

**PRESENT STATUS, PROBLEMS AND PROSPECT OF QUAIL
FARMING AT BOGURA AND NAOGAON DISTRICT IN
BANGLADESH**

A Thesis

By

MD. SHAJIB MIA

Registration No. 1605508

Semester: July-December, 2018

Session: 2016-2017

**MASTER OF SCIENCE (M.S.)
IN
POULTRY SCIENCE**



**DEPARTMENT OF DAIRY AND POULTRY SCIENCE
HAJEE MOHAMMAD DANESH SCIENCE AND TECHNOLOGY
UNIVERSITY, DINAJPUR-5200**

DECEMBER, 2018

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*Submitted to the
Department of Dairy and Poultry Science
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DECEMBER, 2018

DEDICATED
TO MY
BELLOVED PARENTS

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ABSTRACT

The present study was conducted at Bogura and Naogaon district to assess the potentiality of quail farming in rural areas. A total of 40 quail farm were selected at random basis from the study area. The purpose was to examine the present status, problems and prospects of quail farming. The problems and prospects of quail farming of selected areas were quantified and assessed. Data were collected using a pretested interview schedule from March to June, 2018 to identify problems in rearing quail and to know how much farmers are habituated in using different management technologies. The relevant information that were collected during study period are age, education, main occupation, land holding, training, annual income, number of quail, number of breeds or varieties, types of quail farm, rearing, sources of day old chick, bedding materials, diseases prevalence, mortality, day old chick price, feed price, market age, market weight, FCR, biosecurity, future plan, ventilation and lighting system, use of footbath, vaccination frequencies and marketing channel. Introducing of quail farming, training of quail farmers could increase the quail farming with increased income and employment to youth and small holder marginal farmers. In Bogura and Naogaon district, the quail farmers are mostly middle aged people and they got mostly secondary education level. Overall the biosecurity, vaccination schedule and production level is satisfactory in the represented area. Among the respondents 32.5%, 47.5% and 20% were grouped as young, middle aged and old aged groups respectively. A total of 60% farmers had training on quail farming from NGO and dealers, 15% farmers maintain strict biosecurity, 65% maintain moderate biosecurity and remaining 20% maintained no biosecurity. Among the visited farms 20% farmers practice disinfection process to disinfect their farms while the rest 80% farmers did not practice disinfection process.

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CHAPTER I

INTRODUCTION

Bangladesh is an agriculture-based developing country with approximately 140 million poultry (Rahman, 2000). The majority of these poultry are indigenous quails and ducks (Das *et al.*, 2008). The productive performance of this quails is low and losses due to diseases and predators are high (Nakamura, 1990). However, exotic pure breeds did not perform satisfactorily in scavenging system because of their higher nutritional demand and lower disease resistance (Haque *et al.*, 1999). Therefore, in addition to indigenous poultry, rural and semi-urban people need such a suitable species of bird which can be reared easily with little investment and provide more economic return within a very short time.

The continued rise in human population in the developing countries necessitates the need to establish additional sources of animal protein. In this situation, the demand for poultry products has been increasing. To meet up the growing demand for poultry products without importing them, the development of poultry industry is very important. Quail does not only supply animal protein in the form of meat and eggs, but also provides a source of income. The quail farming as a supplement to quail and duck farming has the unique advantage of tapping the growing market demand for poultry products. A large number of educated people also have to look for self-employment, given the limited scope for employment in the public sector. The time has now come for creating alternative employment opportunities for the educated people. The self-employment scheme is one probable answer and quail farming seems to be a promising enterprise in this direction. The quail farming witnessed rapid expansion in urban areas. These farms are producing meat, eggs and quail-chicks/pullets. However, quail farming has not yet been popularized in rural areas. It is very important to know the potential of and constraints to commercial quail farming in the socio-economic environment of Bangladesh.

The term 'quail farming' means, raising quails commercially (like other poultry birds) for the purpose of profitable eggs and meat production. As far as we have experienced, quail farming business is very easy, lucrative and entertaining. It's very easy to maintain a quail farm, because quails are among the smallest species of poultry birds. The Japanese scientists first tamed the wild quails and revealed the ways to raise them as domestic

birds. Commercial quail farming in Japan has spread tremendously. Now, people throughout the world performing quail farming business commercially for the purpose of meat and egg production. Quail farming is very profitable like other farming ventures, such as quail, turkey or duck farming business. Almost all types of weather conditions are suitable for starting quail farming business. Meat and eggs of quail are very tasty and nutritious. Quail eggs are very nutritious than other poultry eggs. Because quail eggs contain comparatively more protein, phosphorus, iron, vitamin A, B1 and B2. Quail farming can play a vital role to meet up the demand of food and nutrition. Quail farming business require small capital and labor. Quails can be raised along with your other poultry birds for meat or eggs production.

Quails were small game birds that are now used for commercial production of eggs and meat (Onyewuchi *et al.*, 2013), and they attain rapid sexual maturity have shorter incubation period and can produce up to four generations per annum, therefore making them the most suitable and effective poultry (Saidu *et al.*, 2014). There are two species of quails suitable for breeding, *viz.*, the Japanese quail (*C. coturnix japonica*) and the American or common quail (*C. coturnix*). Japanese quails belong to Phasianidae family and are migratory birds which migrate between Asia and Europe (Saidu *et al.*, 2014). Japanese quails are the smallest member of poultry with immense potentiality (Minvielle, 2004), and therefore, used in commercial production for meat and egg (Rahman *et al.*, 2010). Egg production is important in Far East and Asian countries, whereas meat production is important in Europe (Karapetyan, 2003).

