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Comparative Performance Study on the Crossbreds and Indigenous Cows under Small Holder Dairy Farming

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Abstract: The study was undertaken to compare the productive and reproductive performance of crossbred and indigenous cows as well as the relative profitability of crossbred and indigenous cows under small holder dairy farming. From this study it was seen that the milk yield and lactation period were 4.10 litre/day and 266 day respectively in crossbred and 2.28 litre/day and 220 days respectively in indigenous cows. The variation in the length of post partum heat period and calving to first services were not statistically significant between the crossbred and indigenous cows. The length of calving interval were statistically significant between crossbred and indigenous cows. Among the costs (Feed cost, housing cost labor cost, housing cost labor cost, treatment cost and A.I. charge), except the housing costs all costs were statistically significant ($p < 0.01$) between the crossbred and indigenous cows. The returns (sale proceeds of milk, value of cowdung, value of calf and price of empty gunny bags) of the crossbreds were higher than the indigenous cows.

Keywords: Performance, Crossbred, Indigenous cows, Small holder dairy farming, Costs and Returns.

Introduction

There are many commercial dairy farms in the country and most of the milk is produced by the rural households. The majority of the rural households have one or two cows, which are used for drought purposes and milk is considered as by product. Some large farmers also keep separate cows, in addition to drought bullock for milk production. Moreover, in the milk pocket areas particularly in Pabna, Sirajgonj, Manikgonj, Faridpur, Madaripur and Rangpur districts in Bangladesh. dairy farming has been traditionally an important and major component of the farming system. Livestock has been an important component of the mixed farming system in Bangladesh. The mutual dependence of livestock and crop sector can hardly be over-emphasized. The crop sector provides feed and fodder such as paddy straw, rice bran, oil cakes, pulse brans etc. to the livestock sector. On the other hand, livestock sector supplies bullocks to the crop sector for tillage, carrying and threatening operations. The relationship between the two sectors is therefore complementary rather than competitive.

Small dairy farms have increased more in number than it was ten years back. A milking cow in Bangladesh yields only 137 litre of milk per lactation. The low productivity of a milking cow in the country is due to poor genetic characteristics, shortage of feed and fodder and wide spread diseases. The low productivity of indigenous cows is an important constraint to future development of the livestock sector. High productive foreign breeds and their crosses normally do not have adequate resistance against the prevalent diseases. They do not thrive well in our environment. Inspire of all these problems recently some people have shown interest for development of small dairy farms. For better performance of crossbred and indigenous, suitable breeds of different cows have to be developed in our country through selection, crossbreeding and upgrading together with improved management practices.

The performance of crossbred and indigenous cattle so far has been studied in scientific articles in our content are very few and sporadic. It was generally in mind to the common people that crossbred cattle performance better than indigenous but practically crossbred performance has been deteriorates in many instances. So, to find out the real truth. The study was conducted with following objectives:

1. To determine and compare the productive and reproductive performance of crossbred and indigenous cows
2. To determine the costs and returns of crossbred and indigenous cows

Materials and Methods

The study was conducted at the five thanas (namely Sadar, Polashbari, Saadullahpur, Gobindhgonj and Shaghata) of Gaibandha district in Bangladesh. Data were collected by a designed survey schedule according to objectives from September to November 1998. A total of 50 small dairy farms were randomly selected, each Thana having 10 dairy farms. The data of 49 crossbred cows and 47 indigenous dairy cows were collected. The collected data were analysed by the Completely Randomized Design (CRD) describe by the Steel and Torrie (1980).

Results and Discussion

The results and discussion of various performance traits and the cost and returns for rearing of crossbred and indigenous cows were describe under the followings.

Comparative performance of crossbred and indigenous cows: The average values of productive and reproductive performance traits of crossbred and indigenous cows are presented in Table 1.

Milk yield: Milk yield per year was measured by taking average milk production per day multiplied by 360 days. It was seen from Table 1 that the average milk yield per day from crossbred and indigenous cows were 4.10 ± 1.57 and 2.28 ± 0.85 litters respectively, while their respective average yield per year were 1476 and 820.80 litres. Similar studies were made by Halim (1992), who found that the total milk yield per lactation of crossbred and indigenous cows were 799.94 and 295.92 litres respectively.

Lactation period: The average lactation period for crossbred and indigenous cows was 266.42 ± 30.87 and 220.21 ± 21.69 days respectively (Table 1). The length of lactation period between crossbred and indigenous were statistically significant ($p < 0.01$) (Table 1). Another study was made by Halim (1992), who found the length of lactation period for crossbred and indigenous cows were 259 and 228 days respectively.

