Production and Marketing of Goat and Goat Meat in Peri-Urban Areas of Bangladesh

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1.   INTRODUCTION

Goats play a vital role in the subsistence economy of smallholders in Bangladesh. Among the countries in Asia, Bangladesh has the second highest population of goat, numbering about 34 million heads (FAO, 1997). More than 90% of goat population in the country comprised the *Black Bengal* (BB) goats having some variation in colour and size, the remainder being Jamunapari and their crosses (Huq and Devendra, 1988). Goat generates income and employment, and meets up capital shortage, especially for the rural households in Bangladesh. The employment opportunities for the family members through goat enterprise are much higher than that of crop enterprise (Chauhan *et al.*, 1993). It contributes greatly to the poverty stricken rural people, especially to small and marginal farmers and landless labourers holding less than 2 acres of land (Husain *et al*., 1998; Das, 1996; SAIC, 1995; Bokonyi, 1976). Goats are generally reared in traditional backyard system allowing them to graze mainly surrounding homestead or open fields and are kept tethered with a short rope from morning to evening. Besides, leaves of different trees, rice polish and wheat bran are also given to goats as feed (Hoque, 1995).

The current production of meat in the country is 0.620 MMT which increased by an average annual growth rate of 3.53% during 1985/86 to 1997/98. The per

capita availability of meat is estimated to be 21.33 gm/day during 2010 and the corresponding figure for per capita requirement is 120 gm/day (Miah, 2002). The increase in demand for meat up to 2010 is 3.8% as against 1.6% increase in human population (Amin, 1997). In this situation, the country has to face a big shortage of meat and is required to import a large number of beef cattle every year.

Therefore, the production of goat meat has to be increased manifold to meet the increasing demand of the country's population. If livestock sector has to play the role in poverty alleviation, it is essential that smallholder producers have to have access to the expanding urban markets for their produces. The present goat and goat meat marketing system in Bangladesh is handled mainly by the private marketing intermediaries and is carried out in an unorganised manner. The smallholder goat farmers are deprived of fair price of their produce due to inefficient marketing system. The achievement of all these targets depends upon balanced livestock development policies relating to technology, institution, and other supporting mechanisms in the country. In this context, peri-urban goat production offers ample opportunities for higher income generation for smallholders due to the proximity to urban markets (Miah, 2002).

A sustainable goat production and an efficient marketing system can ensure producers' benefit and meet the increasing demand of urban people. The present study will add new dimensions to the existing level of understanding on goat development related issues, opportunities and constraints in peri-urban areas of Bangladesh. The results of the study will indicate possible areas of technological and policy interventions by the government and non-government organisations involved in livestock development. The overall objective of this paper is to highlight development issues for peri-urban goat production and marketing to find out potentials, constraints, and the areas of possible intervention for sustainable goat development in Bangladesh.

2.   METHODOLOGY

2.1   Economics of Goat Production

The study was conducted in peri-urban areas of the three municipal towns of Pabna, Mymensingh and Sylhet representing the poorest, medium wealthy and wealthiest towns in Bangladesh, respectively. A farm survey was conducted to examine the profitability of goat production in peri-urban areas. At first, a total of 30 *Mauzas,* taking 10 *Mauzas* from each town, were randomly chosen from the list of peri-urban *Mauzas*. Secondly, a total of 150 goat farmers, taking 50 farmers from each town, were randomly selected for interview. The sample farmers were selected proportionately from each category of farmers (128 small & marginal, 42

medium and 10 large category farmers). Farmers having less then 1.012 ha of land were considered as marginal and small; those having 1.012 to 3.036 ha of land were considered as medium, while farmers having more than 3.036 ha of land were identified as large, following the standard official definition (BBS, 1998).

Production data were collected by the researcher himself and trained enumerators from peri-urban goat farmers using structured and pre-tested interview schedules during September to October 1997. The collected data were analyzed using different statistical measures. Break-even and functional analyses were also done.

2.2   Marketing of Goat and Goat Meat
In order to give an insight into goat and goat meat marketing system, a number of case studies were carried out in and around urban areas of two nearly similar towns namely Mymensingh and Sylhet during the period from June 1998 to May 1999. At first, some marketing channels were identified through which goat and goat meat moved from peri-urban areas to the urban markets. Two main urban markets in each of the selected towns were chosen for the study. Peri-urban markets were chosen according to product flows rather than ease of access although it was probable that they were located at the same place. These markets were used throughout the case study. After validation of marketing channels, 8 traders (4 from Mymensingh and 4 from Sylhet) were chosen for the study. The data for the present study were collected weekly from goat and goat meat traders through personal interview by trained enumerators using structured interview schedule. Furthermore, a total of 62 *Beparis* and 58 butchers were also interviewed during September to October 1997.