The Japanese quails are blessed with many desirable characteristics, *viz.*, faster growth, early sexual maturity, high rate of egg production (300 egg/ annum), short generation interval (3-4 generations a year), small floor space (200-250 and 150-200 cm², respectively in litter and cage system), less feed requirements (20-25 g/adult bird/day), short incubation period of hatching eggs, less feed cost, and less susceptibility to common quail diseases (Faitarone *et al.*, 2005, Aygun *et al.*, 2013 and Jatoi *et al.*, 2013). Because of these encouraging economic traits, quail farming needs much lower capital investment as compared to quail and duck with almost the same profit margin (Jatoi *et al.*, 2013). Japanese quail eggs have a high potential to be developed as a cheaper source of protein, especially in developing countries. In addition to being cheaper and delicious, quail eggs are rich in protein and good sources of foliate, vitamin B12, pantothenic acid, iron, phosphorus, riboflavin and selenium (Kalsum *et al.*, 2012).

Quail meat is tender, tasty, nutritious, and gaining popularity as a table delicacy among the consumers (Tunsaringkarn *et al.*, 2013). In regard to meat quality (pH, color, and texture), the quail meat is similar to broiler meat (Narinc *et al.*, 2013). The nutritional value of quail eggs is 3-4 times greater than quail eggs since it contains more moisture, minerals than broiler meat and has less fat and fewer calories, forming an ideal food for health conscious consumers (Wahab, 2002). Due to its small size and short generation interval, the Japanese quail is also popular as laboratory animal (Ophir *et al.*, 2005).

Although, compared to quail it is quite a new species of poultry in Bangladesh, however, it has already received renewed impetus with the passage of time (Haque *et al.*, 1996). Its immense potentialities as a new dimension in poultry farming have already been recognized in this country. However, till now, the status and the major problems of quail farming in Bangladesh are not properly explored. Therefore, the study was undertaken to obtain thorough and detailed information on the status, problems, and prospect of quail farming in selected areas of Bangladesh.

Objectives of the study

- To assess the socio-economic parameter of Quail farming in Bogura and Naogaon district.
- To compare the cost benefit analysis of Quail with Sonali at farmers level.
- To identify problems and gives some recommendation in Quail farming.

CHAPTER II

LITERATURE REVIEW

Quail is a small, stocky bird with short legs and varied plumage. Quail breeding is also known as coturniculture. The quail is farmed for its eggs (intended for consumption, decoration and remedies) and for its meat

The Japanese quail is similar in appearance to the European Common Quail, *Coturnix coturnix*. Overall, they are dark brown with buff mottling above and lighter brown underneath. They have a whitish stripe above the eye on the side of the head. Legs are orangish-gray to pinkish-gray as is the beak (Hoffmann, 1988). In contrast to the males, females usually (but not always) lack the rufous coloring on the breast and black flecking or markings on the throat (Johnsgard, 1988). There are variations in plumage color. Some birds are whitish to buff with rufous to chestnut mottling above. Others have a very dark brown appearance with little to no mottling. In addition, there have been golden-brown varieties bred in captivity (Hoffmann, 1988). Wing sizes in males and females are similar ranging from 92 to 101 mm. Both male and female have similar sized tails ranging from 35-49 mm in length (Johnsgard, 1988).

2.1 Characteristics of Quail

Quails are very small sized bird. An adult quail weights between 150 to 200 grams and an egg weights around 7 to 15 grams. Female quails start laying eggs within their 6 to 7 weeks of age and continuously lay one egg daily. They lay about 300 eggs in their first year of life. After that they produce about 150 to 175 eggs in second year. Eggs production gradually decreases after their first year of laying period. Quail egg is very suitable for human health. It contains 2.47 % less fat than quail egg. Many people believe that 'quail eggs help to prevent blood pressure, diabetic, pant etc. Quail meat is very tasty and nutritious. Fat is very low in their meat. So quail meat is very suitable for blood pressure patients. Eggs are very beautiful with multiple color Quails do not incubate their eggs. So you have to use an incubator or brooder quails for hatching their eggs.



- As the quail eggs are smaller in size, so the price is also lower than other bird's egg. As a result, all types of people can buy quail eggs and you can easily sell the eggs.
- As the primary costs are less, so you can start this business with a very little investment.
- You can raise about 6 to 8 quails within 0.91 square meter area.
- As it is a lucrative business venture, so commercial quail farming business can be a great source of income and employment for the unemployed educated people. Even, you can start raising a few quails along with your current profession.

2.3 Life Cycle of Quails

Quail generally survive for 3 to 4 years. An adult quail weights between 150 to 200 grams. Female quails start laying eggs from their 6 to 7 weeks of age. Each egg weights between 7 to 15 grams. They lay more than 300 eggs per year. Their eggs are very beautiful. Presence of light increases the egg productive efficiency of quails. They usually lay eggs at afternoon. It takes about 17 days to hatch their eggs. A newly born quail chick weights around 6 to 7 grams. Quail never incubate their eggs. For successful breeding purpose keep one male quail with every five female quails. Quail chicks become very sensitive and take about two weeks to be strong enough. Eggs of 9 to 11 grams weight with smooth and hard eggshell are perfect for hatching and producing chicks.

2.4 Housing of Quail

The Japanese quail is primarily a ground-living species that tends to stay within areas of dense vegetation in order to take cover and evade predation (Buchwalder and Wechsler,

1997). Quail are robust birds that do not mind low temperatures, but prefer a dry climate. Cohabitation with other poultry species is difficult and there is a significant risk of the quail being killed by quails. Wild quail run, jump up to 20-30 cm and scratch the earth to find insects, but they only fly during migration periods or to escape predators.

Thus, its natural habitats include grassy fields, bushes along the banks of rivers, and agricultural fields that have been planted with crops such as oats, rice, and barley (Buchwalder and Wechsler, 1997). It has also been reported to prefer open habitats such as steppes, meadows, and mountain slopes near a water source.

