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Original Article

Prospects of pekin duck rearing in coastal region of Bangladesh

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A B S T R A C T

This study was conducted to evaluate the prospects of Pekin ducks which is associated with socio-economic status of the duck farmers and to analyze cost-benefit of Pekin duck farming. This work was performed in Bhola sadar and Doulatkhan Upazilla of Bhola district during 3 months from October to December, 2019. For this purpose the information was collected by direct interview using a questionnaire from 30 duck farmers. For cost-benefit analysis 50 numbers of Day Old Chicks (Pekin breed) were given to each 30 selected farmers. During 3 months of research feed and technical supports were provided from Grameen Jano Unnayan Sangstha (GJUS). Growth and body weight was observed and recorded in every week. The results reveal that most (50%) of the family were medium (5-7) sized. The majority of the respondents (46%) belonged to over 40 years aged group, about 43% of the farmers are illiterate, 33% received primary education, 24% of the respondents had secondary level education and no one of the respondents had higher level of education. In case of occupation we found that 67% of the respondents were housewives, rest 23% were businessman and 10% were service holders, and 80% of the farmers have no idea about duck diseases. In case of rearing, all (100%) of the farmers use semi-intensive method, most of the farmers (90%) use betel nut tree made house, 90% of the farmers use Sawdust as litter. In case of cost-benefit analysis, average body weight of Pekin duck in day-old 7 days, 15 days, 30 days, 60 days and 90 days were 60.43±2.08, 113±2.65, 282.87±9.26, 743.5±26.48, 1885±34.56 and 2732.83±40.45gm respectively and average Pekin duck rearing cost was Tk. 16041.83±420.12, income was Tk. 29400.4±896.44, net profit was Taka 13358.57±1037.15. Some problems were identified for duck farming including low price of duck meat. Therefore, if the problems are addressed properly, the Pekin duck farming in coastal belt of Bangladesh could be more profitable business for the farmers.

Introduction

Demand for animal protein is increasing and duck production may be able to help meet this demand. As ducks are able to adapt to a wide range of environmental conditions the importance and popularity of duck industry is increasing. There are 55.8 million ducks in Bangladesh (DLS, 2018) with an average of 4.16 ducks per household (BBS, 2007), of which 95 per cent are of indigenous (Hoque *et al.,* 2001). It was found 78 per cent of eggs and 86 percent of poultry meat is produced by the smallholders under scavenging condition (Alam, 1995). The total area of inland water bodies in Bangladesh is estimated to be around 6.7 million (Hossain, 2014) which may provide a congenial environment for duck production. Despite enormous advantages of duck farming (Kunnath *et al.,* 2018) compared to chicken in the country, this species has always been neglected. Many poultry development activities have done concentrating chicken species but little attention has been given on improving feeding guideline of ducks in a well-planned way for its commercial production.

Ducks are being reared worldwide and almost seventy five percent of them are found in Asia. The domestication of wild ducks first occurred in China, probably as early as 4000 BC and it possesses the highest duck population. Even though domestication of wild ducks occurred prior to chicken, also it is believed that commercial duck has been longer in china than in any other country. Today among the leading duck producing countries of the world, Vietnam, Poland,

Indonesia, Thailand, USA, Brazil, and China. Poultry rearing is an integral part of the rural farming system that provides family income for the small, marginal and landless poor. The farmers who cannot afford to rear cattle and goat can easily rear duck. Rearing of ducks gives maximum return with minimum cost. Ducks are efficient converter of agricultural by- products; kitchen wastes, seeds, grains, garden left over, insects, green grasses and all other human refusal that would otherwise waste. Ducks occupy second place in comparison with chicken in producing meat and egg in the country. Ducks are traditionally raised under scavenging (Salahuddin *et al.,* 1991) by the smallholders in coastal and low-lying areas, with little or no feed supplementation. Duck production in the coastal region (Bhola) of Bangladesh provides self-employment for landless and small farmers. There is a great potentiality of improving the growth performance of Pekin ducks in coastal belt through supplementary feeding. Ducks, being an important poultry species, can contribute efficiently in increasing meat production than chicken in the coastal or low lying areas in southern district. No systematic study has yet been done to assess the potentiality of Pekin duck rearing system in the coastal districts. The present study generated information on socio-economic profiles of the Pekin duck owners, assessed potentiality of existing duck rearing practices and found out the problems on duck husbandry in the coastal district of Bangladesh.

Materials and Methods

Study design: A questionnaire was prepared to survey the existing socio economic status of duck rearing farmers in the study area. It was designed in a simple manner so as to get accurate information from the farmers. For cost-benefit analysis 50 numbers of Day Old ducklings (Pekin breed) were given to each of 30 selected farmers. During 3 months of research feed and technical supports were provided from Grameen Jano Unnayon Sangstha (GJUS) Growth and mortality of ducklings were observed and recorded in every week. After 3 months of research all the ducks were sold to local market.