There are several measures for measuring marketing efficiency of a commodity. Each of these measures has some values and limitations in measuring market performance, but no single one tells the whole story. Therefore, the following six performance indicators were considered for measuring the efficiency of goat as well as goat meat marketing system (Rajagopal, 1986). The indicators were: (i) producer's share in the final product price, (ii) relative marketing cost, (iii) level of middlemen margin, (iv) deviation between the minimum and maximum prices, (v) peak period seasonal price variability, and (vi) lean period seasonal price variability. Some analytical tools for measuring above performance criteria are briefly discussed below.

The producers' share was derived by the ratio of gross/net price received by the producers to the weighted average selling price of goat meat. It was calculated with the following formula:

$$Ps \ = \ (Pp \ Pr) \ 100$$

Where, Ps = Producer's share to the consumers price (%)
        Pp = Producers' selling price
        Pr   = Retailers' selling price

The costs of marketing were worked out on the basis of marketing channels and on per unit of goat meat. The marketing channel involving lower cost was ranked as one. Following the same approach, the channel involving lower margins for middleman was ranked as one. On the other hand, the channel with lower deviation between the maximum and minimum price of goat meat was ranked as one. Average price deviation was calculated by using the following formula:

$$Dp = \Sigma di \div N$$

Where, Dp = Average price deviation

di = Price deviation in i^{th} month ($i = January$ ....*December*)
N = Number of total months   (12 months)

The lean and peak season price variability was measured by applying the following standard deviation () formula:

$$\partial = \sqrt{(1 \div T)} \ \Sigma Wt \ (Pt \ - \ P)^2$$

Where, ∂ = Seasonal price variability index
        P   = Average price of the whole season (12 months average)
        Pt = Average price for a particular period
        T = Total months (12 months), and

$$Wt \ = \ \frac{\text{Quantity sold through a particular channel during the month (St)}}{\text{otal quantity sold during the month in all channels (i t Sit)}}$$

A lower value of implies that the price of farmer was not affected by seasonal change and vice versa. The channel with lower standard deviation was ranked as one. The final ranking of all the six indicators for all the channels was computed by the following index formula:

$$R \ = \ (\ Ri \ Ni \ )$$

Where, Ri = Total value of ranks of all indicators
        Ni = Number of indicators

3.   ECONOMICS OF GOAT PRODUCTION

3.1   Pattern of Input Use

Goats were given very small amount of feed, especially in the rainy season. They were allowed to graze about 7 hours per day in the open field or roadside. In all categories of farmers, the average amount of green leaves, wheat bran and oilcake given to each goat per year were estimated to be 32.13, 14.56 and 3.29 kg, respectively. Veterinary care for goats was found to be very negligible in the study areas. A positive relationship was found between farm categories and amount of feed used in the study areas. In case of wheat bran use, larger category farmers ranked first followed by medium and small category farmers (Table 1).

3.2   Human Labour Use (Employment Generation Potentials)

Involvement of human labourer was not crucial in goat rearing because goats were reared in the traditional backyard system. On an average, a goat generated 6.03 man-days of employment per year of which the shares of family and hired labourer were 86% and 14%, respectively. It was observed that a notable extent of female and child labour was utilised in goat rearing. The involvement of child labour was for outside grazing, while female labour was mainly involved in stall-feeding (Table 2). Nearly 44% of human labour was involved in stall-feeding, 24.9% in goat shed cleaning, and the remainder in taking goat in and out of goat-shed for grazing (Miah, 2002).

3.3   Cost of Goat Production

In all categories of farmers, the annual costs of production per goat were Tk. 803, Tk.315 and Tk. 266 as full cost, variable cost and cash cost respectively. The share of fixed and variable cost to total cost was 61% and 39%, respectively. The highest variable cost was incurred for wheat bran (12%) and hired labour (12%), followed by green leaves (5%) and oilcake (3%). The highest share of total fixed costs was incurred for family labour (Table 3). A positive relationship between farm category and the cost of production was found in the study areas. Cash expenses were found to be higher in large category farmers and lower in small category farmers.

