



RESEARCH ARTICLE

COVID-19 EFFECT ON NET INCOME OF RURAL BLACK BENGAL GOAT FARMERS OF BANGLADESH

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ABSTRACT

Global community has seriously affected by COVID-19. From China it has spread all over the world in a year, threatened the human life and their socio-economic condition. Livestock sector is also in a vulnerable condition. In Bangladesh there was a little research on the losses that has occurred during this pandemic in livestock sector. Our study was taken to focus on effect of cost benefit ratio during and before the pandemic COVID-19 of Black Bengal goat rearing of Bangladesh. A total of 70 farmers were randomly chosen. The primary data of socio-economic condition of the farmers and data for fixed and recurring cost was taken by a pretested questionnaire. The data was then analyzed to find out the differences between cost benefit analysis ratio before and during pandemic of COVID-19. The study showed that though per kg meat price significantly increased during pandemic but most of the parameters for calculating cost benefit ratio have been decreased significantly ($p < 0.05$). As a result the net income reduces almost half and one fourth during pandemic. This finding indicates that Black Bengal goat farming has seriously affected by the pandemic. So, long term necessary initiative should be taken helping this sector.

KEYWORDS

Black Bengal Goat, Cost and Benefit Analysis, COVID-19, Socio-economic Condition.

1. INTRODUCTION

The (Black Bengal goat) BBg is mostly known for its high prolificacy, fertility, early sexual maturity, and skin quality (Faruque et al., 1970). Since BBg is the only native goat breed that's why it is commonly found in almost all regions of Bangladesh. As BBg is small in size, it is easier to rear than that of cow with a low-cost maintenance (Chowdhury et al., 2019). This breed has high disease resistance ability and high adaptability with an extreme environment (Moni and Samad, 2019). In 2019-2020 the goat population has increased to 264.35 lakh, that has a great contribution of total Gross Domestic Product (GDP) of 46,673 core earn from livestock sector (DLS, 2020). In Bangladesh, the Novel Coronavirus Disease was first reported on 8 March 2020 (COVID-19) (WHO, 2020). To stop the spreading of the virus government declared lockdown on 26 March 2020 (Kamruzzaman and Sakib, 2020). As livestock is an important part of the economy which had faced a great disaster because of this pandemic.

The GDP growth rate of Bangladesh decreased 8.2% to 3.8% in 2020 during this pandemic (Statista, 2020). The market demand for milk, eggs, and meat decreased (Rahman and Chandra Das, 2021). The contributions in GDP and GDP growth rate of livestock decreased from 1.47% to 1.43% and 3.47% to 3.04% (DLS, 2020). This pandemic situation is threatening our main economic resources like livestock (Alam et al., 2020). So, the study aimed to focus how much changed has occurred in net income of BBg rearing farmers during pandemic. There is a close relationship between the profit of the farm and the socio-economic development of rural area farmer's lifestyles. A few research have been done about the socio-economic conditions and cost and benefit analysis of the rural BBg rearing

farmers during pandemic. So, the study would help the Govt. and different organizers who are involving in this area for their future planning to resolve problems occurred during pandemic in this sector.

2. MATERIALS AND METHODS

2.1 Study Area and Duration

The study was conducted in Sylhet and Narsingdi district from March 2020 to March 2021. This district was selected according to the predominance of the goat farmer. These locations were suitable for goat farming because of their good geographical situation.

2.2 Geographical Location of the Study Area

Sylhet district located at 24° 53' 0" North, 91° 52' 0" East. Narsingdi district located at 23° 55' 12" North, 90° 43' 48" East (Google search engine).

2.3 Data Collection

Total 70 goat farmers were selected randomly, 30 from Sylhet and 40 from Narsingdi district. A pre-structured questionnaire was made for the collection of socio-economic status of farmers, different productive and reproductive performance of animal, and husbandry data mainly on feeding of BBg rearing during the pandemic. Before the pandemic, data was collected through direct interviews. During the lockdown, because of the pandemic situation, the information was collected through mobile phone. The mobile number was collected from the local Upazila livestock office with maximum information. The conversation started with

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explaining the aim of the research. By scheduling with them collection of the information is done in their free time. Some Questions were explained for their better understanding. Recording the information had been done manually.

2.4 Cost and Benefit Analysis

To study the cost and benefit analysis of rural goat farmers some important data was collected from farmers and price of mutton, animal, and concentrated feed were collected from respectively two or three local market point of each district. All the revenue and cost were recorded at BDT taka (Tk). Certain questions were asked indirectly to collect accurate data about their cost and benefit of their goat rearing. For better analysis of cost and benefit of BBg farm, collection of data done with a minimum goat number 5 (five).