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Table 1: Comparative productive and reproductive performance of Crossbred and indigenous cows.

Parameters	Crossbred	Indigenous	Level of Significance
Milk yield (litre/day)	4.10 ± 1.57	2.28 ± 21.51	**
Lactation period (days)	266.42 ± 30.87	220.21 ± 21.69	**
Service per conception	3.33 ± 1.40	1.98 ± 0.58	**
Post-partum heat period (days)	109.59 ± 26.87	103.83 ± 18.54	NS
Calving to first service (days)	124.13 ± 27.89	113.98 ± 20.75	NS
Dry period (days)	97.17 ± 29.11	141.38 ± 21.61	**
Calving interval (days)	653.10 ± 84.90	539.40 ± 128.10	**
Age at first calving (months)	37.41 ± 3.21	36.85 ± 2.87	NS

** = Significant at 1% level of probability, * = Significant at 5% level of probability, NS = Non significant

Table 2: Comparative production cost of crossbred and indigenous cows

Parameters	Crossbred	Indigenous	Level of significance
Price of milk/litre (Tk.)	17.04 ± 0.96	17.48 ± 0.85	*
Value of one year calf (Tk.)	2773.47 ± 1236.73	2021.27 ± 769.99	**
Feed cost/cow/day (Tk)	60.71 ± 14.36	40.11 ± 6.72	**
a) Roughage cost/cow/day (Tk)	25.41 ± 5.48	18.11 ± 2.78	**
b) Concentrate cost/cow/day (Tk)	35.30 ± 10.17	22.00 ± 5.28	**
Labor cost/cow/month (Tk)	176.12 ± 37.92	126.38 ± 29.44	**
Housing cost/cow/month (Tk)	89.80 ± 35.12	87.34 ± 31.36	NS
Treatment cost/cow/month(Tk)	92.65 ± 26.74	41.38 ± 10.71	**
AI charge/cow/month (Tk)	11.88 ± 5.74	3.89 ± 3.31	**

Table 3: Average costs of raising a crossbred and an indigenous cow per year

Items of cost	Cross-bred		Indigenous	
	Tk.	% in gross cost	Tk.	% in gross cost
Feed cost	21,855.60	83.00	14,439.00	82.29
a) Roughage cost	9,147.00	34.78	6,519.60	37.15
b) Concentrate cost	12,708.00	48.32	7,920.00	45.14
Labor cost	2,113.44	8.04	1,516.56	8.64
Housing cost	1,077.60	4.10	1,048.00	5.97
Treatment cost	1,111.80	8.04	496.56	2.83
AI charge	142.56	0.54	46.68	0.27
Total Cost	26,301.00	100.00	17,547.48	100.00

Table 4: Average returns of raising per cow per year

Particulars	Crossbred		Indigenous	
	Amount (Tk)	% in gross income	Amount (Tk)	% in gross income
Gross income	29,844.48	100.00	17,904.84	100.00
Value of milk	25,151.04	84.27	14,347.56	80.13
Value of calf	2,773.44	9.29	2,021.28	11.29
Value of cowdung	1,800.00	6.03	1,440.00	8.04
Value of empty gunny bag	120.00	0.40	96.00	0.54
Net return	3,543.48	NA	357.36	NA
Input-output ratio	1:1.13	NA	1:1.02	NA

NA = Not applicable

Service per conception: The rate of service per conception means the number of insemination required for each conception. The average service per conception of crossbred and indigenous cows were significantly different ($p < 0.01$) (Table 1). This result are in agreement with Kastyak and Wawro (1978) observed that 70.96 percent conception rate to be equivalent to 1.32 service per conception and 63.48 was equivalent to 1.47 service per conception.

Post partum heat period: Post partum heat period is defined as the calving to first service interval. That is, it is the number of days from calving to the first subsequent service of a cow. The average post-partum heat periods of crossbred and indigenous cows were 109.59 ± 26.87 and 103.83 ± 18.54 days respectively. This result are in agreement with Islam (1980) who worked with some reproductive traits in 1247 indigenous cows and found post

partum interval to be varied from 2 to 6 months.

Calving to first service: The average calving to first service for crossbred and indigenous were 124.13 ± 27.89 and 113.98 ± 20.75 days respectively. The average calving to first service between crossbred and indigenous cows were not significantly different ($p > 0.05$) (Table 1). Kassa (1990) who found the calving to conception of Zebu cow was 199.80 ± 61.80 days and 157.80 ± 61.80 days for crossbred cow.