3.4   Returns from Goat Rearing

The annual gross return per goat was estimated at Tk.1,056; Tk.1,092 and Tk.1,186 for small, medium and large category of farmers respectively. The goat farmers in the study areas received, on an average, nearly 97% return from farm inventory change (Table 4). The percentage share of inventory changes to the total return was found mostly to be similar in different categories of farmers. The average net return per goat was estimated to be Tk. 274; 762 and Tk. 812 on full

cost, variable cost and cash cost bases respectively. The small farmers received the highest net return per goat than the medium and large farmers due to lower cost[44] Das (1996) found similar results in his study conducted in Mymensingh areas. In his study, the small farmers received the highest net return per goat (Tk. 735), followed by medium (Tk. 655) and large farmers (Tk. 166).

The benefit cost ratios in all categories of farmers were 1.34, 3.42 and 4.06 on full cost, variable cost, and cash cost bases respectively, which were nearly double the ratios observed for cattle rearing (Miah, 2002).

3.5 Break-even Size of Goat Production

Table 5 shows that the goat farmers in the study areas reared goats profitably as the break-even size of goats was much lower than the actual number of goats reared by them. A herd-size of at least 3.50 numbers of goats for the study areas was required to cover the cost of production.

3.6 Factors Affecting Goat Production and Resource Use Efficiency

Different socio-economic factors like family size, farmers' income, education level, level of experience in goat rearing, and size of land holding had positive impacts on the production and management practices of goat (Huq, 1990; Prabharan and Thirunavukkarrasu, 1994). Multiple linear regression analysis showed that the co-efficient of human labour (X_1), green leaves (X_2), wheat bran (X_3), oilcake (X_4) and veterinary care (X_5) were positive and significant at 1% and 5% levels, implying that one taka increase for these inputs, keeping other factors constant, would result in an increase of annual gross returns per goat by Tk. 0.475; Tk.0.714; Tk.1.084; Tk.1.482 and Tk.3.529, respectively. Wheat bran and other cost (X_6) had significant influences on goat production in all the study areas.

$$Y = 389.68 + 0.48X_1{}^{***} + 0.71X_2{}^{**} + 1.08X_3{}^{***} + 1.48X_4{}^{***} + 3.53X_5{}^{***} + 8.64\,X_6{}^{***}$$
$$(47.670) \quad (0.072) \quad (0.345) \quad (0.134) \quad (0.275) \quad (1.230) \quad (1.398)$$
$$R^2 = 75, \ \ F\text{- value} = 71.97^{***} \ \ N = 150$$

The MVP of wheat bran, oilcake, veterinary care and other cost were greater than one and positive, indicating less amounts of inputs used in goat production. Therefore, there were ample opportunities to increase gross return or output by using more of these inputs. Besides, the MVP was less than one and positive for human labour and green leaves implying the inefficient use of these inputs. In that case, the goat farmer could decrease production cost, keeping gross return constant, by decreasing the cost of labour and green leaves, through using scientific methods and improved technologies of goat production.

4. MARKETING OF GOAT AND GOAT MEAT

Marketing of live goat and goat meat in Bangladesh is traditional and is mostly handled by the private entrepreneurs. A number of middlemen are involved in the process of goat and goat meat marketing in the country. In India, different types of intermediaries existed in the chain of marketing of live goats and goat meat (Bhasin and Devendra, 1988). The marketing systems of live goat and goat meat in the study areas are discussed below.

4.1 Marketing Channels

Two types of transactions, direct and indirect, were found between farmer and buyer in goat and goat meat marketing. The farmer sold goats directly to final consumers under direct transaction, whereas *Bepari* and butchers were involved in the indirect transaction. The direct transaction was found mostly in various social and religious occasions. The sample butchers in the study areas bought goats from farmers and *Beparis,* and sold meat to general customer, restaurant and bakery. More than 96% goats in Mymensingh and 86% goats in Sylhet were sold by *Beparis* to butchers (Fig. 1 & 2). The smallholder goat farmers in Sylhet sold more goats to butcher compared to the farmers in Mymensingh. The following major channels were identified in the study areas for goat and goat meat marketing.