2.5 Formula

Some formula used to study better about the Cost and benefit analysis of BBg farm (Manurung et al., 2018; Baruwa, 2013).

1. Total weight = (Average weight of doe * Average number of doe) + (Average weight of a buck * Average number of buck)
2. Total price of stock = (Average price of meat per kg * Total weight)
3. Total price of feed/ allot(flock)/year = (Total feed consume per kg per allot * price of feed per kg)
4. Miscellaneous cost = (Depreciation cost + medication and vaccination cost + labor cost)
5. Total feed cost = (Total price of feed/allot/year + feed transportation action)
6. Total variable cost per allot per year = (cost of feed + miscellaneous costs + fodder cost)
7. Total return = (Income from selling of goat + milk income)
8. Net income = (Total return -Total variable cost per allot per year)

2.6 Statistical Analysis

Then after collection of all data we uploaded them in an Excel, 2007. Different statistical measures done like descriptive statistics (frequency

and percentage) for the entire variable both socio-economic conditions data and cost and benefit data. One sample chi-square test was done for socio-economic conditions data for each region. Paired sample t-test was done for cost and benefit analysis data between March 2020 (before pandemic) and March, 2021(during pandemic) with difference and standard error. In one sample chi-square test and paired sample t-test p value determined and the level of significance measured for variable.

3. RESULT AND DISCUSSION

3.1 Socio-economic Status

3.1.1 Sex

A prominent feature about both regions was male and female contribution to BBg farming was not significantly (p>0.05) different (Table 1). Male and female in Sylhet district were (60%,40%) and in Narsingdi district (57.5%,42.5%). There was a piece of good news that the female were also moving forward there. It was found that though the head of the family is male, they don't influence the profit of goat rearing by females. Females contribute their profit to the family needs (children's educational or recreational equipment, women's makeup things, cloths) also keeps as savings for their future (Galiè et al., 2019). But due to the pandemic situation, as men don't go to work, they were helping females with the management of the house, agriculture, livestock rearing (Nipane et al., 2016; Dossa et al., 2008). Whereas some studies showed that most (65%) of the goat farmers were female (Raghavan and Raja, 2012; Baruwa, 2013).

3.1.2 Age

Young people were more interested (53.3%,70%) and adult people were less engaged (10%,7.5%), which is significant (p<0.05) in BBg farming of both district (Table 1). After completing higher schools, young people find out their way of livelihood (Aboard, Garments worker, Business). Usually, due to unawareness about the importance of studies by parents, the temptation to go abroad to earn more money from brokers and the burden of family responsibilities on their shoulders, they cannot finish their studies. Some studies who expressed that most of the farmers are middle age from 30 to 40 years old (Baruwa, 2013; Tanwar et al., 2008; Islam et al., 2018). A group of researchers reported that young people aren't much involved with goat keeping (Nipane et al., 2016).

Table 1: Socio-economic Status of Farmers Rearing BBg in Sylhet and Narsingdi District

Criteria		Sylhet	Narsingdi	Level of Significant
Sex of Farm Owner	Male	18(60%)	23(57%)	*
	Female	12(40%)	17(42.5%)	
Age	Adolescent (0-20) year	7(23.3%)	5(12.5%)	*
	Young people (21-30) year	16(53.3%)	28(70%)	
	Adult people (31-40) year	3(10%)	3(7.5%)	
	Old people (41-50) year	4(13.3%)	4(10%)	
Occupation	Housewife	11(36.7%)	6(15%)	*
	Business	4(13.3%)	6(15.0%)	
	Farmer	7(23.3%)	9(22.5%)	
	Student	3(10%)	7(17.5%)	
	Others	3(10%)	8(20%)	
Religion	Muslim	22(73%)	29(72.5%)	*
	Hindu	5(16.7%)	11(27.5%)	
	Ethnic	3(10%)	0	
Level of Education	Primary	6(20%)	8(20%)	*
	Secondary	10(33.3%)	17(42.5%)	
	Higher secondary	10(33.3%)	10(25%)	
	Above	4(10%)	5(12.5%)	
Rearing System	Intensive	3(10%)	8(20%)	*
	Semi-intensive	27(90%)	32(80%)	

The Significance Level is (.050), *= p<0.05

3.1.3 Occupation

Considering the occupation, it was found that most of the people involves who were housewives (36.7%, 25%) in both districts. Then farmers (23.3%, 22.5%), followed by businessmen (13.3%, 15%), student (10%, 17.5%) and others (10%, 20%) among BBg keepers. It was found that people of different professions are now getting involved in goat rearing as additional financial aid (Deshpande et al., 2010). A group researchers reported about 95% of the farmer was housewife these are similar with present findings (Faruque et al., 2017). According to a study the main occupation of goat farmers is farming, reported that most of the goat farmer in Sylhet is labor (Islam et al., 2018; Hossain et al., 2017).