Feeding

For keeping your quails healthy, proper growing and highly productive, provide them balanced feed regularly. An adult quail consumes about 20 to 25 grams of food daily. Chick feed should contain 27% and adult feed 22-24% of protein. A chart of balanced feed for quails is shown below:

| Ingredients | Age | | |
|---------------------|------------|----------|-------|
| | 0-3 week | 3-5 week | Adult |
| Broken Wheat | 48 | 50 | 50 |
| Sesame Cake | 23 | 22 | 22 |
| Kipper Fish | 20 | 16 | 14 |
| Rice Bran | 6 | 8 | 9 |
| Broken Oyster shell | 2.25 | 3.25 | 4.25 |
| Salt | 0.50 | 0.50 | 0.50 |
| Mineral Mix | 0.25 | 0.25 | 0.25 |
| Total (Percentage) | 100 | 100 | 100 |

Egg Production

Presence of adequate light is highly recommended for desired egg production from your quails.

You can provide artificial light and heat by using electric bulb or heater. You can use 40 to 100 watt bulb for this purpose. Demand of light and heat varies depending on the season. If you want successful breeding and want to hatch their eggs, then keep one male with every five female quails. For getting better egg production, select highly productive

breeds and always keep their house dry and clean. Egg production also depends on temperature, feeding, water, care and management.

To get desired egg production from your quails, light play a vital role. Lightening period of laying quails is shown below through a chart.

| Age | Temperature (⁰ C) | Light (Hour) |
|------------|-------------------------------|--------------|
| 1 Week | 35 | 24 |
| 2 Week | 30 | 24 |
| 3 Week | 25 | 12 |
| 4 Week | 21-22 | 12 |
| 5 Week | 21 | 12 |
| 6 Week | 21 | 13 |
| 7 Week | 21 | 14 |
| 8 Week | 21 | 15 |
| 9 Week | 21 | 16 |
| Other time | 21 | 16 |

Raising Quail Chicks

Quails never incubate their eggs. So, you can produce chicks by hatching their eggs through quails or artificially through using incubators. Incubation period for quail egg is about 16 to 18 days. For maximum egg production, 16 hours of lighting period is required daily inside the quail house. Keep newly born quail chicks in a brooder house. Chicks need artificial heat and temperature management system for 14 to 21 days from their birth. Quail chick becomes very sensitive. They can be raised in both litter and battery system. Keep in mind the following factors while raising quail chicks.

- Adequate temperature
- Sufficient light
- Proper air movement
- Density of quail chicks
- Supply of food and water
- Hygienic rearing rules

Diseases

Diseases are less in quails, compared to other poultry birds. But you have to take good care and manage them properly, to keep them free from all types of diseases or illness. Good care and management is a must for profitable quail farming business. Generally they are not provided any disease preventive vaccines. Quail chicks can't tolerate weather change, and sudden temperature change. So they get affected by disease, if they experience sudden temperature or weather changes. Be very careful during this period. Following diseases are very harmful for the quails.

Coccidiosis: If the quails get affected by coccidiosis disease, serve them coaxial 20 by mixing with water (two grams per litter) for three days. Otherwise feed this according to the advice of a veterinarian.

Ulcerative Enteritis: Mix one gram streptomycin with one litter water and serve it to the quails for three days. This will stop ulcerative enteritis disease.

2.5 Reproduction of Quail

Like hens reared for laying, modern laying quail that are the result of along selection process lay all year round. However, the number of eggs laid is higher between February and September. The male and the female begin to reproduce around 6 weeks old. However, it is better to wait until the male and female are 8 weeks old to ensure the production of fertile eggs. As with other quail, eggs were laid at a rate of one per day (Lambert, 1970), with 7-14 eggs per clutch (Hoffmann, 1988). An egg averages 29.8 by 21.5 mm is size and weighs 7.6 g (Johnsgard, 1988). Incubation time is 19-20 days (Lambert, 1970), although clutch sizes have been associated with latitude and length of photoperiod. In Japan, clutch size is 5-8 eggs, while in Russia, clutch size is 5-9 eggs (Johnsgard, 1988). The chicks are considered to be mature and able to mate after four weeks old (Hoffmann 1988). As soon as the first eggs are discovered in the bird houses, the birds must be divided into breeding groups (one male and four to five females).

In nature, the female builds her nest on the ground, well hidden in the tall grass. The breeding season varies with location. In Russia, the season starts in late April and continues to early August. In Japan, nesting occurs from late in May and usually ends in August. On the rare occasion, eggs may be found in nests in September (Johnsgard, 1988). When raised in a quail house or a cage, she will rarely sit on her eggs if she cannot find a discreet spot. That is why the Japanese quail has, in many cases, lost the brooding instinct.

2.6 Incubation

Eighteen hours of light per day are required to ensure regular and optimum laying. The selection of eggs for incubation is important. Eggs to be incubated:

- must have a smooth, matt shell
- must not have a broken or shiny shell
- must not be spherical

Do not store the eggs for more than 10 days before placing them in the incubator. It is best to store them in a cool place at around 15°C. Incubation lasts 16-18 days. Use static hatching chambers or small incubators with static ventilation. The incubation temperature is 38.5- 39°C in the incubator. Humidity should be 55-60% for the first 14 days and on the 15th day be increased to 70% or more. The eggs must be placed horizontally or pointing down and should not be turned for the first 3 days. From the second to the 14th day, turn the eggs regularly, at least 2 or 3 times every 24 hours to prevent the embryo sticking to the shell. Forgetting to turn the eggs, even for a single day, can cause serious losses. It is therefore helpful to mark each egg on one side. During the first 3 days, do not open the incubator as this will change the temperature, and this is the point at which the eggs are most fragile. If the incubator is poorly ventilated, cool the eggs by removing them one by one from the hatching chamber for 5-10 minutes. The temperature is slightly lower in forced-air incubators. It is not necessary to take the eggs out on a daily basis, however they must be turned 3 times a day.