In Mymensingh,   Channel   I= Farmer? Butcher? Consumer
                       Channel   II= Farmer *? Bepari?* Butcher? Consumer
In Sylhet,   Channel   I= Farmer *?* Butcher? Consumer
                       Channel   II= Farmer *? Bepari-* Butcher? ConsumerChannel
                                        III= Farmer *? Bepari?* General Customer

Fig. 1: Flow diagram for goat meat marketing in and around Urban areas of Mymensingh
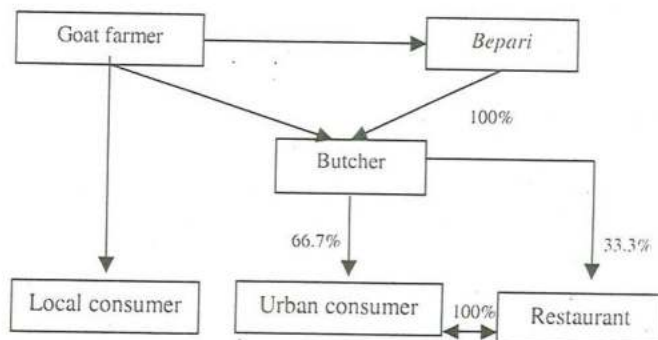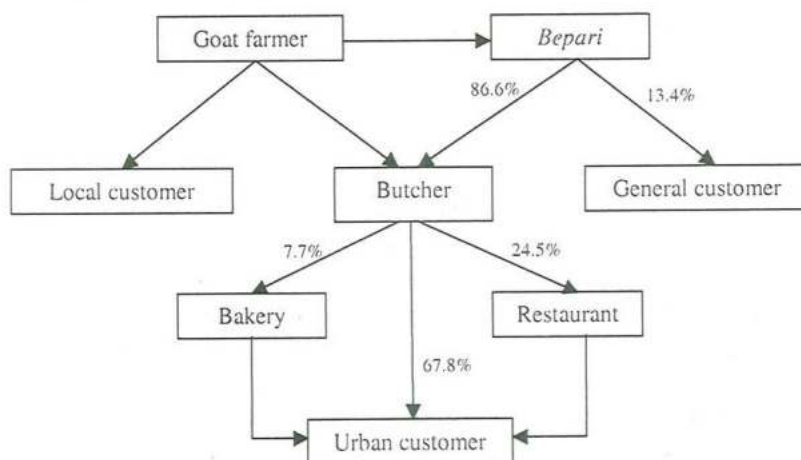
**Fig. 2: Flow diagram for goat meat marketing in and around
Urban areas of Sylhet**

Although the final consumer was the most important and prominent customer of goat meat in all study areas, the general public was one of the most important customers of live goats in Sylhet. The reason was that many visitors from different parts of the country visited the *Dargah* (grave) of Hazrat Shahjalal (R) and sacrificed many goats in the name of *Allah*. Some butchers of Sylhet supplied goat meat to restaurants and bakeries regularly.

4.2 Number of Goats Traded

During the study period, the number of goats, on an average, traded by a *Bepari* of Mymensingh and Sylhet were 1194 and 880 which were equivalent to 5,557 kg and 5,527 kg of meat, respectively (Table 6). The average size and body weight of goats was much higher in Sylhet, compared to Mymensingh.

The volumes of goats and goat meat were influenced by different factors. The most significant reasons were the fluctuations in demand for goat as well as goat meat and the availability of goats in the market. The most important factors behind increased demand for goat meat were wedding ceremony, picnic, *Eid* festivals, and other social and religious occasions. On the other side, weather, flood, financial capabilities of goat farmers and *Eid* festivals were responsible for the variation of the goat availability in the market. The traders in both the study areas traded the highest volume of goats and goat meats during the period March to April and the lowest from August to September.

4.3   Seasonal Variations in Prices

Price of goat meat varied from season to season due to fluctuations in consumers' demand. Graphs 1and 2 revealed that the prices of goat meat varied from Tk.101.30 to Tk.131.00 per kg in Mymensingh and from Tk.105.90 to Tk.121.90 in Sylhet. The overall trends of prices were found to increase in the winter and decrease in the summer. The sample traders got the highest prices during March-April and the lowest during August-September. The reasons for the rise in prices were that the overall demands for goat and goat meat went up in the above period because the general customers bought goats in larger quantities for slaughtering in the *Eid* festival. Nevertheless, the supply of substitutes like chicken and fish were also very low in that period, and farmers could not find enough time to sell goats due to their engagement in harvesting crops. On the contrary, they received lowest prices during the period from August to September due to larger supply of chicken in the market and their cheap prices, leading to decrease in the demand and price of goat meat.
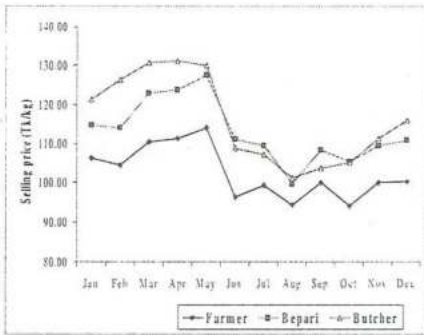
Fig. 1. Selling price of goat meat for farmers and traders of Mymensingh during June 1998 to May 1999
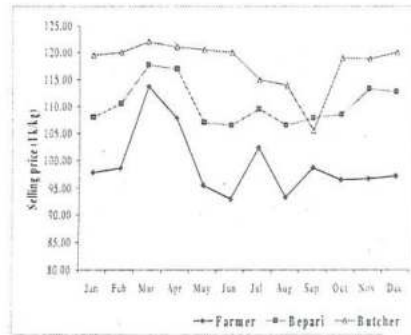
Fig. 2. Selling price of goat meat for farmers and traders of Sylhet during June 1998 to May 1999