3.1.4 Religion

Most of the farmers of both regions were Muslim (73.3%,72.5%) and Hindu (16.7%,27.5%). Both regions had significant ($p<0.05$) differences in religion (Table 1). It was known that the Sylhet district had a great religious and cultural diversity so ethnic people like Khashi and Monipori lived in Sylhet district more than other parts of Bangladesh. Though their traditional occupation was joom (cultivation of crops, fruits, citrus fruit, Betel nut and Betel leave in the hills) but nowadays they had significant ($p<0.05$) contribution in BBg rearing (10%).

3.1.5 Education Level

The study indicates a significant number of people who had at least a

minimum or primary education. 20% of people had primary education, which is up to class 5 in both regions. In Sylhet and Narsingdi, most of the farmers either completed their secondary (33.3%,42.5%) or higher secondary (33.3%,25%) also hon's or master's degree (13.3%,12.5%), which was significant ($p<0.05$). The education level of goat farmers was increasing day by day (Hossain et al., 2017). But the findings of some researchers expressed that most of the farmers had primary education were different from the present study (Hossain et al., 2017; Baruwa, 2013). Some others studies revealed that a significant proportion of goat keepers were illiterate (Tanwar et al., 2008; Islam et al., 2018).

3.1.6 Rearing System

A considerable number of farmers choose semi-intensive rearing system. They allowed the animal to graze for some part of the day to minimize the feeding cost to get a large benefit. Farmers used (90%,80%) semi-intensive rearing system; the rest used intensive rearing system in respectively both districts (Table 1). However, expressed that in the southern part of Bangladesh, a large number of farmers maintain semi-intensive rearing system (80.5%) with night shelter at goat house (75.6%) (Hossain et al., 2015). A group researchers reported that Semi-intensive rearing system is economically sustainable and productive than scavenging practice (Islam et al., 1970).

3.2 Cost and Benefit Analysis

Table 2: Cost and Benefit analysis of BBg rearing farmers in Sylhet and Narsingdi district

COST AND BENEFIT	(SYLHET) (N=30)			(NARSINGDI) (N=40)		
	March-2020	March-2021	Difference ±SE	March-2020	March-2021	Difference ±SE
Number of batches per year	1.25	1.11	0.14±0.018*	1.75	1.17	0.58±0.065*
A. Cost of stock						
Number of does (female goat)	10	6.5	3.5±0.451*	15	9.5	5.5±0.615*
Weight of doe (female goat) (kg)	11.91	10.23	1.68±0.217*	12.65	11.15	1.5±0.168*
Number of bucks (male goat)	3	1.2	1.8±0.232*	5	2.2	2.8±0.313*
Weight of buck (male goat) (kg)	14.89	11.96	2.93±0.378*	14.50	12.57	1.93±0.216*
Total weight(kg)	183.77	80.85	102.92±13.287*	262.25	133.579	128.68±14.387*
Price of meat per kg (Tk)	901.31	1061.77	160.46±20.715*	900	1000	100±11.810*
Price of stock (Tk)	165633.74	85844.10	79789.64±10300.8*	236025	133579	102446±11453.81*
B. Cost of feed						
Feed consume by kid per kg Body Weight gain (kg)	3.33	3.05	0.28±0.036*	3.5	3.05	0.45±0.050*
Number of kid born/goat/year	1.8	1.2	0.6±0.077*	3	1.7	1.3±0.145*
i. concentrate/grain/cereal feed cost						
Feed consumes (gram) /doe/day	75	49.60	25.4±3.279*	70	58	12±1.342*
Total feed consumes (kg) /doe /year	27.375	18.105	9.27±1.198*	25.55	21.17	4.38±0.490*
Feed consumes (gram) /buck /day	50	33.33	16.67±2.152 ^{NS}	50	35	15±1.677*
Total feed consumes (kg) /buck/year	18.250	12.167	6.08±0.785*	18.50	12.775	5.72±0.640*
Total feed consumes (gram) /allot/day =	900	362.40	537.6±69.403*	1300	588.2	711.8±79.582*
Total feed consumes (kg) /allot/year =	328.50	132.28	196.22±25.332*	474.50	214.69	259.81±29.048*
Price of feed /kg	20	25	5±0.645*	25	30	5±0.559*
Total price of feed/year	7170	3307	3863±498.711*	11862.5	6440.7	9151.6±2710.9*
Feed transportation action (Tk)	0	0	0 ^U	0	500	0 ^U
Total feed cost/year (Tk)(total price of feed+ Transportation)	7170	3307	3863±498.711*	11862.5	6940.7	5421±606.176*
C. Miscellaneous cost						
Depreciation cost (10% of housing and equipment)/year (Tk)	55.05	73.35	18.3±2.362*	50.50	80	29.5±3.298*
Medication and vaccination cost/year (Tk)	576.23	748.28	172.05±22.112*	550.55	780.67	230.17±25.734*
Labor cost /year (Tk)	127.59	50.15	77.44±9.997*	156.32	24.11	132.21±14.782*
D. Fodder cost						
Fertilizer cost (Tk)	30	50	20±2.582*	35	65	30±3.354*
Irrigation cost (Tk)	0	0	0 ^U	0	0	0 ^U
Fodder Cutting cost (Tk)	80	130	50±6.455*	90	150	60±6.708*
Total variable cost /allot/year (Tk)	7938.87	4308.63	3630.24±468.662*	12617.32	8016.37	4600.95±514.402*
Returns						
Avg. number of selling animal/year	13	11	2±0.258*	16	13	3±0.335*
Selling weight(kg) (1 year)	13.14	10.87	2.27±0.293*	12.5	10	2.5±0.280*
Mortality rate (%)	26.45	57	30.55±3.944*	28	53	25±2.795*
Total price of goat (selling of goat) (Tk)	104500	47300	57200±7384.488*	114288	85540	28748±3214.124*
Milk price (if any)/year (Tk)	27.56	0	13.78±13.78*	0	0	0 ^U
Total return (Tk)	104527.56	47300	7227.56±388.046*	1,14,288	85540	28748±3214.124*
Net income (Tk)	96588.69	42992	53596.69±6919.303*	101670.68	77523.63	24147.05±2.699.722*

