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# A baseline survey on the availability of Black Bengal breeding bucks in different districts of Bangladesh

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## Abstract

The present study was conducted to assess the availability of Black Bengal breeding bucks in five districts from the Northern part (Lalmonirhat and Rangpur), Central part (Tangail and Mymensingh) and Southern part (Khulna) of Bangladesh and also to explore the relationship between distance of does from these breeding bucks and type of scarcity. The data were collected using a pre-tested questionnaire from 100 goat rearers of 100 villages in five districts. In this study, the selected characteristics of the respondents and other factors on the availability of Black Bengal breeding bucks were considered as independent variable whereas type of scarcity was considered as dependent variable. The buck and doe ratios were 1:164, 1:138, 1:114, 1:127 and 1:96 in Lalmonirhat, Rangpur, Tangail, Khulna and Mymensingh district, respectively. The pooled buck and doe ratio was 1:128. More than 70% farmers faced severe shortage of breeding bucks for serving their does in the above districts which ultimately represent the overall situation of the country. Almost all farmers (100%) had to depend on natural mating to serve their does except the farmers of Mymensingh where 12% farmers depended on artificial insemination in goat. It was observed that type of scarcity had significantly positively correlated (0.933) with distance of does from breeding bucks. This also indicated that type of scarcity gradually reached to severe level which may create the inbreeding depression in goat breeding.

**Keywords:** Breeding buck, Black Bengal

## Introduction

Goat production is one of the major and important sectors in Agricultural operation of Bangladesh. Among the Asiatic countries, Bangladesh has got the fourth highest population of goats which accounted for about 23.27 million heads (DLS, 2010). About 90 percent of goat population comprised the Black Bengal goats (Husain, 1993). The higher demand of meat and skin in the local as well as foreign markets focused the goat enterprise extremely prominent to the vulnerable group of people in the existing socio-economic condition of the country (Husain, 1993). This also contributes to the sustenance of small and marginal farmers and landless rural poor - holding less than 2 acres of land in a sedenterized system of grazing which makes the best use of natural vegetation (Husain, 1993). Black Bengal goat had been focused very prominently at present by the Government to alleviate poverty in the rural areas. To make the enterprise economically viable, overall goat production systems need to be modified and improved. But in present goat production system, the acute shortage of Black Bengal breeding bucks is considered as the severe aspect of production constraints in the rural areas (Husain *et al.*, 1996a, 1996b). Nevertheless, bucks are not available in some villages, regions or locality. So, farmers have to go a long distance to serve their does. Sometimes they failed to serve their heated does in right time. As a consequence, life time productivity of the does become squeezed. In this context, the present study was conducted to assess the number or availability of Black Bengal breeding bucks as well as to know the level of scarcity of these breeding bucks in some selected districts of Bangladesh.

## Materials and Methods

A total number of 100 farmers from 100 representative villages from five districts (two from the Northern part (Lalmonirhat and Rangpur), two from Central part (Tangail and Mymensingh) and one from Southern part (Khulna)) were selected to collect the information on population structure of goat, assess the ratio of Black Bengal buck and doe, type of scarcity of breeding buck and also on socio-economic aspects of goat rearers. Before conducting this study, a questionnaire was carefully designed keeping the objectives of the study in view. The schedule contained both open and close form question. Most easy, simple and

direct question was used to obtain the authentic information. During data collection, the objectives of the study were clearly explained to the respondent so that they could respond freely. The data were collected through face to face interview with the goat rearers from the selected areas about the availability of breeding bucks and problems associated with goat rearing. The data were collected from November, 2006 to November, 2010. The independent variables of the study were age, education, family size, occupation, family income, involvement in goat rearing of the respondents, distance of does from breeding bucks and type of mating. However, the dependent variable of the study was considered on the availability of Black Bengal breeding bucks as type of scarcity in the respected areas. For describing the variables, suitable scales were employed to measure the dependent and independent variables.

**Measurement of independent variable**

**Age** : Age of the respondent farmer was calculated from his time of birth to the time of interview and was measured in terms of years.

**Education** : Education of the respondent was measured by calculating the year of schooling. Respondent, who did not go to school but could sign only was given score 0.5 whereas score of zero (0) was given to that respondent who was unable to read and write.