4.4   Efficiency in Goat Meat Marketing System

The following two major marketing channels were considered for measuring the efficiency of goat meat marketing for both the study areas.

Channel I = Smallholder goat farmer? Butcher? Consumer
Channel II = Smallholder goat farmer? *Bepari?* Butcher? Consumer

Producers' share in the consumers' price: Producers' share was found highest in channel-I and lowest in channel-II in both the study areas (Table 7). It means that the smallholder goat farmers got the highest benefit when they sold their

produce to butchers instead of *Beparis*. Therefore, channel-I in both study areas was ranked one. The shares in all channels received by Mymensingh farmers were lower than the shares received by Sylhet farmers due to higher difference between producers' price and consumers' price.

Marketing costs and margins to the middlemen: The important cost items reported in both the study areas were shop rent, labour, taxes, personal expenses and transportation (Table 8). Some costs like subscription to the religious institutions, cost of goat storage, cost of electricity and licence fee were found to be paid only by the traders of Sylhet. The marketing of goat meat in channel-I involved lower cost, compared to channel-II in all areas and hence, it was ranked as number one. The goat meat traders got highest margin in channel-I and lowest in channel-II both in Mymensingh and Sylhet. Table 8 further reveals that the traders in Sylhet got lower margin in all channels than the margins received by Mymensingh traders due to lower goat meat price.

Price deviation: Price deviations in different channels did not show any specific pattern (Table 9). However, in channel-I the higher price deviations were found in the peak season and the lower deviations in the lean season. Furthermore, the overall deviation between maximum and minimum prices was lower in channel-I than in channel-II in both areas. Price deviation mainly depended on the availability and demand for goats in the market. In the peak season the demand for goat was found to be very high on the one hand, and availability of goats in the market was found to be low on the other. These might be due to the reasons that the price deviations were high in the peak season and low in the lean season.

Peak and lean period seasonal price variability: Peak season price variation in channel-I was lower, compared to the variations found in channel-II in both the study areas (Table 10). On the contrary, the lean season price variations was lower for channel-I in Mymensingh and channel-II in Sylhet. The overall price variations in peak and lean seasons were much lower in Sylhet than in Mymensingh.

The efficiency of different marketing channels based on the ranks of different performance indicators (Table 11) revealed that channel-I in Mymensingh had the highest marketing efficiency followed by channel-II. It was indicated that the farmers as well as butchers marketed their produces efficiently in channel-I than in channel-II. A different scenario was apparent from the final ranking of the efficiency of marketing channels in Sylhet. In Sylhet channel-I and II both had the same marketing efficiency.

4.5   Production and Marketing Problems

The peri-urban farmers in the study areas faced various socio-economic problems in goat farming. The highest percentage of farmers mentioned that wild animals like jackal, fox sometimes took their kids. The lack of working capital was stated as the second most important problem of goat farming. The other important problems encountered by the farmers were scarcity of green fodder; lack of quality breed; presence of middlemen in the market; and inadequate extension services (Table 12).

The traders involved in live goat and goat meat marketing also faced served problems (Table 13). These were lack of working capital; inadequate marketing facilities; higher market toll/tax; lack of transport facilities; scarcity of goat; and credit sale. Among these problems, the top ranking problems for *Beparis* and butchers were lack of working capital and inadequate marketing facilities.

5.   CONCLUSIONS AND POLICY IMPLICATIONS

The study revealed that goat farming under traditional system was a profitable venture, because a goat farmer earned Tk. 812 as net return per year from a goat. It also created a substantial number of employments for the unused family members. The goat farmers in the study areas could not use inputs efficiently. Therefore, they had ample opportunity to increase their income by more use of green leaves, concentrate feed, veterinary care and human labour for goat production. They faced several socio-economic problems in goat farming. The most serious problem was the attack goat by of wild animals like jackal and fox.