To save room in the incubator, 'candle' the eggs every seventh day to eliminate 'clear' eggs, or when they are put into the hatching basket on the 12th day. Clear eggs have no dark spot.

On the 14th day, transfer the eggs to a hatcher, which is a similar piece of equipment with the same capacity. Do not turn them from the 15th day.

Do not turn the eggs during the last 2 days of incubation, as it can cause the chicks to die. During these final days, the chicks will choose their exit position.

2.7 Hatching

Hatching takes place between the 16th and 18th day for 85-90% of the fertilised eggs, which corresponds to 75-80% of the eggs placed in incubation. Consanguinity can lead to a deformity rate of 10% among the chicks. It is preferable not to open the hatching

incubator from the 15th day until all the chicks have hatched, as every time the door is opened, the humidity drops considerably. The chicks will weigh 5-6 g. They must remain in the hatching incubator for 24 hours after hatching to be perfectly dry. They do not need food during this period.

2.8 Starting period

The quail chicks grow at a very fast rate during the first days of life. The first feathers appear from the third day, and at 3 weeks the young quail are fully covered. The sex can also be identified from the age of three.

This stage is extremely important as all of the other rearing stages depend on its success.

Thoroughly clean and disinfect the quail house before installing the chicks. Use dry, absorbent bedding that is not too rough. Place strong paper or hessian on the floor for the first week to prevent the young quail absorbing wisps of bedding. If you use wire mesh cages, place strong paper on the mesh for up to the first week, so that their legs and feet are not damaged.

Never mix quail chicks of different ages. Avoid overcrowding. On the floor space, do not have more than 40 chicks/m². Prepare and turn on the warm brooder 24 hours before hatching to ensure that the temperature on the floor under the brooder or at the level of the mesh floor is between 38-40°C. For example, if using a 250 watt lamp, place it approximately 60 cm from the floor. For a 15 watt lamp, place it 7 cm from the floor and raise it about 2 cm every 4 days for 3 weeks. In this way the temperature at the level of the chicks will gradually fall.

From the second day, the quail chicks are placed under the brooder, which provides a temperature of 40°C for the next 3 days. The temperature is then reduced by 1°C until a constant (if possible) temperature of 23-25°C is reached. If the chicks huddle together under the brooder, this indicates that they are too cold. If they stay a long way from the lamp, they are too hot. If they are very agitated, they are too hot or they have no drink or food.

The length required for the feeders is 120 cm, and 40 cm for the water troughs for 100 young quail. During the first week, fill the feeders to the top, then when they have learned how to feed themselves properly, reduce the level to avoid waste. When the young birds have learned how to drink correctly, raise the drinkers slightly so that the

water does not spoil the bedding. Change the water at least once a day and whenever it becomes tainted.

2.9 Fattening

From the third week, after the starting period, place the quail into cages or quail houses/chicken coops, where they will remain until the seventh week until slaughter. Each cage or house must contain birds of the same age. For wire mesh cages, remove the droppings every 3 days.

To make the work easier on a small quail farm, place old newspapers under the cage, and change this as often as necessary. Another solution is a removable metal tray placed under the cage, which helps with efficient washing and disinfecting. If bedding is used, it is possible to leave it in place until the end, provided enough has been installed, so as to prevent an excess of excrement that could be eaten by the quail and cause enteritis. In any case, it is essential to change the bedding before the next hatching and avoid diseases. It can be used or sold as manure. It is not necessary to provide more than 8 hours of light per day, as is the case for the breeders. This means that sexual maturity will be reached more slowly and the quail, which will not have enough energy to fight or copulate, will fatten up more quickly.

The normal mortality rate can reach 10% during fattening. The best birds will be kept as breeders.

2.10 Production Performance of Quail

The production of eggs with eggshell quality is an important concern of the egg industry. According to Roland (1988) losses due to low eggshell quality or other reasons may reach 20% before the eggs arrive at retail. Hurwitz (1989) asserted that the nutritional factors that affect eggshell quality depend on the metabolic exchanges, which occur during egg formation. In the uterus, the organic fraction of the eggshell is synthesized by the glands, and calcium – its largest component – is mobilized from the blood. Eggshell is sensitive to calcium availability and carbonate is influenced by dietary factors that affect acid-base balance. This author also observes that eggshell mineral content is 90%, out of which 98% consist of calcium carbonate. It is well known that, during eggshell formation, the transference of calcium from the plasma to the uterus in layers in very fast of an average of one minute.

According to Etches (1996) eggshell is formed mostly during the night, when birds do not eat and this may increase calcium deficiency for egg formation. Therefore, calcium is mobilized from the bones. Leeson *et al.* (1991) verified that calcium requirements are generally very low, except at the time eggshell is deposited. Faria *et al.* (2011) observed that commercial layers lay more frequently during the morning, after a period of fasting during the night, when eggshell is formed.

Aiming at improving eggshell quality in commercial layers, Joly *et al.* (2015) mentions some techniques, such as feeding calcium-rich feeds in the afternoon, high particle size calcium dietary addition, short lighting period during the night, etc. However, in order to successfully apply these techniques in quails, feed intake behavior and lay times must be similar between.