**Family size** : Family size of the respondent was measured in terms of actual number of members in the family including his wife, children and other dependents. One score was assigned for each member of the family. Total number of members in a respondent's family constituted the family size score. In this case, up to 4 members were considered as small family size whereas 8 and above were considered large family size.

**Occupation** : Occupation was measured in terms of three categories where 1 was assigned for agriculture, 2 for business and 3 for service

**Family income** : Family income of the respondent was measured in terms of actual income from his main occupation.

**Involvement in goat rearing** : This was measured from the number of goats reared in each family

**Distance** : The distance of does from breeding bucks in five selected districts was measured in three categories where 0.1-0.9 km was considered as low, 1.0-3.0 km was medium and more than 3.0 km was high distance.

**Type of mating** : This was measured in two categories where 1 was assigned for natural and 2 for artificial mating.

**Measurement of dependent variable**

The dependent variable of the present study was "breeding bucks scarcity type". The interview schedule was prepared with 3-point rating scale for dependent variable to make it easy for all type of respondent to answer. Based on the 3-point rating scale, scoring in respect of the type of scarcity of the breeding bucks was performed where 1 was given for no scarcity and 2 for moderate and 3 for severe scarcity.

**Statistical analyses**

The data collected for the study were coded, compiled, tabulated and analyzed in accordance with the objectives of the study. Descriptive statistics such as number, percentage distribution, mean, standard deviation etc were used in describing the dependent and independent variables. Correlation and regression analysis was performed to explore the relationship between dependent and independent variable. All the analysis was performed using SPSS 11.5 (Statistical Package for Social Sciences).

## Results and Discussion

### Selected characteristics of the respondent farmers

Selected characteristics of the respondent farmers indicated that most of the respondents (67%) were middle age group i.e. 30-49 years old (Table 1). Out of the respondents, 45% were illiterate whereas 27% can sign only. Among the respondents, most of the farmers (61%) had medium sized (5-7) family and their occupation was mainly agriculture (76%). The income of most of the family (58%) was low i.e., 21-50 thousand taka/year. As a source of extra income, they were involved in goat rearing. The number of goat/ family was mostly (52%) low (1-3), though 36% farmers reared 4-6 goats and only 12% farmers were involved with high (7 and above) number of goat rearing.

**Table 1. Characteristics of the respondent farmers with categories and basic statistical values**

| Characteristics | Scoring method | Categories | Respondents (N=100) No./percent | Range | Mean | SD |
|---|---|---|---|---|---|---|
| Age | Years | Young (15-29) | 11 | 15-65 | 36.84 | 10.43 |
| | | Middle (30-49) | 67 | | | |
| | | Old (50 and above) | 22 | | | |
| Education | Year of schooling | Illiterate (0) | 45 | 0-16 | 6.28 | 4.77 |
| | | Only can sign (0.5) | 27 | | | |
| | | Primary (1-5) | 18 | | | |
| | | Secondary (6-10) | 7 | | | |
| | | Higher education (11 and above) | 3 | | | |
| Family size | No. of members | Small (up to 4) | 28 | 2-12 | 6.03 | 2.68 |
| | | Medium (5-7) | 61 | | | |
| | | Large (8 and above) | 11 | | | |
| Occupation | Type | Agriculture (1) | 76 | 1-3 | 1.31 | 0.59 |
| | | Business (2) | 13 | | | |
| | | Service (3) | 11 | | | |
| Family income | Thousand taka | Very low ( up to 20) | 8 | 18-150 | 49.61 | 22.51 |
| | | low (21-50) | 58 | | | |
| | | Medium (51-100) | 25 | | | |
| | | High (101 and above) | 9 | | | |
| Involvement in goat rearing | No. of goat/family | Low (1-3) | 52 | 1-8 | 2.96 | 1.59 |
| | | Medium (4-6) | 36 | | | |
| | | High (7 and above) | 12 | | | |

### Black Bengal Goat population and male-female ratio in different districts

It was reported that the total number of goats in 20 villages of Lalmonirhat district was 3112 where the buck and doe ratio was 1:164 whereas in Rangpur, Khulna, Tangail and Mymensingh districts were 1:138, 1:127, 1:114 and 1:96, respectively (Table 2). Though among the five districts the ratio between buck and doe was lower in Mymensingh district (1:96), nevertheless, this result also indicated that the male-female ratio is not rational in this district.

