

Competitive Advantage and Constraints Associated With Duck Farming in North Eastern Region of Bangladesh

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Abstract: This study econometrically analyzed the factors affecting competitive advantage and related constraints faced by the producers in duck farming in North-Eastern part of Bangladesh, using multiple regression analysis. Through a simple random sampling technique, structured questionnaire was used to collect farm level data from 150 small-scale commercial duck farmers from different hoars of Sunamgonj district. The parameter estimates of costs of duckling, feed and labor costs in the model are as expected and highly significant at 1%, while extension service contact was not significant but it met the expected negative sign. Medicine/vaccines are positive but insignificant. The coefficients of the parameter estimates represent percentage change in cost of duck production when the explanatory variables change by one percent. The diagnostic statistic results show F-value of 26.59 which is statistically significant at 1%. The coefficient of determination (R^2) means that about 42% of variability in per unit variable cost was accounted for by the explanatory variables in the model. Indeed, the explanatory factors in the cost function model explain competitive advantage of duck producers. Higher price of feed (1st problem), lower price of duck egg and meat (2nd problem) and lack of extension services (3rd problem) were found to be the three main problems in duck farming in the study area. Duck farming should be encouraged to adopt better feed management practices and also feeding duck with nutritious feed for the right market weight to be gained to reduce expenditure on feed. Policies that will encourage duck producers to increase production capacity should also be encouraged.

Key words: Competitive advantage, Multiple regression, CFI, Farming, Bangladesh.

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I. INTRODUCTION

Poultry is an integral component of the farming system in Bangladesh. Before the nineties of the last century, backyard poultry farming system was the main source of poultry meat and eggs in Bangladesh, but since the mid-nineties with the development of commercial duck and layer farming in the country, a major portion of poultry meats and eggs are being supplied by these commercial farms. The current production of animal proteins is not enough to meet the national demand and there is good evidence for a huge deficit of animal proteins in Bangladesh. The average annual per capita availability of meat in Bangladesh is only 9.12 kg against the required amount of 43.25 kg; the share of poultry meat is only 1.9 kg. The annual per capita availability of eggs is about 36 against the required amount of 104^[1]. Presently there are six Grand Parent Stock farms in Bangladesh. Every week 5.5 to 6 million duck Day Old Chicks (DOC) and 0.5 million-layer chicks are being produced from 82 Parent Stock farms in the country. The growth of commercial chick farming is impressive but duck farming which is an important component of the poultry, in the country was not given enough attention. Geographical advantages like natural feed resources, abundant water for swimming, tolerable temperatures etc. have made especially the North-Eastern part of Bangladesh suitable for duck farming. As a species next to chicken, duck production plays an important role in the rural economy of Bangladesh. According to a report of Food and Agricultural Organization, the position of Bangladesh with respect to duck meat and egg production is 11th and 4th respectively among the Asian countries^[2]. Duck farm serves dual purpose – egg and meat. Duck comprises of about 16% (42.68 million) of the total poultry population (270.71 million), occupying second place next to chicken in the production of table eggs in the country^[3]. It contributes a major source of animal protein in Bangladesh. Like chicken duck provides hard-cash income and creates employment opportunities for the rural farmers and landless women and could be produced within a short time at reasonable cost. Ducks contribute about 22 to 25 percent of the total annual egg production, but their contribution remains constant throughout the years. The water basins and the southern delta may be used effectively for increasing duck production in the country^[4]. Despite tremendous opportunities of duck farming in the Hoar areas, a wet