2.11 Benefits of Quail Farming

- Quails are smaller sized poultry birds, and it's very easy to handle them. The main benefits of starting quail farming business are listed below.
- Quails are smaller sized bird, so they can be raised within small place.
- Feeding cost of quails are comparatively lower than quails or other poultry birds.
- Diseases are less in quails, and they are very hardy.
- Quails grow very fast and gain maturity faster than any other poultry birds.
- They start laying eggs within their 6 to 7 weeks of age.
- It takes about 16 to 18 days to hatch their eggs.
- Meat and eggs of quail are very tasty, delicious and nutritious. So it's a great source of food and nutrition.
- Quail farming needs small capital, and labor cost is very low.
- Quails can be raised successfully in commercial method. Some people have already started commercial quail farming business.
- Quails are very strong bird and diseases or other health problems are less. So risks are less in this business.
- Quail meat contains less fat. So, it is suitable for high blood pressure patients.
- Their food to meat or eggs converting efficiency is satisfactory. They can produce one kg meat or eggs by consuming three kg food.
- You can raise 6 to 7 quails in the same place that is required for one quail.

CHAPTER III

MATERIALS AND METHODS

3.1 Steps of the study

3.1.1 Method of Data collection

Among different method of data collection survey method was preferred. The interview schedule is provided in the appendix 1. Following steps were followed to conduct the survey.

3.2 Selection of the study area

The survey was conducted in two districts of Bangladesh: Bogura and Naogaon. These districts were considered representative in terms of availability of Quail. Six upazilas were selected from each district based on the concentration of quail rearing.

3.3 Sampling procedure

Before selecting survey samples, a list of upazilas and villages was prepared in consultation with government officials, the local offices of non-governmental and quail dealers/agents. Farms were selected randomly from the sample frame, which was created through discussions with different shareholders. Data and information were collected from a specific locality at the same time to avoid survey errors.

3.4 Sources of data

The study used both primary and secondary data. The main source of primary data was the 150 farmers from whom both qualitative and quantitative data were collected. Secondary data and information were collected from 40 Quail farm of different area of Bogura and Naogaon district.

3.5 Period of data collection

Data were collected from March to June, 2018. Collection of data was done through several visits each of the Quail farms by the researcher.