The livestock census for Rajasthan (1997) estimates there is 1 buck available for every 34 does. Observations from 2 case studies each covering over 100 villages along the Aravalli range, mention a buck: adult females ratio of 1:20 and 1:26. But in the present study, it was observed that the average buck and doe ratio was 1:128 which is much higher than the normal buck and doe ratio observed in Rajasthan of India. This picture showed that there was severe scarcity of breeding bucks in the selected areas. Moreover, People are interested to eat the meat of castrated animal. So, a large number of bucks are castrated at an early age which is also shown in Table 2. This is also a major cause of shortage of breeding bucks. From the result, it can be concluded that the number of stud bucks is very much lower.

**Table 2. Distribution of different categories of Black Bengal goat in different districts**

| Categories | Lalmonirhat | Rangpur | Tangail | Khulna | Mymensingh |
|---|---|---|---|---|---|
| Buck | 12 | 21 | 29 | 11 | 27 |
| Doe | 1970 | 2900 | 3300 | 1400 | 2600 |
| Castrated | 1130 | 1800 | 1900 | 1100 | 1800 |
| Total | 3112 | 4721 | 5229 | 2511 | 4427 |
| Buck : Doe | 1:164 | 1:138 | 1:114 | 1:127 | 1: 96 |
| Pooled ratio | 1:128 | | | | |

**Availability of Black Bengal breeding bucks in village flocks**

From the survey on the availability of breeding bucks, it was reported that about 74% farmers had to pass a long distance (more than 3.0 km) to breed their does in Lalmonirhat district whereas 18% farmers need to pass a medium distance (1.0-3.0 km) and only 8% have to pass a low distance (0.1-0.9 km). In this district farmers have to pass a distance of 0.2-6.8 km with a mean of 4.95. Whereas in Rangpur district, the farmers had to pass a distance of 0.2-5.1 km with a mean of 4.14 to serve their does where most of the farmers (69%) had to pass a long distance (1.0-3.0 km). In Tangail, Khulna and Mymensingh districts the farmers had to pass 0.1-4.2, 0.2-4.7 and 0.1-3.8 km with an average distance of 3.44, 3.74 and 2.67 km, respectively to breed their does. Most of the farmers (58, 67 and 58%, respectively) had to move a high distance (more than 3.0 km) to serve their does in the above three districts.

According to 89% respondent farmers, the scarcity level of Lalmonirhat district was severe, whereas 10% farmers reported moderate scarcity and only 1% farmers thought that there was no scarcity of buck at all. In case of Rangpur, Tangail, Khulna and Mymensingh, the severe scarcity of breeding bucks was reported by most of the farmers *i.e.* 85, 77, 78 and 69%, respectively. This indicates that the breeding bucks are not easily available for the village farmers. The farmers are not interested to rear bucks due to some social taboos. In most situations, bucks were being kept by only the few lower cast people and animals are often genetically very poor with unknown pedigree. From the economic point of view, most of the farmers want to fetch more income by castrating their male goats because castration help in improvement of meat quality (Werdi Pratiwi *et al.*, 2004) which have a great demand in the market. People are habituated to eat the meat of castrated animal. Farmers do not find it economically feasible to rear buck for one or two doe(s). As a consequence, the availability of breeding bucks becomes decreased day by day. From this survey, it was also reported that most of the farmers castrate their male goats at an earlier age of 5-11 weeks. For lack of breeding bucks, a large number of does cannot be served in time and farmers are compelled to serve their does by passing a long distance by the inferior quality bucks or their close relatives which increases the possibility of inbreeding depression.

It was also reported that farmers were bound to depend on the community based buck breeding system with unknown pedigree. Almost 100% of the farmers in Lalmonirhat, Rangpur, Tangail and Khulna districts served their does naturally by these unknown pedigree and low quality breeding bucks. As a result, unplanned and haphazard breeding has been performed in our country. In some cases, it is a matter of great concern that crossbreeding has been performed which not only decreases the purity but also increases the heterozygosity of this breed day by day. On the other hand, due to unavailability of Black Bengal breeding bucks, the same buck has been used generation after generation. As a consequence, inbreeding depression may be increased which is ultimately responsible for the gradual decline of overall productivity of goat.

