**CHAPTER-I**

**INTRODUCTION**

Poultry production is an important and significant tool to bridge the gap between supply and demand of animal protein in developing countries (Alders and Pym, 2009). Among the species of poultry duck is a potential source of meat and eggs in rural areas of Bangladesh (Hoque *et al.,* 2010).Chicken, and duck or both rearing practiced are reported in Bangladesh. Majority portion of farmers raise 77.29% chickens and 84.41% duck respectively of the total population in Bangladesh (Hoque *et al*., 2011). However the duck production is increasing steadily in Bangladesh. It has increased from 25.8 million in 2001 to 38.1 million in 2006 (BBS, 2007).

Bangladesh has the third largest population of duck after china and Indonesia with a population of 41.5 million (Dolberg, 2008). Recent estimates of duck population are varying from 8% to 25% of the total population of chicken(DLS, 2012). The variation also clearly indicates the house hold and small scale duck production in Bangladesh. There are different types of duck rearing system which can be classified as house hold (scavenging), Semi Intensive (semi scavenging) and Intensive duck farming (Khan, 2013).

House hold duck farming or scavenging system provides no feed to the duck while semi scavenging system provides little of supplementary feed. However, at least the first two duck rearing system are greatly influenced by present of large water body like Beel, Hawor. The intensive farming of duck is less and mostly operated by the government to facilitate the small scale farmer (Hoque *et al*., 2011). The house hold duck scavenge in nearby large water bodies for snail, duck weed, fish and algae. The availability of feed is varies on season to season.

The distribution of duck population is varies in district to district in Bangladesh. The pick pocket area of duck production is Char Fasson on the Island of Bhola in Barisal division, the coastal areas of Lakshmipur district, Tarail and Netrakona in Mymensingh division and Kalia in Khulna division. But Comilla district is also important for duck rearing specially in Muradnagar Upazilla. There are many small scale duck farmers establish their duck farm near to water bodies. The management system of duck is moderate of semi scavenging duck farming system. The farm size varies from 10 to 30 numbers of ducks. The performance and profitability of the semi scavenging farming system is not yet evaluated in this area. Little study was conducted mainly in the Noakhali, Netrokona and Haor area of Sylhet. Muradnagar Upazilla under Comilla district occupies an important place in respect of backyard duck practice in Bangladesh, because of having availability of natural feed during harvesting season and available pond and fellow waterlogged land for duck foraging. It is a densely populated upazilla and they are traditionally practice cattle, buffalo, sheep, goat, poultry and duck rearing. There is a considerable amount of low land in this upazilla which riches with natural feed. There for a large number of households having backyard duck in a traditional practice. The backyard duck has been identified as a focus area in the human development programmers. So, this study is on the existing backyard duck, rearing system with the objectives to pave the way for development backyard duck into sustainable income generating activity for the rural households. Information on the household duck is scarce. Improvement programmers cannot be checked out due to lack of accurate data on production of backyard duck. This study was undertaken to provide data, which will help to overcome the lack of knowledge regarding production and utilization patterns of family ducks and the income generated in rural households through duck rearing.

**The objectives of the study are as follows:**

1. To evaluate the production performance and management system of scavenging ducks and profitability of rearing ducks in different numbers.
2. To determine feeding system and availability of feed for raising ducks in this locality.
3. To identify the major constrains and prospect of duck farming.

**CHAPTER-II**

**MATERIALS AND METHODS**

A two months (15th July, 2016 – 15th September, 2016) long study was carried out on house-hold duck rearing system in 4 selected villages of Muradnagar upazilla under Comilla district. The villages were selected on the basis of availability of duck farms and communication facilities with a view to collect information on rearing practices, especially on feeds and feeding systems of ducks at farm level. Farmers had no proper data recording system and for this survey were conducted to collect required data through direct interviewing process and finally these were analyzed.

Twenty households duck farms were selected randomly from 4 villagers under Muradnagar upazilla. Simple random sampling technique followed for collection of necessary data to obtain the specific objectives of the study. Households having at least 5 ducks reared under scavenging condition was included in the study.