land ecosystem (also known as back swamp) in North-Eastern Bangladesh, they have remained unexplored so far. Duck farm can be a vital tool to improve women's status, households' food security, and employment opportunity. In Bangladesh, rural women feel more comfortable to participate in home-based income activities [5]. Moreover, duck meat is highly demandable for people of all over Bangladesh which is also considered as low cost, easy to handle, highly productive, adaptability to stressful environmental conditions, comparatively more resistant to common diseases. It serves dual purpose-egg and meat, which accounts for about 6.34% (42.68 million) of total poultry population (270.71 million), occupying second place next to chicken in the production level [6]. Similarly, in the report of Food and Agriculture Organization (FAO), it is evident that the position of Bangladesh with respect to duck meat and egg production is 11th and 4th, respectively among the Asian countries [3]. An economic analysis of few studies conducted by [7,8,9] revealed that low status of duck farmers seems to affecting duck productivity in different areas of Bangladesh. But still there is a lack of sufficient studies in *inhaor* areas of Sylhet region, where a significant number of *ofhaor* people were involved in duck rearing farm. It appears that inadequate or no systematic study has been conducted on factors affecting competitive advantage of duck farming.

II. MATERIAL AND METHODS

Reliability of research depends on the proper methodology used in the study. This study was used both descriptive and analytical models. Questionnaire and observational methods were employed for this research. The study areas (different upazila of Sunamgonj district) were selected keeping in mind the objectives of the study. The study was based on primary and secondary data. The primary data was collected from 150 producers, selected by simple random sampling technique, of Sunamgonj district by using face to face interview method. The following analytical techniques were used.

Analytical Techniques:

Analysis of factors affecting competitive advantage of duck farming: The analytical framework developed for this study based on the one proposed by Porter (1990).

$$C_i = f(Y, X, \beta) + \varepsilon_i \dots \dots \dots (1)$$

Where C represents average birds variable cost per for selected duck agribusiness, β are coefficients to be estimated, i represent the farm surveyed, Y is output X is a vector of independent input costs and other variables hypothesized to influence cost/competitive advantage and ε represents the error term assumed to have a zero mean and constant variance^[10,11]. The implicit econometric cost/competitive advantage regression mode was used for the study is specified as:

$$\ln C_i = \beta_0 + \ln \beta_1 + \ln \beta_2 + \ln \beta_3 + \ln \beta_4 + \ln \beta_5 + \varepsilon_i \dots \dots \dots (2)$$

Where ln is natural logarithm, Ci is the competitive advantage of duck agribusiness proxied by average variable cost of producing duck at market age;

- β_1 = Duckling costs;
- β_2 = Feed costs per kilogram of feed per bird;
- β_3 = Costs of labour per bird;
- β_4 = Costs of medications and vaccines per bird;
- β_5 = Extension service;
- ε_i = Error term.

Constraint facing index (CFI): A constraint facing index for each selected constraint were computed by using the following formula^[12].

$$CFI = (C_h \times 3) + (C_m \times 2) + (C_l \times 1) + (C_n \times 0) \dots \dots \dots (3)$$

Where,

- C_h = Percentages of farmers indicating high constraint;
- C_m = Percentages of farmers indicating medium constraint;
- C_l = Percentages of farmers indicating low constraint;
- C_n = Percentages of farmers indicating no constraint.

III. RESULT AND DISCUSSIONS

Factors affecting competitive advantage of duck farming: The econometric regression results of the parameters of the factors affecting competitive advantage of duck producers sampled are presented in Table 1. The parameter estimates of costs of duckling, feed and labor costs in the model are negative and highly significant at 1%, while extension service contact was not significant but it met the expected negative sign. Medicine/vaccines are positive but insignificant. This means that these factors are significantly different from zero and therefore important in explaining competitive advantage in duck production. The coefficients of the

parameter estimates represent percentage change in cost of duck production when the explanatory variables change by one percent. The diagnostic statistic results show F-value of 26.59 which is statistically significant at 1%. The coefficient of determination (R^2) means that about 42% of variability in per unit variable cost was accounted for by the explanatory variables in the model. Indeed, the explanatory factors in the cost function model explain competitive advantage of duck producers. Thus, the cost function regression model was adequate. According to Gujarati (2004) in determining model adequacy, broad features of results, such as the value of coefficient of determination (R^2) and F-value should be looked at.

Table 1. Regression result of factors affecting competitive advantage of respondents.