The significance level is (.050), * = $p<0.05$, NS = Not Significant, U = Undefined (both or single of the value is "zero" (0))

3.2.1 Cost of Stock

Total weight of stock(kg) reduced in Sylhet and Narsingdi. (Table 2). A group researcher found that body weight at 12 months of male and female were (14.28±0.20) kg and (11.27±0.13) kg which was more or less similar to our findings before pandemic and a little higher than during pandemic data of the present study (Faruque et al., 2017). Though some studies reported that the average live weight at slaughter is 12.15 kg (Nazim et al., 2014). But it also found that the live weight of male Bbg is 20.34 kg at 12 months of age with a highly significant effects of sex (Chowdhury and Faruque, 2004). Weights of both male and female were reduced during pandemic may be due to inadequate nutrition especially dry matter intake for higher prize of concentrate and high prevalence of disease in both regions. After spreading corona virus in Bangladesh, there is a sudden increase in the price of goat meat (Tribune, 2020). Though the average price of meat increased in both districts. But, the price of the stock had been reduced more than that, so farmers were in a loss condition.

3.2.2 Concentrate Feed Prize

Feed consumed(gram)/doe/day, feed consumed(kg)/ doe/year, feed consumed (gm)/buck/day, feed consumed(kg)/ buck/year, total feed consumed(gm)/allot/day decreased in Sylhet and Narsingdi, on the other hand price of per kg feed, total price of feed/year, was increased (Table 2). The average cost of feed is mainly dependent on concentrated feed or grain feed because Bbg farmers mainly depended on green grasses and tree leaves (Faruque et al., 2017). A group researcher also reported that 19.5% of farmers depended on grass concentrate feed and 39% of farmers provided concentrate feed comparing with the present study farmers containing small groups (5-6 animals) didn't provide any concentrated feed (Hossain et al., 2015). During the lockdown, feed consumption of a doe or a buck per day decreased due to low supply of concentrated feed given to animals. This may be due to high price of feed due to pandemic in both regions. The average feed cost of a goat during a pandemic was (3863±498.711) Tk and (5421±606.176) Tk with approximately zero feed Transportation cost.

3.2.3 Fodder Cost

The average fodder cost had increased during pandemic. Total variable cost increased (3630.24±468.662, 4600.95±514.40) Tk in both regions. Although most of the Bbg farmers didn't seem interested in fodder cultivation for goats.