Breed, age, types of housing, feeding system, no.egg production, egg hatching, duckling brooding, socio-economic condition of the farmer were recorded in the data sheet through farmer’s interview.

Sexing of ducklings was done by color, feather and vent sexing method. Age was recorded by interviewing to farmers. Breed was defined according to phenotypic characteristics of duck. Deshi white, Deshi black and Deshi mixed, Zinding were included in this study.

Vaccination, types of treatment, intervention and types of drugs used for each case, marketing system of eggs and duck were also recorded.

Data obtained were entered into Microsoft Excel 2007 and exported to STATA (Stata Crop, 4905, Lakeway River, College Station, Taxas 77845, USA) for analysis. Descriptive statistics were performed. Results were expressed as frequency number and percentage against each category of variable.

**CHAPTER-III**

**RESULTS**

**3.1. Literary level of the duck farmers**

The literary level of the studied duck reared is categorized as four groups such as illiterate, primary, secondary, higher secondary and above. From table 01, it can be found that the highest no. of households lies in the literacy group primary (60%) and lowest in the literacy group higher secondary (25%).

**Table 01:** Literacy level of the duck reared of the studied area

|  |  |  |
| --- | --- | --- |
| **Literacy level** | **No. of households (N=20)** | **Percentage** |
| Illiterate | 3 | 15% |
| Primary | 12 | 60% |
| Secondary | 5 | 25% |
| Total | 20 | 100% |

**3.2. Yearly income level of the duck farmers**

The yearly income level of the studied duck reared is categorized as five groups such as up to Tk. 5000, Tk. (50000-60000), Tk. (60000-70000), Tk. (70000-80000) and above Tk. 80000. Table 02 shows that maximum households lie in income group of Tk. Up to 50000.

**Table 02:** Yearly income level of the duck farmers

|  |  |  |
| --- | --- | --- |
| **Income level** | **No. of households (N=20)** | **Percentage** |
| Up to Tk. 50000 | 7 | 35% |
| Tk. (50000-60000) | 4 | 20% |
| Tk. (60000-70000) | 4 | 20% |
| Tk. (70000-80000) | 3 | 15% |
| Above Tk. 80000 | 2 | 10% |
| Total | 20 | 100% |

**3.3. Land holding sizes of the farm owners**

Land holding sizes of the households are classified into four groups such as Landless farmers (0-0.49 acre), Small and marginal farmers (o.50-1 acre).Medium farmers (1 acre- 1.5 acre) and large farmers (Above 1.5 acre). Table 03 showed, the maximum farm owners are land less farmers group which are estimated as 55% and minimum are in the group of large farmers, which are 05%.

**Table 03:** Land holding sizes of the duck farmers

|  |  |  |
| --- | --- | --- |
| **Land holding size** | **No. of households (N=20)** | **Percentage** |
| Land less farmers (0-0.49 acre) | 11 | 55% |
| Small and marginal farmers (0.5-1 acre) | 05 | 25% |
| Medium farmers (1-1.5 acre) | 03 | 15% |
| Large farmers (Above 1.5 acre) | 01 | 5% |
| All | 20 | 100% |

**3.4. Land utilization pattern of the farmers**

The land utilization patterns are categorized as cultivable, residential and non-cultivable land. The estimated average land areas per house hold is 0.496 acre. Table 04 shows that 54.44% of the land is utilized under cultivation.

**Table 04:** Average land utilization pattern of the house holds

|  |  |  |
| --- | --- | --- |
| **Type of land** | **Land holding size (acre)** | **Percentage** |
| Cultivable | 0.27 | 54.44 % |
| Residential | 0.146 | 29.43 % |
| Non-cultivable | 0.08 | 16.13 % |
| All | 0.496 | 100 % |

**3.5. Structure of family ducks and its production by season (percent)**

The mature ducks were highest (74.2%) in October-December and lowest (45.2%) in April-June. The highest number of ducklings (27.6%) was found in April-June which indicates that the farmers hatched eggs for ducklings before start of rainy season. No duckling was available in the months from October to December, as the farmers do not hatch duck eggs.