Dry period: Dry period is an important reproductive indicator of the cows. In this study dry period was defined as the time period starting from the end of lactation upto next calving. The average dry period for crossbred and indigenous cows were 97.17 ± 29.11 and 141.38 ± 21.61 days respectively. There was a statistically significant variation in the length of dry period of

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cross-bred and indigenous cows ($p < 0.01$) (Table 1). This result was in agreement with Nahar (1987) found the average dry period for F_1 graded Sindhi and Sahiwal as 145.90 ± 4.29 and 127.21 ± 5.84 days respectively.

Calving interval: Calving interval is one of the main indicators of the reproductive performance of a cow. In this study calving interval was defined as the period of the time one calving to another calving. The average length of calving interval of crossbred and indigenous cows was at 635.10 ± 84.90 and 539.40 ± 128.10 days respectively. The length of calving interval statistically significant differed ($p < 0.01$) in between crossbred and indigenous cows (Table 1). This result was contradicted with Nahar (1987) who studied calving interval of 180 crossbred progenies under urban conditions. In her study the mean calving interval of Sindhi and Sahiwal, cows were 414.54 and 428.58 days respectively.

Age at first calving: The average age at first calving of crossbred and indigenous cows was 37.41 ± 3.21 and 36.85 ± 2.87 months respectively. Statistically there was no different age at first calving between crossbred and indigenous cows ($p > 0.05$) (Table 1). The results were similar to the results of Khan and Khatun (1998) who obtained that the average age at first calving for 62 cows of Sahiwal X Pabna were 37.29 ± 9.35 months.

Costs and returns of raising dairy cows: The items of costs included in this study were feed, labour, housing, veterinary services (treatments) and artificial insemination (AI) charge. On the return side, value of milk, calf, cowdung and empty gunny bag. Then the total costs gross returns and net returns were determined and analysed in this study. The total costs for crossbred and indigenous cows were presented in Table 2. The total costs per crossbred and indigenous cows per year were estimated at Tk. 26,301.00 and Tk. 17,537.00 respectively. The item wise costs of raising dairy cows were made by Halim (1992) who found the total costs per lactation per crossbred and indigenous cow were Tk. 7,593.00 and Tk. 5,105.00 respectively.

Feed cost: Feed cost was one of the major cost items of raising the cows. The average feed cost per day for a crossbred and an indigenous cows were Tk. 60.7 ± 14.36 and 40.11 ± 6.72 respectively. Costs of feed included expenses on roughage and concentrate. The purchased feeds were valued according to the average price actually paid by the cow's owners. Home supplied feed was also charged according to the average price prevailing in the market. Feed cost covered 83 percent of the total costs for crossbred and 82 percent for indigenous cows. Thus the total feed cost were higher by on percent for a crossbred cow than for an indigenous cow. Roughage and concentrate were divided into important feed costs item of cow raising. The difference in the expenses on the total feeds roughage and concentrate were also significant ($p < 0.01$) between crossbred and indigenous dairy cow (Table 2). The total feed cost per year for a crossbred and a indigenous dairy cow were Tk. 21,856.00 and Tk. 14,440.00 respectively (Table 3). From this table it was seen that about 35 percent of the total costs were shared by roughage while concentrate feed constituted 48 percent for crossbred cows, while the respective percentage were 37 and 45 for indigenous cows. Another study were made by Halim (1992) who found the total feed costs per lactation period for a crossbred and a indigenous dairy cow were Tk. 4144.00 and 2232.00 respectively and it was revealed that about 21 percent of the total feed costs were shared by roughage while concentrate feed constitute 33 percent for crossbred cows, while the respective percentage were 27 and 16 for indigenous cows.

Labour cost: In order of importance, the labour cost came next to feed cost. The average labour cost per month for a crossbred and an indigenous were estimated Tk. 176.12 ± 37.92 and

Tk. 126.38 ± 29.44 respectively (Table 2). This table showed that the total labour cost per year was estimated at Tk. 2,113.00 for a crossbred and Tk. 1,517.00 for an indigenous cow and their respective shares of the total costs were 8 and 9 percent. The operation wise labour cost was included feeding, milking, cleaning, washing and grazing of cow. Labour cost of crossbred was higher than indigenous due to more feeding, milking, cleaning and washing time. The difference of labour cost were highly significant between a cross-bred and a indigenous cow ($p < 0.01$) (Table 2). According to Halim (1992) the total labour cost per lactation period were estimated at Tk. 2,683.00 for a crossbred and Tk. 2,342.00 for an indigenous cow.