Study Location: The study was conducted in different place of Bhola sadar and Doulatkhan upazilla under Bhola district. Five branches under Grameen Jano Unnayon Sangstha (GJUS) from both upazillas were selected where duck populations seemed to be higher. The survey areas were Miyarhat, Velumia, North Jaynagar Veduria and Porangonj, 6 farmers from each branch and total 30 farmers were selected randomly for survey and Pekin duck rearing.

Study Duration: The study was conducted for three months from October to December, 2019

Source of birds: Day old ducklings (Pekin breed) was collected from Bhai Bhai Hatchery and Breeding farm, Kusthia, Bangladesh. The average weights of the day-old ducklings were 60.43g/m.

Housing, feeding and management: Before starting the study Tin- bamboo shed house was prepared by each farmer. All the ducklings were brooded for 0-10 days. At the age of 11 days the ducklings were transferred to tin-bamboo houses. All ducklings were vaccinated against Duck Plague and Duck Cholera. The experimental birds were allowed to scavenge freely in the natural water body from 6.00AM to 2.00PM hours daily. In addition to scavenging feed, the birds belonging to supplementary group received different amounts of concentrate mixtures. Supplemental feeds were given @ 10g in the first week which was further increased @ 12.5g in each week until 8 weeks and there after 100g of wet mash feed was supplied to the birds up to 90days of age. The supplemental feeds were divided into two equal portions and were given twice daily (7.00 A.M. and at 5.00P.M.). Feeds were supplied in the plastic bowls and the bowls were cleaned properly before each feeding time. Proper care and management practices were followed by the farmers throughout the experimental period under the supervision of researcher.

Data Collection: Data were collected through interview of randomly selected members under 5 branches of Grameen Jano Unnayon Sangastha (GJUS) who were involved in duck farming. The relevant data for this study were collected without biasness. Respondents had no specific written documents of their own. So, they had to rely on memory. Interviews were normally conducted in respondent's house during their leisure time.

Data Management and Analysis: Collected data were coded after ending of data collection and then compiled, tabulated and analyzed the data. The local units were converted into standard units. The qualitative data were transferred into quantitative data by appropriate scoring technique. Data were carefully tabulated and descriptive analysis was performed.

Result

Socio economic status of duck farmers:

Table 1. Existing Socio-economic profile of duck farmers in Bhola sadar and Doulatkhan upazila in Bhola district.

Characteristics	Categories	Farmer (n=30)	Percentages (%)
Family size	Small(>4)	12	40
	Medium(5-7)	15	50
	Large(>7)	3	10
Age	< 25 years	5	17
	25-40 years	11	37
	>40years	14	46
Education	Illiterate	13	43
	Primary	10	33
	Secondary	7	24
	Graduate	0	0
Occupation	Housewife	20	67
	Business	7	23
	Service	3	10
	Others	0	
Scientific knowledge about Duck rearing	Yes	0	0
	No	30	100
Knowledge about duck diseases	Yes	6	20
	No	24	80

The profile of duck farmers is summarized and presented in Table 1. According to table 1 Small (>4), Medium (5-7), Large (>7) family size percentage were 40, 50, 10% respectively, the majority of the respondents (46%) belonged to over 40 years aged group and 37% were from middle aged group (25-49 years). About 43% of the farmers are illiterate, 33% received primary education, 24% of the respondents had secondary level education and no one of the respondents had higher level of education. In case of occupation we

found that 67% of the respondents were housewife, 23% of the respondents were businessman and 10% provide service along with agriculture. All of the respondents do not have scientific knowledge, 80% of the respondents do not know about duck diseases.

Table 2. Existing housing and feeding type of duck farmers in the study areas

Indications	Characters	Farmers (n=30)	Percentages (%)
Duck rearing method	Intensive method	0	0
	Semi-intensive method	30	100
	Scavenging method	0	0
Types of housing	Tin and Bamboo/betel nut shed	27	90
	Bamboo- straw	3	10
	Soil Made	0	0
Litter used	Ash	3	10
	Sawdust	27	90
	Sand	0	0
House Cleaning time/month	Regular	0	0
	10-15	17	56.67
	5-10	10	33.33
	Once	3	10
Feed supply	Natural	6	20
	Supplemental	24	80
Source of supplemental feed	Domestic source	26	87
	Purchase	3	10
	Both	1	3
Feeding ingredients	Ready feed	4	13
	Rice polish	4	13
	wheat bran	22	74
Source of drinking water	Pond	20	67
	Tube well	10	33
Source of treatment	Livestock Service Provider(LSP)	17	56.67
	Non-governmental Organization	10	33.33
	Upazila Veterinary Hospitals	3	10
Vaccinations	Yes	27	90
	No	3	10