In case of duck egg production was highest and lowest in January-March and July-September respectively. It was observed that the total egg production per bird was higher in ducks than in chickens (Sazzad 1986 and Huque *et. al.,* 1990).

**3.6. Percentage of duck according to age group and breed**

The following table shows the percentage of duck according to age group and breed. From table-5, it can be shows that the highest percentage of duck is laying (38.7%) and lowest percentage of ducks is drake (10.4%) in the study area.

**Table 05:** Percentage of duck according to breed

|  |  |  |  |
| --- | --- | --- | --- |
| **Age of ducks** | **Percentage** | **Breed** | **Percentage** |
| Duckling (0-2 months) | 10 % | Deshi white | 17 % |
| Grower (2-9 months) | 14 % | Deshi Black | 23 % |
| Drake | 11 % | Deshi Mix | 60 % |
| Duck | 25 % | Indian Runner | 00 |
| Laying duck | 40 % | Zending | 00 |
| Total | 100 % | Total | 100 % |

**3.7. Traditional management practices followed by the owners of ducks**

**3.7.1. Housing**

Around 40% of the farmers housed their duck in bamboo made cage and rest 60% of the farmers kept their ducks in house made of wood, tin, straw or mud. About 85% of the farmers used single or combinations of materials (straw, ash, rice husk) as litter where the rest of the farmers kept ducks without using any litter.

# 3.7.2. Feeding and watering

65% of the respondents fed their birds with mixture of boil rice and rice polish as it is available and cheap. Most of the households fed their duckling with snail, duck weed and khai etc. Around 90% respondents said that they do not spend any money on supplementary feed. Other 10% spend a considerable amount of money on supplementary feed. Frequency of feed offered to ducks varied from two to three times in a day.

Most common places for ducks to scavenge around household were observed to be pond, digi (transitory fallow land), paddy field, Nala and ditch. A wide range of scavenging feed such as snail, duck weed, earthworm, crabs, frog, land and water insects were noticed to have been available. Around 8-9 months in a year duck are grazed in marshy land.

**Table 06:** Different type of feed ingredients and their percent that are used by the farmers

|  |  |
| --- | --- |
| **Feed ingredients** | **Percentage %** |
| Rice polish | 38 |
| Rice | 30 |
| Paddy | 20 |
| Broken rice | 7 |
| Wheat bran | 4 |
| Total | 100 |

Table 06 shows different types of feed ingredient used by the farmers and their percentage. It can be found that most of the house hold farmers use rice polish (38%) and a small no of farmers use wheat bran (4%) as duck feed.

# 3.7.3. Breeding and hatching

Natural mating is done for rural ducks. Maintenance of standard 1:5 drake and duck ratio was reported by most of the farmers. Most of the farmers said that sexual maturity at deshi breeds of ducks attained between 5.5-6 months and average egg production (85-90) per year. It was also found that egg production reaches peak during winter especially after crop harvesting season. Mortality rate of duck is high in winter, and due to less vaccination mortality varies from place to place.

**Table 07:** Maturity, egg production and mortality of duck

|  |  |  |  |
| --- | --- | --- | --- |
| Age at first laying (months) | Season of year at peak production | Egg production per/year | Mortality |
| 6 | Winter | 85 | 19% |

Table 07 shows the average age of first laying, season of year at peak production, egg production per year and mortality rate. It was found that most of the house holder use natural procedure of hatching by using hen and brooding also by hen itself. But hardly select artificial brooding. Hatchability is near about 75%.

**3.7.4. Vaccination and Medication**

Most of the households said that duck are affected mostly in winter season and they used to slaughter duck due to sick. They hardly treat the sicked duck. About 80% farmers said that Duck plague and Duck cholera are the main reasons for mortality where the rest said that, they were not aware of and could not identify the diseases. Due to unavailability of vaccine and lack of awareness a considerable number of households do not vaccinate regularly to their ducks.

