out to explain the relationship between the annual net returns per doe and the factors affecting them (Table 11).

The annual losses due to diseases per doe and average price of goats realized (Rs/kg live body weight) were the most important factors, which influenced the annual net returns per doe on the commercial farms. The relationship between losses due to diseases and the net returns from goats was negative and highly significant, indicating the importance of disease prevention for the sustainability of commercial goat production. This has implications for improvement in the productivity and profitability of commercial goat production, particularly in the short-run, through effective adoption of disease prevention technologies. The average price of live goats realized by the farmers influenced the net returns positively and significantly. The reason for higher price realization by some farmers may be the effective

Table 11. Linear estimates of factors affecting the annual net returns per doe on commercial farms

Explanatory variables	Regression coefficient	't' value
Flock size (No. of does)	-1.40	1.56
Annual losses due to diseases/ doe	-2.04***	5.15
Dummy for system of management	-42.36	0.11
Dummy for training acquired	683.33	1.68
Average price of goats realized, Rs/kg live body weight	15.81*	1.78
Constant term	-757.08	
Coefficient of determination (R ²)	0.79	

*** Significant at 1 per cent level (< 0.01), * Significant at 10 per cent level (< 0.10)

marketing strategy and better quality of their animals (pure breed and good health). The flock size was negatively associated with the net returns per doe, indicating higher net returns on small farms. However, its regression coefficient was not highly significant. The coefficient of dummy for system of management was negative, but not significant. It demonstrated that the system of management had no effect on net returns and the goats may be profitably raised under both intensive as well as semi-intensive systems of management. The regression coefficient of the dummy variable for training acquired by the farmers, which reflected the level of technical knowledge of the farmer, was positive. It indicated that those farmers who acquired training on commercial goat farming could earn higher net returns per doe.

The analysis revealed that a majority of commercial goat farms were operating with positive net returns with 39 per cent of them earning good profit. 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.

Constraints in Commercial Goat Farming

Though commercial goat farming under intensive and semi-intensive systems of management has been picking up for the past couple of years, only less than one per cent of goat population in the country has come under such production system. There has been no organized effort to develop this

sector and hence hardly any support system and the required infrastructure are available for encouraging the commercial goat farming in the country. There have been some efforts only by individual entrepreneurs to develop this enterprise besides R&D efforts of Central Institute for Research on Goats and a few NGOs. Of late, some state governments have started making efforts towards promoting goat rearing. In this backdrop, the commercial goat farmers do face a number of constraints, particularly during the initial phases of the goat-farming project.

- In the absence of proper standards and specially-designed vehicles for transporting the live goats, the officials in collusion with police harass the farmers under the pretence of welfare of the animals during transportation of the breeding stock from long distances.
- High mortality in goats due to PPR, diarrhoea, pneumonia, tetanus, etc. in the beginning of the project, was a major concern of the farmers. It resulted even in closure of a number of farms in the beginning. High mortality in goats in the initial phase was mainly due to lack of knowledge about package of practices of improved goat farming, poor prophylaxis, non-availability of vaccines, etc., poor preparedness of the farmers, lack of personal attention of the entrepreneurs and poor access to veterinary doctor with experience of small ruminants. High mortality and poor growth in kids was a major constraints for 30 per cent farmers in category I, and 50 per cent in category II.
- Due to lack of knowledge, 70 per cent farmers in category I had difficulty in identifying pure breed animals. Difficulty in getting good quality breeding animals was a major constraint. The best animals (particularly males) from the traditional flocks were sold for slaughtering to traders/butchers. That resulted in scarcity of good quality breeding animals. The absence of organized efforts for breed improvement of goats has been compounding this problem. Since large goat flocks of different breeds under commercial production are only few, the entrepreneurs had to select the breeding animals from the available traditional flocks mostly through middlemen. Therefore it takes a long time to establish a good flock.
- Non-availability of vaccines, especially PPR, was another major constraint. Even the ET vaccine, which is being produced for decades, was not available in time in many states, including U.P., Orissa, Chhattisgarh and Bihar. Non-availability of veterinary doctor and limited knowledge of available veterinarians about goats was a constraints in categories I and II. However, large flock owners in category III could hire a specialized veterinarian. The low cost complete feed was not

available. All the commercial farmers required identification tags for their goats, however they did not have access to a cost effective tagging material.

- Another major constraint was realization of low prices for the surplus live goats. The trade of live goats, which is unorganized and is in the hands of a large number of middlemen, traders and butchers, does not favour goat farmers. The live goats were sold not on the basis of their body weight in the livestock markets; this resulted in under-estimation of the value of live animals. Before building the reputation as a producer of quality breeding goats, the farmers got very low price for their animals. However, with the increased awareness and linkages, the commercial farmers have started insisting on deciding the price of their live goats on body weight basis. Poor access to good quality breeding animals and veterinary services were more severe constraints.
- The availability of institutional credit was relatively easy for large goat farming projects, but was a major constraint for the small entrepreneurs with projects of 50-100 goats and had limited capital for collateral security.

Implications

- Goat rearing, which was the economic activity of rural resource-poor people has attracted large and progressive farmers, businessman and industrialists due to its economic viability under intensive as well as semi-intensive systems of management for commercial production. The entry of resource-rich people, including poultry farmers, who have better access to technical knowledge, resources and markets, into this activity would help in realizing the potential of this enterprise. It would also encourage the aspirant commercial goat farmers who do not have access to grazing resources.
- The lack of good quality breeding stock being a major constraint in commercialization of goat production, the farms managed on scientific lines should be encouraged to become the centres of production of superior quality breeding animals.
- Considering good economic potential in commercial goat production, some large industrial houses such as Hind Agro Industries (a major meat exporter of the country) are entering into goat farming business, especially for the export market. The big poultry farmers from Haryana, Punjab, Delhi, Madhya Pradesh and Maharashtra have also successfully started diversifying their business towards commercial goat farming. However, for availing the benefits of lucrative export market, food safety standards will have to be developed.

- The commercial goat farmers can earn best profit by producing and marketing pure breed goats and festive sale during *Eid*. In the long-run, vertical and horizontal integrations would have to be evolved for achieving sustainability of commercial goat production and remaining competitive in the global market. Service centres 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 centres (possibly in each development block) to maintain commercialization of goat 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

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