Housing cost: The average housing cost per month for a crossbred and an indigenous cow were estimated at Tk. 89.80 ± 35.12 and Tk. 87.34 ± 31.36 respectively (Table 2). The housing cost covered about 4 and 6 percent of the total costs for crossbred and indigenous cows respectively (Table 3). The amount of housing costs per cow per year for crossbred and indigenous dairy cows stood at nearly Tk. 1,078.00 and 1,048.00 respectively (Table 3). There was no significant difference the housing cost between breeds ($p > 0.05$). According to Halim (1992) amount of housing cost per cow lactation for crossbred and indigenous cow stood at nearly Tk. 107.00 and Tk. 147.00 respectively.

Treatment cost: The average treatment cost per month for a crossbred and an indigenous cow were estimated at Tk. 92.65 ± 26.74 and 41.38 ± 10.71 respectively (Table 2). The treatment costs were calculated by taking into account the actual cost incurred by the farmers. Doctor's fees and medicines were the two major components of the treatment costs. The total treatment costs per cow per year for a crossbred and an indigenous cows were Tk. 1,112.00 and Tk. 497.00 respectively (Table 3). The treatment costs were significantly difference between breeds ($p < 0.01$) (Table 2). Similar studies were made by Halim (1992), who found that the treatment costs per lactation of crossbred and indigenous cows were Tk. 92.00 and 54.00 respectively.

AI charge: The artificial insemination charge of crossbred and indigenous cows per year was about Tk. 143.00 and Tk. 47.00 respectively (Table 3). The average AI charge per year for crossbred was higher than indigenous cow (Table 3). The AI charge was statistically significant difference ($p < 0.01$) between crossbred and indigenous cows (Table 3). Halim (1992) found average AI charge per month per cow was Tk. 13.00 for crossbred and AI charge for indigenous was no need. It was found in his study that AI charge was higher for crossbred cows.

Returns from dairy enterprises: The purpose of this section was to determine gross returns and net returns from dairy cow over total costs. The returns, from cows consisted of sale proceeds of milk, the value of cowdung, value of calf and from empty gunny bag.

The average sale proceeds of milk were calculated on the basis of the average quantity of milk produced per day per cow and the average price received per litre of milk, multiplied by 360 days. It was assumed that the calves of y cows were sold out just one year of age. The value of calves was estimated on the basis of the respondent's expectation. It was also assumed that a crossbred and a indigenous dairy cow daily produced 12-13 kg and 9-10 kg cowdung respectively, which price assumed from a cross-bred and a indigenous cow were Tk. 5.00 and Tk. 4.00 respectively (Table 3). Price of cowdung was imputed by taking the average price at which cowdung was sold at the locality. The average price of cowdung per kg was assumed to be taka 0.40. Returns from empty gunny bag per cow were calculated by taking average income from empty gunny bag. Yearly empty gunny bag from crossbred and an indigenous cow was got number 15 and 12 respectively. Price of per empty gunny bag was sold Tk. 8.00 at the locality.

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Table 4 shows that the gross returns per year stood at Tk. 29,844.00 for a crossbred cow and Tk. 17,905.00 for an indigenous cow. The average returns from milk per crossbred and indigenous cows were estimated at Tk. 25,151.00 and Tk. 14,348.00 respectively (Table 4). The net returns were found about Tk. 3,543.00 and 357.00 respectively from a crossbred and indigenous dairy cow per year. The input-output ratio from crossbred and indigenous dairy cow was 1:1.13 and 1:1.02 respectively. The average returns from cowdung per crossbred and indigenous cow were approximately Tk. 1,800.00 and Tk. 1,440.00 representing 6 and 8 percent of their respective gross returns. The value of calves for crossbred and indigenous cows were Tk. 2,773.00 and Tk. 2,021.00 respectively, which constituted 9 and 11 percent of their respective gross returns. The average returns from empty gunny bag were Tk. 120.00 from crossbred and Tk. 96.00 from indigenous cows and they shared 0.40 and 0.54 percent to their respective gross returns. Yearly the average gross income from a crossbred and an indigenous cow were Tk. 29,844.00 and Tk. 17,905.00 respectively (Table 4). Yearly the average total costs for a crossbred and an indigenous cow were Tk. 26,301.00 and Tk. 17,547.00 respectively. So yearly net income from a crossbred and indigenous were Tk. 3,543.00 and Tk. 358.00 respectively. According to Halim (1992) input-output ratio for a crossbred and indigenous dairy cow was 1:1.57 and 1:1.13 respectively. It may be concluded from the above study that the productive and reproductive performance of the crossbred cows was better than that of indigenous cows. The production cost is also higher in crossbred than that of indigenous cows but the net return of indigenous cows were higher than that of crossbred cows.

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