The efficiency of goat meat marketing system revealed that channel-I (Goat farmer*?* Butcher*?* Consumer) had the lowest score indicating highest marketing efficiency. Higher producers' shares, lower marketing cost, lower margin for middlemen and stable price for the consumers were ensured in this channel throughout the year. The goat and goat meat traders encountered different problems in doing this business. Their main problems were the lack of working capital and inadequate marketing facilities.

It emerges from the preceding discussion that goat development in peri-urban areas depends on many factors. Among different factors, five critical areas deserve priority: genetic stock, feed supply, animal health and disease control and economic environment. Considering all these factors together with suggestions made by sample farmers and personal observations, a set of policy guidelines for goat development in peri-urban areas have been made for policy makers, researchers, extension workers and NGOs.

- The government or NGOs should provide short-term loan (2-3 years) with lower interest rate to the goat producers seeking to expand beyond subsistence level to undertake small-scale goat farming in the homestead areas on a commercial basis. The loan recovery system should be easy and consistent with their income flows.

- Wherever possible, demonstration farm for improved grass (e.g. napier, para, ipil-ipil) cultivation should be established in each *Upazila,* and seed, seedling and cuttings of those grasses should be initially introduced to enthusiastic farmers. Extension work must be strengthened to popularize grass cultivation among farmers.

- Farmers should be encouraged to use BLRI developed improved feed mixtures and other locally available low cost feed and fodder as goat feed.

- The disease diagnostic services have to be strengthened. Adequate number of veterinarians and veterinary technicians should be employed in each livestock hospital for prevention of diseases and treatment of diseased animal.

- With emergence of NGOs and other stakeholders, the core activities of DLS should be built around developing its professional skills and capacity in two major areas, e.g. veterinary medicine and animal health. The organizational restructuring around these core functions needs to focus on several key areas like regular monitoring on animal diseases, maintaining disease investigation/control laboratories, check-up and disease control at the borders, enforcing quarantine arrangements, and training to create a pool of private well-trained para-vet workers.

- The goat farmers in the rural and peri-urban areas have to be trained properly on intensive goat farming and improved goat management practices (proper housing and feeding, improved grass cultivation, sanitation, simple first aid, and early diagnosis of disease).

- The level of coordination and linkage among different organizations and institutions working for livestock development, education, research and extension should be strengthened so that the improved livestock technologies can be disseminated to its ultimate users within the shortest possible time.

- To improve marketing system for live goat and goat meat, government should provide marketing facilities like water supply, sewerage, sanitation, hygiene, security, and market place improvement. The local government authorities should be involved in the management and maintenance of markets, utilizing local resources as much as possible.

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Table 1: Average quantity of inputs used per goat per year

Input	Small farmer	Medium farmer	Large farmer	All category
No.ofgoats/household	*5.23*	*5.64*	*6.80*	*5.45*
Green leaves (kg/yr)	30.82	34.27	36.01	32.13
Wheat bran (kg/yr)	11.50	17.75	31.15	14.56
Oilcake (kg/yr)	3.18	2.90	6.09	3.29
Outside grazing (Hour/day)	6.80	6.57	6.60	6.72
Veterinary cost (Tk/yr)	21.30	21.68	18.54	21.22
Human labour (Man-day/yr)	6.08	6.19	5.15	6.03

Table 2: Employment generation potentials of goat

Labour category	Male labour	Female labour	Child labour	All category
Total labour (Farm/year)	10.16	17.95	4.78	32.88
Family labour	6.56	17.38	4.47	28.40
Hired labour	3.60	0.57	0.31	4.48
Total labour (Goat/year)	1.86	3.29	0.88	6.03
Family labour	1.20	3.19	0.82	5.21
Hired labour	0.66	0.10	0.06	0.82

1 man-day = 8 hours (for male)= 12 hours (for female)= 16 hours (for child)