Variable	Coefficient	Std. error	t-Statistic
Constant	-1.338	0.577	-2.32
Duckling costs	-0.621***	0.083	7.45
Feed costs	-0.061***	0.021	2.89
Labour costs	-0.031***	0.013	2.27
Medicine /Vaccine cost	0.015	0.019	0.79
Extension contacts	-0.003	0.009	0.368
R-squared	0.419		
Adjusted R-squared	0.404		
F-statistic	26.59		

Source: Authors estimation, 2018

As indicated by Porter (1985), competitive advantage is created when a firm uses its resources and capabilities to achieve a lower cost structure. Based on this, factors that reduce per unit cost of production promote competitive advantage of duck farming. Thus, a negative parameter estimate indicates that reduction in the explanatory factor will result in reduction in per unit cost, hence promotes competitive advantage. The parameter estimates of all the variable input costs used in the model are negative and statistically significant at 1%, implying that the cost function monotonically increases in variable input prices. It is clear from this results that feed and duckling costs have the highest impact on cost, confirming their significance in duck production in the study area. All other things being equal, if duck producers could have access to ducking at competitive price and also adopt proper feed management practices, they would be able to reduce production cost significantly to gain competitive advantage and maximize profit. Efforts should be directed at reducing the cost of these two inputs to promote competitive advantage of the duck sector. The number of days that ducks are raised to be ready for sale is vital in determining the feed conversion ratio as well as the production cost of a duck business. As ducks are kept for longer days to gain the right market weight, the quantity of feed utilized increases. This increases the value of feed conversion ratio. Duck producers therefore incur extra cost when they keep their birds for extra days beyond the required number of days. The negative coefficient of extension service contacts implies that duck producers who have more extension service contacts reduce their production cost than those who do not have more extension service contacts. Though extension service contact variable was not significant, the negative coefficient means that if duck farming has more extension service contacts their abilities in duck production is enhanced. This is because they have more access to information on new production techniques. With the technical know-how and information from the extension service contacts, duck producers are able to adopt modern and better production methods to reduce production cost. This will in turn promote competitive advantage of duckfarming. Moreover, increasing production capacity utilization of duck producers will ensure that cost is spread over larger output. This reduces per unit cost of production to promote competitive advantage of the duck sector. Policies directed at encouraging duck producers to increase their production capacity to reduce production cost are recommendable.

Constraints faced by the duck farmers: In order to compute farmers extent of constraints facing in individual, a constraint facing index (CFI) used. The computed CFI and associated rank order on the basis of CFI values taking all 8 constraint items have been presented in Table 2. On the basis of total weighted score these problems were finally ranked as, 1st, 2nd, 3rd, 4th and so on respectively out of 8. Higher price of feed (1st problem), lower price of duck egg and meat (2nd problem) and lack of extension services (3rd problem) were found to be the three main problems in duck farming in the study area. Rahman (2000) also observed higher price of feed and lower price of duck meat and egg as vital problems in coastal area. Threats of import of duck, outbreak of

disease, organized marketing system, availability of credit, availability of quality ducklings were other important problems which were ranked as 4th, 5th, 6th, 7th and 8th problems respectively out of 8. Roy (2000) identified outbreak of disease is the most important problems in poultry sector especially in chicken farming but duck farmers of the study area ranked it as comparatively less serious problem (5th), because ducks are comparatively more resistant to diseases than chicken. Mahmud (1998) reported lower price of duck meat and egg, lack of credit, scarcity of feed in dry season, lack of proper treatment and medicine etc. were serious problem in duck farming in Haor region of Bangladesh. A Survey by the Borgachashi Unnayan Project (Tenant Farmers Development Project), of BRAC showed that about 125 'Rice husk hatcheries' are producing in three districts (Netrakona, Kishoregonj and Sunamgonj) approximately 1.5 million ducklings annually. An unknown number of ducklings are also being produced by farmers through a traditional egg hatching system. These ducklings that are hatched with the traditional system at farmers' houses are basically meeting up the demand of backyard duck farms at the household level. The ducklings which are produced in the 'Rice husk hatcheries' are basically crossbreds of Khaki Campbell, Jinding and deshi (native) varieties. In the entire Haor belt there are no Grand Parent Stock and Parent Stock farms of these breeds to maintain the breed purity. Farmers are producing eggs at their farms and supplying the same eggs to local markets for both table and hatching purposes. Different breeds are being kept in the same flock and often a proper male-female ratio is not being maintained. As a result, the fertility rate of eggs used by these hatcheries varies from 55 to 70 percent, and sometimes below 50 percent and the production rate of the farms remains unpredictable. Farmers often experience an extremely low production at their farm and this is primarily due to inferior quality of the ducklings that are supplied by the hatcheries. Most of the positions of the rank orders could be explained by the situation of the locality and existing potential for commercialization of duck production. These problems could be ameliorated through well-designed extension program towards the improvement of commercial duck production.