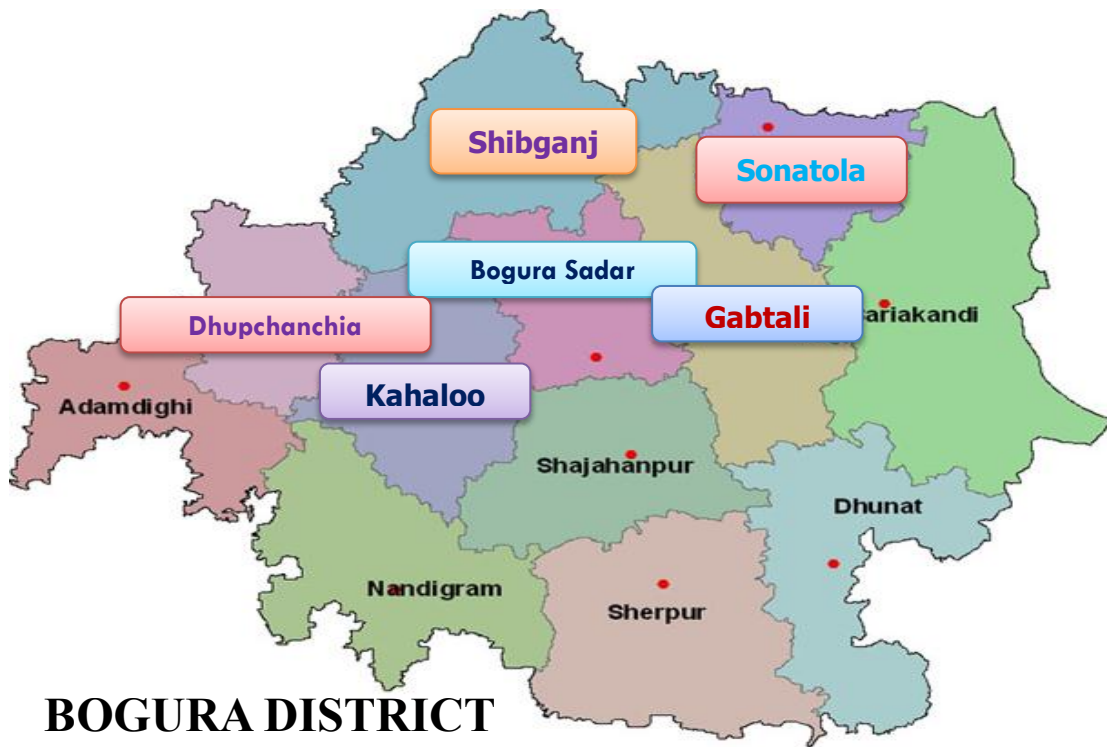


Fig. 1: Selected area of Bogura District

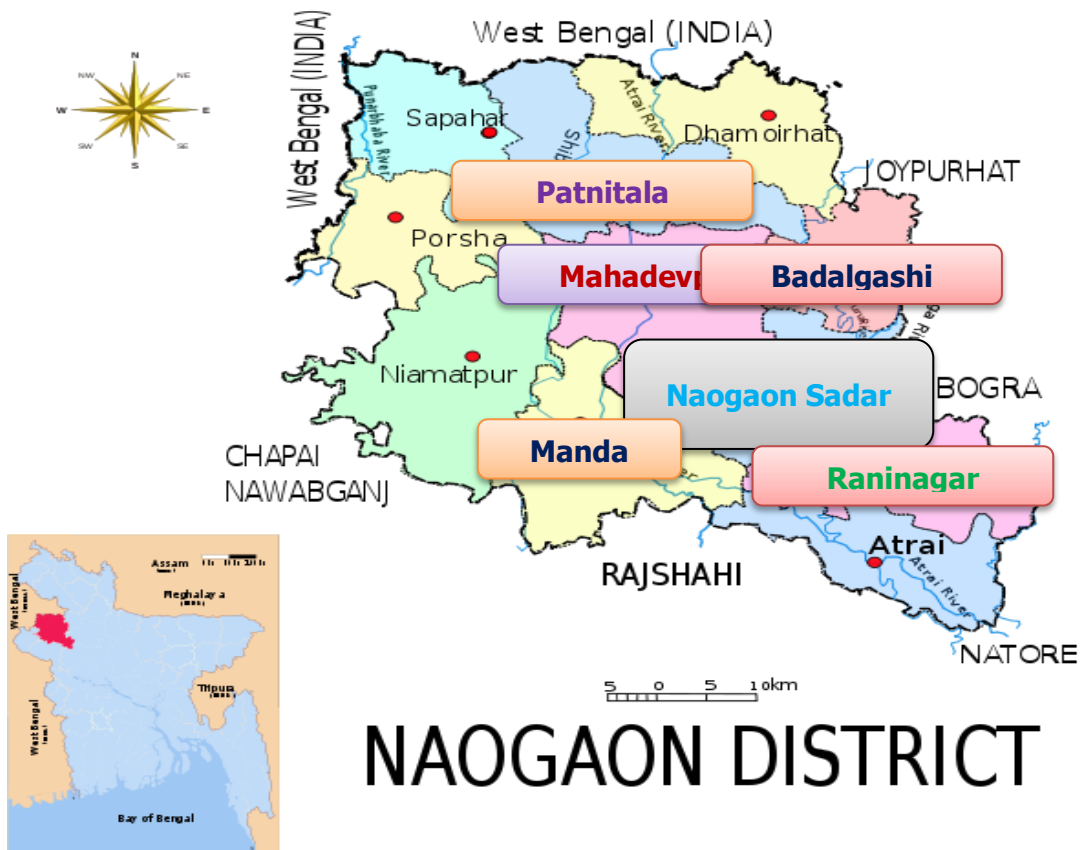


Fig. 2: Selected area of Naogaon District

3.6 Reasons for the selection of the study area

Availability of the Quails farm in the study area is the main reasons for the selection of the study area. Good communication facilities and less expense conducting the study. Bogura and Naogaon is the quail's zone and the farmers are more co-operative to the researcher.

3.7 Sampling techniques

Samples of representative farm were collected in such a way that the information to be collected must satisfy the purpose of study. A random sampling was followed. It was pre-tested for judging for suitability of schedule for respondents. After compilation of the pre-tested survey some new information was included and some excluded from the draft schedule. Then the draft schedule was improved, rearranged, modified in the light of the actual practical experience. Attention was given to the general form of the interview schedule to see that the question followed a logical and appropriate sequence care was taken in wording question to ensure that they were unambiguous and easily understood. These questions were most easy and informative for livestock socioeconomic condition. The following information's were considered.

3.8 Compilation of data

After completion of final primary data collection, all interview schedules were compiled, coded, tabulated and analyzed according to the objectives of the study.

3.9 Problems faced during data Collection

In collecting data the researcher had to face some problems. These are presented below:

1. Most of the respondents hesitated to give their actual information about their production income, capital, etc.
2. Most of the respondents were doubtful about the purpose of the study because they have no previous ideas.
3. There was the limitation of time. All of the necessary information were collected within the shortest possible of time.

4. In reply to question, the respondent used local units of measurement, which were often difficult to convert these to standard units.
5. Most of the farmers did not keep any records of their business, therefore it was difficult to recall and the researcher had to depend upon their memory.
6. Sometime the respondent did not co-operate willingly with the researcher as their have no direct benefit by supplying information. However the researcher very ardent in developing relations with the respondents and data were collected with fervor and contentment.

3.10 Data processing and analysis

Data collected from the field were entered into computers using MS Excel. For the analysis of the data, a combination of descriptive statistics (mean, standard deviation, averages, percentages) and mathematical techniques (gross margins, net returns, benefit/cost ratios [BCR]) were used to obtain meaningful results.



Fig. 3: Collection of data from the farmers

CHAPTER IV

RESULTS AND DISCUSSION

4.1 Education of quail farmers

In the study area, it was showed that 5% farmers were illiterate followed by 17.5% had primary education, 42.5% had up to secondary education and rest 35% had above secondary level of education (Table 1).

Table: 1 Education of quail farmers

| Educational group | Quail farmers | |
|----------------------------|---------------|----------------|
| | No. | Percentage (%) |
| Illiterate | 2 | 5 |
| Up to primary (1-5) | 7 | 17.5 |
| Up to secondary (6-10) | 17 | 42.5 |
| Above secondary (11-above) | 14 | 35 |

4.2 Age of quail farmers

Age of the Quail farmers ranged from 25 to 70 years. The farmers were stratified into 3 age categories; namely young <32, middle age 33-50 and old >50 (Table 2). The average age of Quail farmers was 35.97.

Table: 2 Age of quail farmers

| Age group of quail farmers (years) | Quail farmers | | Mean | Deviation |
|------------------------------------|---------------|----------------|-------|-----------|
| | No. | Percentage (%) | | |
| Young age (<32) | 13 | 32.5 | 35.97 | 13.07 |
| Middle age (33-50) | 19 | 47.5 | | |
| Old age (>51) | 8 | 20 | | |

4.3 Size of the farm

According to flock size of the birds, the farmers were classified into four categories; namely very small, small, medium and large. Average number of birds per farm was 376.25 with standard deviation of 225.89 and number of birds per farm ranged from 50 to 1000. The (Table 3) revealed that 22.5% farm were very small 37.5% small, 32.5% medium and 7.5% farmers were large category.