**3.8. Cost, Return and Profitability of Duck Rearing**

**3.8.1. Family wise and per bird annual gross cost**

Average annual expenditures and economic return of rearing ducks in the study regions is shows in table 08, 09 and 10. The farmers with 3-20 ducks usually do not hire any labor and work by themselves. It was found from the data that the average cost for ducklings, feed, housing, vaccination & medication was 22.72, 90.20, 13.14 & 4.92 respectively.

**Table 08:** Family wise and per bird annual gross cost (average)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item** | **Family wise annual cost (Tk.)** | | **Per bird annual cost (Tk.)** | |
| **Gross cost** | **Depreciation cost (10%)** | **Gross cost** | **Depreciation cost (10%)** |
| Duck ling cost | 163.58 | - | 22.75 | - |
| Feed cost | 649.44 | - | 90.20 | - |
| Medication & vaccination | 35.424 | - | 4.92 | - |
| Total gross cost | 848.44 |  | 117.84 |  |
| Housing cost | 94.608 | 9.46 | 13.14 | 1.31 |
| Total deprecation cost | - | 9.46 | - | 1.31 |

**Table 09:** Family wise and per bird annual Gross Cost (average)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Family wise annual net cost (Tk.)** | | | **Per duck annual net cost (Tk.)** | | |
| **Duck rearing** | | | **Duck rearing** | | |
| Gross cost | Dep. cost (10%) | Total cost | Gross cost | Depreciation cost (10%) | Total Cost |
| 848.44 | 9.46 | 857.9 | 117.84 | 1.31 | 119.15 |

# 3.8.2. Family wise and per bird gross return:

Table-10 shows that family wise & per bird total income is 1661.09 & 220.69 Tk. respectively.

**Table 10:** Family wise and per bird gross return (GR)

|  |  |  |
| --- | --- | --- |
| **Item** | **Family wise annual GR** | **Per duck annual GR** |
| Return from selling eggs | 1280.37 | 177.82 |
| Return from selling ducks | 380.72 | 42.87 |
| Total income/return | 1661.09 | 220.69 |
| Gross cost over GR | 848.44 | 117.84 |
| Net cost over annual return | 857.9 | 119.15 |
| Cost benefit ratio | 0.52 | 0.53 |

# 6.3 Marketing of eggs and ducks

Around 80% households’ farmers sold eggs to the local market and 20% sold their ducks eggs to the bepari. Duck meat has high demand in Comilla and that’s why most of the households sold 5-7 ducks per year and also consumed by themselves.

Farmer

Bepari

Aratdar

Wholesaler

Retailer

Consumer

Local shopkeeper

**Table 11:** Sale proceed of duck and ducklings

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tk./egg** | | **Tk./Duck** | | |
| During Autumn | During rest of the year | Drake | Duck | Duckling |
| 9 | 7.5-8 | 350/drake | 300/duck | 35/duckling |

**CHAPTER-IV**

# DISCUSSION

The level of education of women beneficiaries varied from primary to higher secondary. However 15% farmers were illiterate. About 46% of duck raiser received primary education, only 10% of the respondents had secondary level of education, but 44% women in the study area were illiterate (Romaja *et al*., 2015)which partially support my findings.

Some part of the study area being low land and most of the area are highland. It is a density populated area; around 35% of the households have yearly income up to 50000 tk. About 55% of the farmers had a patch of cultivable land (Average 20 decimal). But 99% women were landless in which only 1% had own land in which most of land was owned by male counterpart (husband/ father) in the family (Romaja *et al*., 2015) which is not supported by our findings.

The average farm size was 12 and it is always remain variable with the ducks loss attributed to different causes (diseases), new introduction through own hatching, purchase and gift. Around 35% of the farmers reared ducks with hen. Though the main source of duckling is family, some NGO like RELDC also supply duckling.