Table 2 show existing, housing and feeding type of duck farmers in the study areas. It was found that all (100%) of the farmers use semi-intensive method, most of the farmers (90%) use tin and bamboo/betel nut shed house, 90% of the farmers use sawdust and 10% use ash as litter. Most of the farmers (56.57%) clean house 10-15 times in a month, 33.33% farmers clean 5-10 times in a month and 10% clean house once regularly. In case of feeding 20% of the farmers depends natural feed, 80% depends on supplemental feed. Among supplemental feed farmers use ready feed, rice polish and wheat bran were 13, 13 and 74 % respectively and 87% farmers use feed from domestic source. In case of source of drinking water 67% farmers use water from pond and rest 33% from tube well. In case of source of treatment 56.67% farmers receive treatment from LSP, 33.33% from NGOs worker and 10% from Upazilla Veterinary Hospitals. Ninety percent of the famers maintain regular vaccination schedule. (Table 2)

Cost-Benefit analysis of Pekin duck rearing

Table 3. Body weight gain of Pekin Duck of the Pekin duck upto 90 days of age

Age of Duck	Body Weight g/m (Mean±SEM)
0 day	60.43±2.08
7 days	113±2.65
15 days	282.87±9.26
30 days	743.5±26.48
60 days	1885±34.56
90 days	2732.83±40.45

Table 3 show the body weight gain of Duck from Day Old Ducklings to 3 months. Average body weight of Pekin duck in 0 day, 7 days, 15 days, 30 days, 2 months and 3 months were 60.43±2.08, 113±2.65, 282.87±9.26, 743.5±26.48, 1885±34.56 and 2732.83±40.45 respectively.

Table 4. Cost of duck rearing enterprise in the coastal areas

Expense	Cost value (Taka)	Mean±SEM
Day Old Chick (Breeder Farm)	4500	4500±0
Feed	9000.833	9000.833±393.84
Medicine	823	823±101.73
Housing and Litter	1500	1500±0
Miscellaneous	218	218±15.57
Total Cost	17088.83	16041.83±420.12

Table 4 shows the cost of Pekin duck rearing. The cost for Day Old chick, Feed, Medicine, Housing & litter and miscellaneous were Taka 4500±0, 9000.833±393.84, 823±101.73, 1500±0, 218±15.57taka respectively and the total cost was Taka 16041.83±420.12.

Table 5. Income from duck rearing enterprise in the coastal areas

Income	Income value (Taka)	Mean±SEM
Meat	29060	29060±890.95
Litter	340.4	340.4±13.53
Total Income	29400.4	29400.4±896.44
Net profit	13358.57	13358.57±1037.15

Table 5 shows income and profit from Pekin duck rearing in study areas. Income from meat and litter materials were rearing were Taka 29060±890.95 and 340.4±13.53. The average total income was Taka29400.4±896.44 and net profit was Taka 13358.57±1037.15.

Discussion

Socio economic status of duck farmers

We found that Small(>4), Medium(5-7), Large(>7) family size percentage were 40,50,10% respectively, the majority of the respondents (46%) belonged to over 40 years aged group and 37% were from milled aged group(25-49years). In case of education we found that 43% of the farmers are illiterate, 33% received primary education, 24% of the respondents had secondary level education and no one of the respondents had higher level of education. We also found that 67% of the respondents were housewife, 23% of the respondent had business and 10% provide service along with agriculture,

80% of the respondents do not know about duck diseases (Table 1). This was in close agreement with the observation of Rahmann *et al.* (2009) who reported that 39% farmers were from middle-aged category and 30% farmers have got primary level of education, 18% had secondary and 9% had higher education, about 50% farmers had large family size having an average of 7 persons per family and Eighty five per cent farmers in both districts did not use vaccines against duck diseases in Noakhali and Lakshmipur districts. Of course, their locations of survey were different.

Jha *et al.* 2015 also reported that most of the respondents duck farmers were < 35 years of age (52%) having with primary level of education (28%). Family size of the most of the farmers (57%) were large (size > 6 members). About 73% farmers had no training on duck farming and some of the farmers had training with short duration (7 to 15 days). Result of this study revealed that majority of the farmers (68%) had no idea about common duck diseases which is almost similar with this study. Rahman *et al.* (1999) also showed that rural farmers were not aware to adopt scientific knowledge for poultry production.

Existing housing and feeding type of duck farmers study areas.