Table: 3 Size of the farm

| Size of the farm | Quail farms | | Mean | Standard deviation |
|--------------------|-------------|------|--------|--------------------|
| | No. | % | | |
| Very small (<500) | 9 | 22.5 | 376.25 | 225.89 |
| small (501-1000) | 15 | 37.5 | | |
| Medium (1001-2000) | 13 | 32.5 | | |
| Large (>2000) | 3 | 7.5 | | |

4.4 Farm types of quail farmers

There were three farm types was found in the study area layers, meat type and mixed type. The percentage of layers types was 17.5%, meat type was 37.5% and mixed type was 45%.

Table 4: Farm types of quail farmers

| Group | Quail Farmers | |
|------------|---------------|----------------|
| | No | Percentage (%) |
| Layers | 7 | 17.5 |
| Meat type | 15 | 37.5 |
| Mixed type | 18 | 45 |

4.5 Number of breeds (varieties)

In the study area, it was showed that 60% quail farmer was one breed, 27.5% was two breed, 12.5% was three breed.

Table 5: Number of breeds (varieties)

| Group | Quail Farmers | |
|--------------|----------------------|-----------------------|
| | No | Percentage (%) |
| One breed | 24 | 60 |
| Two breeds | 11 | 27.5 |
| Three breeds | 9 | 12.5 |

4.6 Member involved in quail rearing

In taking care and management of quail, wife, son and daughter of the farmer were responsible. Table shows that 40% of wife of farmers' household were responsible to take care of quail rather than son, daughter and others (Table 4).

Table 6: Member involved in quail rearing

| Members | No. | Percentage (%) |
|-------------------|------------|-----------------------|
| Wife | 16 | 40 |
| Son | 3 | 7.5 |
| Wife and daughter | 9 | 22.5 |
| Son and daughter | 5 | 12.5 |
| Brother | 7 | 17.5 |

4.7 Rearing system

All the farmers in the study area reared quail in intensive system. The percentage of quail rearing in deep litter system is 92.5% and cage system is 7.5%.

Table 7: Number of rearing system

| Group | Quail Farmers | |
|--------------------|----------------------|-----------------------|
| | No | Percentage (%) |
| Deep litter system | 37 | 92.5 |
| Cage system | 3 | 7.5 |

4.8 Bedding materials

Variation of bedding materials in the house was observed. It was shown that 65% farmers used rice husk for bedding materials and rest 12.5% farmers use saw dust and 22.5% use mixture of rice husk sawdust for bedding materials in quail house. (Table 8)

Table 8: Bedding materials

| Name of the bedding materials used | Quail farms | |
|------------------------------------|-------------|----------------|
| | No. | Percentage (%) |
| Rice husk | 26 | 65 |
| Sawdust | 5 | 12.5 |
| Mixture of sawdust and rice hull | 9 | 22.5 |

4.9 Disease prevalence in the study area

It was observed that most prevalent diseases of quail farms were Mycoplasmosis, Colibacillosis, Salmonellosis, Coccidiosis and Infectious Bursal Disease in the study areas. About 80 % farmers stated that their quail were affected with Mycoplasmosis, 57.5% farms were affected with Coccidiosis and 47.5% farms were affected with Colibacillosis (Table 9).

Table 9: Disease prevalence in the study area

| Disease | No. of farms | Percentage (%) |
|-------------------|--------------|----------------|
| IBD | 9 | 22.5 |
| Pox | 13 | 32.5 |
| Mycoplasmosis | 32 | 80 |
| Newcastle disease | 5 | 12.5 |
| Coccidiosis | 23 | 57.5 |
| Salmonellosis | 16 | 40 |
| Colibacillosis | 19 | 47.5 |
| Aspergillosis | 3 | 7.5 |

4.10 Mortality of birds

Mortality of ranged 0-30% with an average of 11.73%. The farmers were categorized into three groups; namely low (<10%), medium (10-20%) and high (>20%) (Table 10). Table shows that about 70% farmers reported that their birds mortality was 10%. About 7.5% of the farmers reported that their birds mortality was above 20%.

Table 10. Mortality of birds

| Mortality rate | Quail farms | | Mean | Standard deviation |
|-----------------|-------------|------|-------|--------------------|
| | No. | % | | |
| Low (<10%) | 28 | 70 | 11.73 | 9.76 |
| Medium (10-20%) | 9 | 22.5 | | |
| High (>20%) | 3 | 7.5 | | |

4.11 Land size of the farm

The land size of was measured for each respondent in terms of decimal. The land size of the farm ranged from 10 to 60 decimal with a mean of 23.3 decimal and standard deviation of 11.74 (Table 11).

Table 11: Land size of the farm

| Category/Land size(decimal) | Quail farms | | Mean | Standard deviation |
|-----------------------------|-------------|----------------|------|--------------------|
| | No. | Percentage (%) | | |
| Small (5-20) | 27 | 67.5 | 23.3 | 11.74 |
| Medium (21-40) | 11 | 27.5 | | |
| Large (>40) | 2 | 5 | | |

Analysis of data revealed that 67.5% of the farmers farm land size was small, 27.5% medium and 5% were large. According to Bangladesh Bureau of Statistics (1998) the 7 farm holding is 1.33 acres. The average farm land size in the study area was found 23.3 decimal which are lower than that of farm holding average of 1.33 acre. These

finding indicates that comparatively poor farmers in term of land use are involved in the quail farming.

4.12 Sources of DOC (Day Old Chick)

Most of the farmers take their Day Old Chick from local hatchery. There were various local hatchery like Akash, Ayon, Palli Bandhu, Sharna Krishan and others local hatchery in the study areas.