Though artificial insemination has gained widespread acceptance in the dairy cattle industries of most developed countries and now-a-days also becoming popular in Bangladesh. But it has not yet been received such universal acceptance in the goat breeding industries (Evans and Maxwell, 1987). Only a few percent of farmers (12%) used AI in Mymensingh district among the survey areas. But still now, most of the farmers (88%) of Mymensingh district had to depend on natural breeding for their does by passing through a long distance.

**Table 3. Availability of Black Bengal breeding bucks in different regions**

| Criteria | Regions | Categories * | | | Range of criteria | Mean | SD |
|---|---|---|---|---|---|---|---|
| | | Low (0.1-0.9) | Medium (1.0-3.0) | High (More than 3.0) | | | |
| Distance | Lalmonirhat | 8 | 18 | 74 | 0.2-6.8 | 4.95 | 1.46 |
| | Rangpur | 11 | 20 | 69 | 0.2-5.1 | 4.14 | 1.06 |
| | Tangail | 15 | 27 | 58 | 0.1-4.2 | 3.44 | 0.91 |
| | Khulna | 9 | 24 | 67 | 0.2-4.7 | 3.74 | 1.09 |
| | Mymensingh | 12 | 30 | 58 | 0.1-3.8 | 2.67 | 0.85 |
| Type of scarcity | | Not at all(1) | Moderate (2) | Severe (3) | | | |
| | Lalmonirhat | 1 | 10 | 89 | 1-3 | 2.85 | 0.43 |
| | Rangpur | 3 | 12 | 85 | | 2.75 | 0.54 |
| | Tangail | 4 | 19 | 77 | | 2.63 | 0.67 |
| | Khulna | 6 | 16 | 78 | | 2.70 | 0.61 |
| | Mymensingh | 11 | 20 | 69 | | 2.28 | 0.75 |
| Type of mating | | Natural (1) | | Artificial (2) | | | |
| | Lalmonirhat | 100 | | 0 | 1 | 1.00 | 0.00 |
| | Rangpur | 100 | | 0 | 1 | 1.00 | 0.00 |
| | Tangail | 100 | | 0 | 1 | 1.00 | 0.00 |
| | Khulna | 100 | | 0 | 1 | 1.00 | 0.00 |
| | Mymensingh | 88 | | 12 | 1-2 | 1.23 | 0.43 |

** Data in the categories column indicates the respondent percentage (N=100) of five districts*

From the correlation analysis between distance of does from breeding bucks and type of scarcity (level), it was revealed that type of scarcity significantly and positively correlated (0.933) with the distance of does from breeding bucks. This indicated that type of scarcity gradually reached to severe level with the increase of distance.

From the regression analysis, it was observed that the regression equation of type of scarcity (y) on distance (x) was y = 0.2409x + 1.7297 which indicated that per 0.2409 km increase of distance tends to increase the level of scarcity from one level to another (Fig. 1).

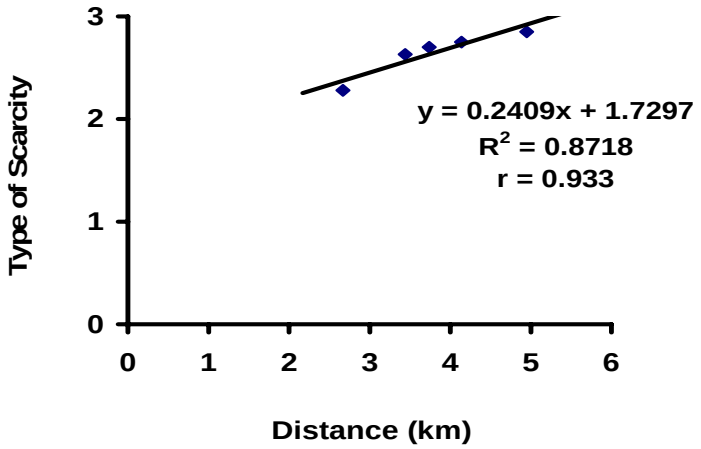


**Fig. 1. Relationship between distance and type of scarcity of breeding bucks**

## Conclusion

It can be concluded that acute shortage of Black Bengal breeding bucks exist in the representative districts of Bangladesh which ultimately represent the overall situation of the country. The type of scarcity gradually reached to severe level which may create the inbreeding depression in goat breeding. In this respect, adaptation of AI with frozen semen can play a vital role to spread the desirable germplasm of the selected good quality bucks as well as reduce the scarcity of breeding bucks.

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