3.2.4 Miscellaneous Cost

Depreciation cost/year, medication and vaccination cost/year increased. Total miscellaneous cost decreased (267.79, 391.88) Tk in both region (Table 2). The average labor cost had decreased because of the unemployment of male members.

3.2.5 Total Variable Cost

Total variable cost /flock /year was decreased in both districts. A group researcher also reported that the total variable cost is 2,326 Tk and 235,332 Naira per flock, which is also the opposite of recent study (Islam et al., 1970; Baruwa, 2013).

3.2.6 Returns

Number of selling animal/year, selling weight, mortality rate, total price, total return was decreased for Sylhet and Narsingdi district (Table 2). As a result, returns decreased (57200±7358.488, 28748± 3214.124) Tk for both districts.

3.2.7 Total Return

The total price of the animal was decreased about 50% during the pandemic, which affected farmer's economy. The average profit of the farm with little contribution of milk which decreased during pandemic in Sylhet district (Figure 1). In Narsingdi district the average profit of the farm during pandemic which also decreased (Figure 2). The difference between before and during the pandemic average total return was significant ($p < 0.05$).

3.2.8 Net Income

Net income decreases in Sylhet and Narsingdi district. The difference between the average net income of the farm is 53596.69±6919.303 Tk in Sylhet district and 24147.05± 2699.722 Tk in Narsingdi district which is significant ($p < 0.05$). Some studies investigated that the net income per farm (30 does and 1 buck) was 315,818 Naira (Baruwa, 2013).

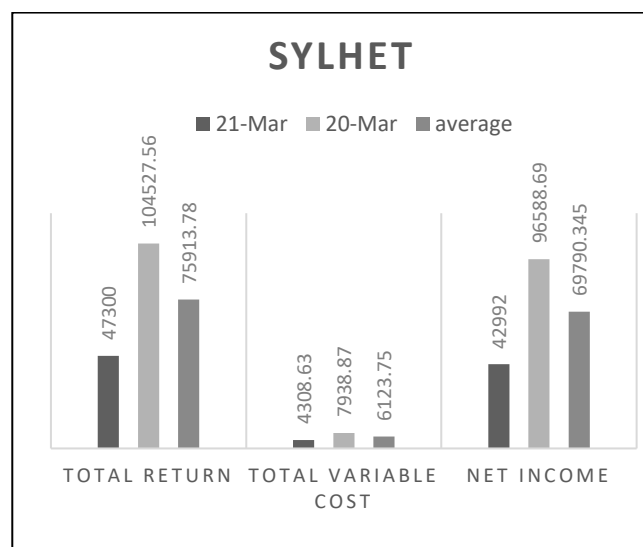


Figure 1: Different cost and benefit analysis of Bbg in Sylhet

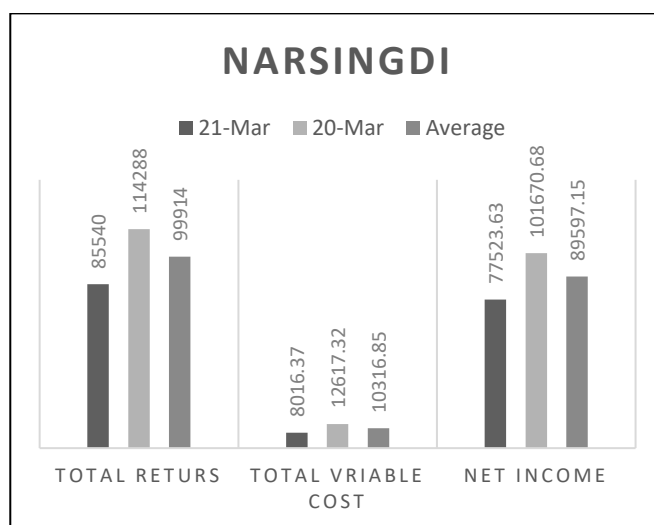


Figure 2: Different cost and benefit analysis of Bbg in Narsingdi

4. CONCLUSION

It can be concluded from the study that most of the farmers were young age with Secondary and higher secondary education are involving in Bbg rearing but during pandemic the situation have been changed. A large proportion of goat rearer were housewife and most of the male goat rearer were farmer. Semi-intensive rearing system is mainly followed by a huge quantity of farmers. However, most of the productive performance decreased and reproductive performance changed negatively which affected the cost and benefit analysis of Black Bengal goat rearing farmers in Bangladesh. Bbg is the only native breed of Bangladesh with a high genetic value. So, the Conservation of this breed should be taken in these critical conditions. Moreover, Governments and NGOs should take necessary initiative for helping to these economically damaged goat farmers.

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