Table 3: Annual cost of goat production under different categories of farmers

Costitem	Small farmer		Medium farmer		Large farmer		All category	
	Tk/farm	%	Tk/farm	%	Tk/farm	%	Tk/farm	%
Number of head	*5.23*		*5.64*		*6.80*		*5.45*	
A. Fixed cost	2868	70	2341	50	1976	33	2661	61
1. Family labour	2405	59	1788	38	1350	23	2162	49
2. Depreciation on goat shed	318	8	391	8	395	7	344	8
3. Depreciation on goat value	145	4	162	3	231	4	155	4
B. Variable cost	1214	30	2341	50	3987	67	1718	39
1. Hired labour	237	6	981	21	1383	23	522	12
2. Green leaves	210	5	247	5	309	5	227	5
Home supplied	208	5	245	5	309	5	225	5
Purchased	3	0	2	0	-	-	2	0
3. Wheat bran (purchased)	378	9	676	14	1522	26	538	12
4. Oilcake (purchased)	109	3	103	2	350	6	123	3
5. Veterinary service	99	2	117	2	133	2	106	2
6. Transport	18	0	18	0	33	1	20	0
8. Interest on operating capital	34	1	71	2	124	2	51	1
9. Miscellaneous	129	3	128	3	133	2	131	3
C. Total cost (A+B)	4082	100	4682	100	5963	100	4379	100
D. Total cash cost	980		2025		3553		1447	
E. Total cost (Tk/goat/year)								
Full cost	780		830		877		803	
Variable cost	232		415		586		315	
Cash cos	187		359		523		266	

Table 4: Annual return and profitability of goat rearing by category of farmer

Particulars		Small farmer	Medium farmer	Large farmer	All category
A	Return from inventory change	5325	5953	7795	5667
	Dung quantity (Ton/year)	6.89	7.45	9.15	7.20
	Dung price (Tk/kg)	0.55	0.54	0.57	0.55
B.	Return from dung	195	206	267	203
C.	Gross return (Tk/farm/year)	5522	6159	8062	5870
D.	Gross return (Tk/goat/year)	1056	1092	1186	1077
E.	Net return (Tk/farm/year)				
	Full cost1	440	1477	2099	1491
	Variable cost	4308	3818	4075	4152
	Cash cost	4542	4134	4509	4423
F.	Net return (Tk/goat/year)				
	Full cost	275	262	309	274
	Variable cost	824	677	599	762
	Cash cost	868	733	663	812
G.	Benefit cost ratio (BCR)				
	Full cost	1.35	1.32	1.35	1.34
	Variable cost	4.55	2.63	2.02	3.42
	Cash cost	5.63	3.04	2.27	4.06

Table 5: Break-even analysis of goat production in the study areas

Particulars	No.of goat	Fixed cost	Variable cost	Gross cost	Total return	Net return
Average herd size	5.45	2661	1718	4379	5870	1491
Break-even size	3.50	2661	1103	3764	3770	6

Table 6: Volume of goat and goat meat traded by intermediaries during June 1998 to May 1999

Particulars	Mymensingh				Sylhet			
	Quantity		Live weight		Quantity		Live weight	
	No.	%	kg	%	No.	%	kg	%
A. *Bepari*								
1. Quantity bought by	1194	100	5557	100	881	100	5527	100
a. Farmer	1149	96.2	5344	96.2	473	53.7	3018	54.6
b. *Bepari*	45	3.8	213	3.8	408	46.3	2509	45.4
2. Quantity sold by								
a. General customer	-	-	-	-	121	13.7	743	13.4
b. Butcher	1194	100	5557	100	760	86.3	4784	86.6
B. Butcher								
1. Quantity bought by	1279	100	6735	100	3888	100	25147	100
a. Farmer	300	23.5	1529	22.7	668	17.2	4397	17.5
b. *Bepari*	979	76.5	5206	77.3	3220	82.8	20750	82.5
2. Quantity sold by								
a.General customer	-	-	4490	66.7	-	-	17050	67.8
b. Restaurant	-	-	2245	33.3	-	-	6171	24.5
c. Bakery	-	-	-	-	-	-	1926	7.7

Table 7. Producers' share in the consumers' prices under different goat meat marketing channels

(Tk/kg)

Particulars	Mymensingh		Sylhet	
	Chain-I	Chain-II	Chain-I	Chain-II
A. Producer				
Selling price to butcher	107.50	-	102.11	-
Selling price to *Bepari*	-	102.47	-	99.37
B. *Bepari*				
Selling price to butcher	-	113.07	-	110.40
C. Butcher				
Selling price to final consumers	132.85	132.85	125.09	125.09
Producers'share to consumers taka				
	80.92%	77.13%	81.63%	79.44%
Rank (I_1)	(1)	(2)	(1)	(2)