Types of duck house and day shelters with materials used in the present study area are similar to many other parts of the country. The litter used for a duck house in this study represents country wide common practices. Pond sharing for the scavenging ducks among the neighboring farmers was the common practice. Farmers supplied feed seemed not to be sufficiently balanced, so, ducks largely rely on scavenging feed for other essential nutrients.

Duck plague was the most common diseases identified in this study, like other reports (Hoque and Rahman, 2007). Duck were vaccinated against duck plague on day between 15 and 31 for the first and between 35 and 46 for the booster dose. Loss of ducks due to infectious diseases might be controlled through intensifying the vaccination, immediate antibacterial treatment for bacterial diseases.

The average egg production of the Deshi duck and duck under study population is 85 per duck per year. Moreover the cost for production and maintenance of ducks is very low because of feeding on natural resources. Duck meat is of high demand in winter season in my study area. So all these point contributed in the sustainability of the household duck rearing. The overall findings of participation of local women in duck rearing activities were more focused on home based activities which are not supported by others (Bose *et al*., 2009).

**CHAPTER-V**

**LIMITATIONS**

There was insufficiency in keeping data from record book. Limited access of entrance in particular sections of the duck farm. Vaccination schedule is not well developed that leads to insufficient study. Most of the data was collected through interviewing. The authority showed their negligence to give accurate data of the study due to some rules and regulations for their jobs.

# CONCLUSION

Duck rearing under village condition may be more profitable than chicken rearing of the problems which villagers face can be solved. It has been also found that indigenous ducks are more habituated with the ordinary feeding management provided by the small farmers as well as landless farmers. It is now clear that by rearing duck in more modified way we can alleviate our poverty. The study indicates that there are great potentials for an improvement of duck production in rural Bangladesh. Regular vaccination and use of balance diet can have a positive effect on duck rearing providing quality products for human consumption and reducing nutritional deficiencies and poverty of the country. Training in duck rearing has come out as felt need by the farm families. The finding of the present study support to express the overall views that the present status of house hold duck rearing in Muradnagar upazilla considered being as standard as other side of the country. In some cases particular production was reported higher than expected. However the introduction of training and input supply with scientific housing, feeding and breeding management and creating more extended provision of health care and prevention of diseases by undertaking positive initiatives and patronization from both government and NGO will definitely improve the current status of rearing ducks with the livelihood of the households of Muradnagar upazilla under Comilla district in Bangladesh engaged in scavenging duck rearing.

**PROBLEMS OF DUCK REARING**

The following problems are identified in general from the response of the studied ducks rarer under the study:

1. Lack of financial support that can provide inspiration to the farmers to become conscious about duck rearing.
2. Lack of available medicinal supports such as vaccination support, treatment of diseased birds etc.
3. Lack of improved breed among the indigenous duck that can provide better production performance to the rearers.
4. Lack of consciousness about duck rearing.
5. Lack of government supervision.
6. Lack of availability of feed.
7. Ducks are almost incapable of depending themselves and hence losses from predators (Jackal, fox etc.) are high in rural condition.
8. Ducks suffer from diseases, which are due to miss-management such as poor diet or bedding or overcrowded and filthy conditions, which are prevailing, in rural condition.
9. Duck viral hepatitis and duck plague can cause severe losses.
10. Ducks tend to be poor mothers and do not incubate their eggs.
11. There is dis-organized marketing system in Bangladesh where the duck rearers face greater problems for marketing their products.
12. Superstition about duck meat and egg leads to less demand of duck eggs & meat.

**RECOMMENDATIONS**

Duck rearing would have been the first choice of our village people if proper supervision were given. In order to initiate the villagers to rear ducks, the following steps should be taken:

* Supply of improved indigenous ducks to the villagers.
* Provision of financial support to the duck farmers.
* Govt. patronization regarding duck rearing.
* Conduction of stable market for duck meat & eggs.
* Price stabilization should be ensured.
* Availability of ducklings should be ensured.
* Ensure available vaccine for viral diseases of duck.
* Provision of available veterinary service to the duck.