In duck farming, proper housing is an important thing. Houses protect duck from bad weather and predator animals. In the study area, mainly three types of duck houses were found which are shown in Table 2. From the table, it is evident that most of the houses were made with Semi intensive method (100%) followed by straw-bamboo made (10%) and house made by Tin and bamboo/betel nut was (3%). Most of the farmers (56.67%) clean house 10-15 times monthly, some (33.33%) clean houses 5-10 times monthly and rest (10%) once in a month and no one clean house regularly. In case of feeding 20% of the farmers depends natural feed, 80% depends on supplemental feed. Among supplemental feed farmers use ready feed, rice polish and wheat bran 13%, 13% and 74 % respectively and 67% farmers use feed from own source. In case of source of drinking water 67% farmers use water from pond and rest 33% from tube well. In case of source of treatment we found that 56.67, 33.33 and 10% of the respondent receive treatment from LSP, NGOs and Upazilla Veterinary Hospitals respectively. Most of the farmers (90%) follow vaccination schedule and rest (10%) don't follow vaccine for rearing duck (Table 2). This result was in consistent with a study Jha *et al.*(2015) for ducks feeding of the farmers depended on natural feed sources while some provided rice and ready feed (13%%) rice polish (13%) and wheat bran (74%%). Ninety percent of the farmers were made duck houses with tin-shed or betel nut and wood having necessary floor space. The highest proportion of the farmers (90%) followed the vaccination program regularly.

Rhaman *et al.* (2009) reported 44%t of the farmers cleaned their duck houses 2-3 times in a month whereas only 11%cleaned their duck houses every day, 22% once in month, 18 per cent 4-6 times in a month and 5 per cent farmers cleaned their duck houses 7-10 times in a month. About 39 per cent farmers reared ducks under scavenging system with only natural feed resources and 61.5 per cent farmers used supplemental feed, mainly rice polish (118 g/bird/day) in summer season. Eighty five per cent farmers in both districts did not use vaccines against duck diseases. There is a little dissimilarities with Rhaman *et al.* (2009) because of location.

Body weight gain of Pekin Duck

We found that the average body weight of pekin duck in 0 day, 7 days, 15 days, 30 days, 60 days and 90 days were 60.43±2.08, 113±2.65, 282.87±9.26, 743.5±26.48, 1885±34.56 and 2732.83±40.45g respectively. Bhuiyan *et al.* (2005) reported that live weight of 9th week pekin duck was 1763kg and claimed that the Pekin breed is superior to both Muscovy and Deshi white ducks in the sylhet area. It might be due to the reason that, while they were grazing, ate different amounts of fallen grains in the paddy fields, earthworms and small insects. Similar results were reported by Bachno *et al.* (1994). They recorded higher growth rate of Pekin over Muscovy ducks during the first eight weeks of life. Meat of Muscovy was tastier than other breeds of ducks. But the highest amount of meat was found from Pekin.

Szasz and Bogenfurst (1998) indicated that at 12 weeks the Pekin ducks had higher body weight than Muscovy and Mule ducks, which substantiate the results obtained in this trial. Ninety percent of the famers maintain regular vaccination schedule (Table 2) whereas Zahan *et al* (2016) were reported that 60% farmers vaccinate duck regularly and 67% farmers feed their duck by rice polish and wheat bran.

Cost Benefit analysis of Pekin Duck.

Average Pekin duck rearing cost was Tk. 16041.83±420.12, income was Tk. 29400.4±896.44, net profit was Taka 13358.57±1037.15 (Table 5). Solomon *et al.* (2006) reported that profit from rearing of Pekin drakes and Pekin hens was 147.79 and 162.23 USD in Guyana which is almost similar with our study.

Bhuiyan *et al.* (2005) comparing production cost and gross margin reported the highest production cost was found in Pekin and the lowest in Deshi White. The highest gross margin and BCR (Tk.34.93/duck and 1.66 respectively) were obtained from Pekin and the lowest (Tk. 11.45/duck and 1.23 respectively) from Deshi White. There were a little dissimilarities with Hassan *et al.* (2018) during economic calculations it was revealed that Muscovy breed had a significantly lower (P<0.001) feed cost and feed cost/kg gain compared to the other breeds, whereas there is no significant difference between Pekin and Mullard breeds. However, the total variable costs of Muscovy and Pekin were significantly lesser than those of Mullard ducks (P = 0.004). Muscovy ducks showed the highest values for gross income ($12.49), gross margin ($1.12), and benefit–cost ratio (0.54), followed by Pekin and Mullard ducks in that order.

Conclusion

Socio-economic profile of the duck farmers, management practices followed in duck farming and production performance of Pekin ducks in coastal region where the main focus of the present study. The study indicates that the growth performance of Pekin duck is better than the local duck of Bangladesh in scavenging system. Considering all the studied parameters, Pekin duck rearing was a profitable practice in the selected areas and improve the socio-economic status of farmers.

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