**Table 8: Marketing costs and margins of butcher under
different goat meat marketing channels**

Particulars	Mymensingh				Sylhet			
	Chain-I		Chain-II		Chain-I		Chain-II	
	Tk/kg	%	Tk/kg	%	Tk/kg	%	Tk/kg	%
1. Transport	0.59	10	0.26	5	0.30	4	0.20	3
2. Market tools and taxes	1.03	18	0.95	17	0.41	6	0.25	4
3. Personal expenses	1.16	20	1.12	21	1.20	16	1.14	16
4. Labour	0.84	14	0.84	16	2.98	41	2.98	43
5. Rent	1.21	21	1.21	22	1.92	26	1.92	27
6. Slaughtering	1.00	17	1.00	18	-	-	-	-
7. Cleaning	0.05	1	0.05	1	0.10	1	0.10	1
8. Subscription	-	-	-	-	0.07	1	0.07	1
9. Storage	-	-	-	-	0.24	3	0.24	4
10.Licence fee	-	-	-	-	0.01	-	0.01	-
11. Electric bill	-	-	-	-	0.08	1	0.08	1
Total marketing cost	5.88	100	5.43	10	07.31	10	06.99	100
Rank (I_2)		2	1			2	1	
Margin to butcher		25.35	19.78			22.98	14.69	
Rank (I_3)2121								

**Table 9: Deviation between maximum and minimum prices in
different goat meat marketing channels**

(Tk/kg)

Month	Mymensingh		Sylhet	
	Chain-I	Chain-II	Chain-I	Chain-II
January	-	14.26	-	4.10
February	-	2.42	-	9.60
March	11.90	8.38	10.00	15.80
April	12.88	19.43	9.00	8.20
May	4.67	3.38	2.00	8.00
June	4.00	2.50	8.00	8.70
July	9.50	12.00	-	6.00
August	4.37	8.00	4.00	8.60
September	2.25	4.07	5.00	11.50
October	-	5.57	5.00	16.40
November	-	1.81	-	7.80
December	-	14.10	-	2.90
Σd	49.57	95.92	43.00	107.60
N	7	12	7	12
D	7.08	7.99	6.14	8.97
Rank (I_4)	(1)	(2)	(1)	(2)

*Table 10: Seasonal price variability in peak and lean seasons under
different goat meat marketing channels*

Month	Mymensingh		Sylhet	
	Chain-I	Chain-II	Chain-I	Chain-II
Peak season:				
March	5.153	8.420	0.643	4.609
April	1.331	10.955	1.826	4.189
$\Sigma W_t (p_t - p)^2$	6.484	19.375	2.469	8.798
T	2	2	2	2
δ	1.881	3.112	1.111	2.097
Rank (I_5)	(1)	(2)	(1)	(2)
Lean season:				
August	3.699	5.385	0.735	0.531
September	0.187	0.630	0.492	0.155
$\Sigma W_t (p_t - p)^2$	3.886	6.015	1.227	0.686
T	2	2	2	2
δ	1.394	1.734	0.783	0.586
Rank (I_6)	(1)	(2)	(2)	(1)

*Table 11: Final ranking of the efficiency of different
goat meat marketing channels*

Performance indicator	Mymensingh		Sylhet	
	Chain-I	Chain-II	Chain-I	Chain-II
Producers' share (I_1)	1	2	1	2
Marketing costs (I_2)	2	1	2	1
Margin to middlemen (I_3)	2	1	2	1
Price deviation (I_4)	1	2	1	2
Peak period seasonal price variability (I_5)	1	2	1	2
Lean period seasonal price variability (I_6)	1	2	2	1
Composite index (Ri ÷ Ni)	1.33	1.67	1.50	1.50
Final ranking	(1)	(2)	(1)	(1)

Ri = Total value of the ranks of performance indicators
Ni = Total number of performance indicators

Table 12: Problems and constraints faced by peri-urban goat farmers and traders

Types of problem	% of response
1. Lack of care	19
2. Lack of working capital	71
3. Lack of quality breed	51
4. Lack of high yielding buck	14
5. Lack of grazing land	13
6. Scarcity of green fodder	58
7. Lack of improved feed preparing know-how	12
8. Inadequate extension services	35
9. Incidence of disease	17
10. Lack of security	19
11. Problem of insects/wild animals	82
12. Presence of middlemen	50
13. Higher sale tax	10

Table 13: Problems faced by peri-urban goat and goat meat traders

Types of problem	*Bepari* (n=62)	Butcher (n=58)
1. Lack of working capital	81	60
2. Inadequate marketing facilities	68	90
3. Fluctuations in demand & prices	42	60
4. Higher market toll/tax	48	41
5. Lack of transport facilities	58	24
6. Scarcity of goat	34	43
7. redit sale	16	22
8. Other	34	50