Table 2: Constraints faced by the duck farmers

Constraints items	CFI	Rank
Prices of feed	201	1
Prices of meat and egg	199	2
Lack of extension services	193	3
Threats of import of duck	169	4
Disease	132	5
Organized marketing system	101	6
Availability of credit	99	7
Availability of quality ducklings	65	8

Source: Authors estimation, 2018.

Suggestions for solving the problems: To overcome the existing problems in duck farming and to make this business more profitable some suggestions were made based on the comments of the respondent farmers, duck related businessmen and livestock experts. The suggestions are:

To reduce feed price

Duck farming is one of the potential components of poultry industry in Bangladesh. So, for the national interest, the government should provide financial support to the farmers. Since most of the farmers complained about higher price of feed and day-old-chicks, the government intervention is needed to stable the market of production inputs in the study area. Good number of feed mills and hatcheries from where poultry farmers can purchase feed and chicks with reasonable price should be established through government and non-government initiatives.

Maintaining stability in the market price

Low price of meat and egg and its frequent fluctuations discourage the duck farmers and the related businessmen. Price stabilization should be ensured for the producers and other stakeholders. The smuggling of eggs from neighboring country should be strictly prohibited for the interest of thousands of duck farmers.

Providing regular training for the farmers

Since most of the farmers had low technical knowledge about duck farming, intensive training on farm management, duck diseases and its control should be provided by Department of Livestock Services. So, short

training programs on these topics may be arranged by government and non-government authority. If training is provided properly, good management will be ensured that will make duck farming more profitable.

Ensuring veterinary services

In order to provide necessary veterinary services to the duck farmers, the government should establish new veterinary care centers with adequate machineries, vaccines, medicines and technical staffs, so that they can provide free veterinary services to the farmers.

Regular supply of ducklings

In case of non-availability of ducklings at the time of need, proper steps should be taken by the government to give incentives to private hatcheries to continue their production and supply of ducklings throughout the country.

Sufficient credit supply

To solve the insufficiency of working capital, the government and private banks and other financial institutions should grant credit to the duck farmers and related businessmen on easy terms and conditions. This type of financial support will help the farmers and other stakeholders to expand their business. The respondent farmers will be able to buy modern equipment's and make better housing facilities for their birds.

Prevention and control of diseases

Since disease infestation appeared to be severe problem causing mortality of ducks, necessary preventive measures should be taken thorough vaccination program. All types of duck vaccines should be made available at the door steps of the farmers. Preparation of duck vaccines is not so costly for the government. So, government can supply vaccines to the farm owners at minimum price.

IV. CONCLUSION

The optimum utilization of unexplored opportunities for commercial duck farming at *haor* areas in the North-Eastern part of the country can turn the area into a prime source of supplying poultry meat and eggs. This can also result in an improvement of livelihoods, employment generation and ensure food security. Profitable duck farming can also promote women empowerment as women are much involved with duck rearing. Through the development of this value chain linked to agricultural financing, BRAC has endeavored to facilitate better duck farming so that farmers in the *haor* region can get competitive benefits through breaking the shackle of middlemen in marketing their produce.

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