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**APPENDIX**

**QUESTIONNAIRE**

**Study on house-hold duck rearing system at some selected areas in Muradnagar upazilla under Comilla district in Bangladesh**

1 .a) Name of the farmer: … … … …

b) Father/husband’s name: … … …

c) Address:

Village: … … … … Union: … …

Upazilla: … … … … District: …

b) Occupation: Service / Agriculture / Business/ Labour

2. Family details:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| SL.NO | Name of the member | Relation | Age | Sex | Education | Name of association with which he/she related |
| 1. |  |  |  |  |  |  |
| 2. |  |  |  |  |  |  |
| 3. |  |  |  |  |  |  |
| 4. |  |  |  |  |  |  |

3. Land (acre):

a) Residential b) Cultivable c) Non-cultivable

4. Source of income:

a) Agriculture b) Service c) Business d) Duck rearing e) Poultry

f) Dairy g) Other

5. Total income of family… … … … Tk

6. Presence of electricity: Yes/No

7. Number of Duck

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Type | Deshi | | | Hybrid | | | Crossbred | | White | Black | Mix | Indian  Runner | Khaki  Campbell | Zending |  | | Duckling  (0-2m)  Grower  (2-9m)  Drake  Duck  Laying duck |  |  |  |  |  |  |  | |

8. Information on housing:

1. Elements of house: Bamboo / Straw / Tin / Polyethylene / Mud / Wood / Others
2. Type of rearing: Extensive/Intensive/Semi-intensive.
3. Cleaning of house: Yes/No
4. Type of litter used:
5. If any integrated farming: Yes/No
6. Integrated duck & poultry rearing in a common place: Yes/No

9. Feeding information:

a) Type of feeding: Natural/Artificial/Both

b) Name of ingredients in case of natural feed:

… … … … … … … … … … … … … …

c) Source of feed:

d) Frequency of feeding:

e) Supplementary feeding:

10. Presence of marshy land: Yes/No

If yes, what type – Degi / Pond / River

11. How many months in a year duck are grazed in marshy land:

12. Name and quantity of artificial feed ingredients

|  |  |  |  |
| --- | --- | --- | --- |
| Ingredients | Quantity/duck/day | | |
|  | Duckling | Grower | Duck |
|  |  |  |  |

13. Information on disease management of duck:

a) Regular vaccination-Yes/No

b) If yes type of vaccine:

c) Treatment of diseased duck: Yes/No

d) Govt. help in duck treatment: Yes/No

e) Name of some disease of duck-

a) b) c) d)

f) In which season duck is affected mostly: Summer Rainy Winter

g) Source of duckling: Govt. farm NGO Family Personal

14. Information on laying of duck:

a) Age at 1st laying:

b) Egg production/year:

c) Average egg weight:

15. Marketing of eggs:

a) Where eggs are sold:

b) Approximate selling cost of egg/year:

c) Problems of selling:

d) Bird selling:……. /year

16. Information on cost:

Duckling cost: Medicine:

Housing: Labors:

Vaccine: Feed:

17. Information on hatching:

a) Procedure of hatching: Natural/Artificial

b) If natural use of- duck/hen

c) Process of brooding of duckling

18. Source of money for duck rearing- Own/ NGO / Govt / Others

19. Duration of duck rearing: Throughout the year/definite time of a year

20. Problems of duck rearing:

21. What is your future plan about duck rearing-?

Name of Interviewee:……… Name of Interviewer:…….

Date:…………… Date: …………

Signature:…………. Signature:…………

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The Author

**Biography**

This is Azizul Hoque, son of Sahid Mia and Monowara Begum. I passed Secondary School Certificate examination in 2007 followed by Higher Secondary Certificate examination in 2009. Now I am an intern veterinarian under the Faculty of Veterinary Medicine in Chittagong Veterinary and Animal Sciences University. In future I would like to work as a veterinary practitioner and do research on animal production in Bangladesh.