4.13 Counselor of the farmer

The table showed that 22.5% of the farmer take their suggestion from technical graduate, 5% from Government organization 12.5%, from NGO 47.5%, from dealer and 12.5% did not take any suggestion from any one (Table 12).

Table 12: Counselor of the farmer

| Counselor | Quail farms | |
|--------------------|-------------|----------------|
| | No. | Percentage (%) |
| Technical graduate | 9 | 22.5 |
| GO | 2 | 5 |
| NGO | 5 | 12.5 |
| Dealer | 19 | 47.5 |
| None | 5 | 12.5 |

4.14 Vaccination of the birds

Among total 40 farmers the 37.5% farmers vaccinated their birds regularly, 32.5% vaccinated irregularly and 30% farmers did not vaccinated their birds (Table 13).

Table 13: Vaccination of the birds

| Category | Quail farms | |
|------------------------|-------------|----------------|
| | No. | Percentage (%) |
| Vaccinated regularly | 15 | 37.5 |
| Vaccinated irregularly | 13 | 32.5 |
| Non-vaccinated | 12 | 30 |

4.15 Price of DOC

The price of Day Old Chick ranged from 5 taka to 12 taka with mean of 7.53 and standard deviation of 2.07 Tk. (Table 14).

Table 14: Price of Day Old Chick ranged (DOC)

| Taka/DOC | Quail farms | | Mean | Standard deviation |
|----------|-------------|----------------|------|--------------------|
| | No. | Percentage (%) | | |
| 5-7 | 23 | 57.5 | 7.53 | 2.07 |
| 8-9 | 9 | 22.5 | | |
| 10-11 | 6 | 15 | | |
| 12-above | 2 | 5 | | |

4.16 Feed price

The feed price of Day Old Chick ranged from 35 taka to 40 taka with mean of 36.18 and standard deviation of 1.48 Tk. (Table 15).

Table 15: Feed price of Day Old Chick ranged

| Taka/kg feed | Quail farms | | Mean | Standard deviation |
|--------------|-------------|----------------|-------|--------------------|
| | No. | Percentage (%) | | |
| 35 | 16 | 40 | 36.18 | 1.48 |
| 36 | 13 | 32.5 | | |
| 37 | 7 | 17.5 | | |
| 40 | 4 | 10 | | |

4.17 Market age of the birds

From the fowling table it was reported that the market age of the birds ranged from 38 to 42 with mean of 39.88 and standard deviation of 1.26. The market age of the birds varying depends on the feed consumption and weight gain of the birds and due to fluctuation of the market price of the birds (Table 16).

Table 16: Market age of the birds

| Market age | Quail farms | | Mean | Standard deviation |
|------------|-------------|------|-------|--------------------|
| | No. | % | | |
| 38 | 8 | 20 | 39.88 | 1.26 |
| 39 | 6 | 15 | | |
| 40 | 13 | 32.5 | | |
| 41 | 9 | 22.5 | | |
| 42 | 4 | 10 | | |

4.18 Farmers training for the quail farming

From the table below it is found that 7.5% of the farmers taken training and about 92.5% of the farmers did not taken any training. For the optimal production and profit the development training program on quail farming for the farmers is necessary (Table 17).

Table 17: Farmers training for the quail farming

| Training | Quail farmers | |
|-----------|---------------|----------------|
| | No. | Percentage (%) |
| Taken | 3 | 7.5 |
| Not taken | 37 | 92.5 |

4.19 Market weight of the birds

The market weight of the birds ranged from 140gm to 200gm. The average weight of the birds is 172.9gm with standard deviation of 14.56gm (Table 18).

Table 18: Market weight of the birds

| BWG/bird | Quail farms | | Mean | Standard deviation |
|----------|-------------|----------------|-------|--------------------|
| | No. | Percentage (%) | | |
| 140-150 | 5 | 12.5 | 172.9 | 14.56 |
| 151-170 | 9 | 22.5 | | |
| 171-180 | 17 | 42.5 | | |
| 181-200 | 9 | 22.5 | | |

4.20 Farm size based on the annual income of the farmers

Income of the farmers refers to the total earning by the farmers from agriculture, livestock, fishing, business and other mean of non-agriculture sources (Table 19).

Table 19: Farm size based on the annual income of the farmers

| Annual income (taka) | Quail farmers | | Mean | Standard deviation |
|-------------------------|---------------|------|----------|--------------------|
| | No. | % | | |
| Low income(<10000) | 14 | 35 | 128485.7 | 67189.53 |
| Medium(10000-200000) | 21 | 52.5 | | |
| High income(>30000) | 5 | 12.5 | | |

4.21 Batch per year reared by the farmers in the study area

In the study area about 60% of the farmer rear 3 batch per year, 32.5% of the farmer rear 4 batch per year, 7.5% rear 5 batch per year with mean of 3.48 and with the standard deviation of .64 in the study area (Table 21).

Table 20: Batch per year reared by the farmers in the study area

| Batch per year | Quail farms | | Mean | Standard deviation |
|----------------|-------------|------|------|--------------------|
| | No. | % | | |
| 3 | 24 | 60 | 3.48 | 0.64 |
| 4 | 13 | 32.5 | | |
| 5 | 3 | 7.5 | | |

4.22 Feed Conversion Ratio

The Feed Conversion Ratio was varied from one farm to another. These variations were due to management, quality of feed and chick and disease prevalence in the study area. The average FCR was 1.73 with standard deviation of 0.09 in the study areas (Table 11).

Table 21: Feed Conversion Ratio

| FCR Range | Quail farmers | | Mean | Standard deviation |
|-----------|---------------|------|------|--------------------|
| | No. | % | | |
| 1.60-1.71 | 18 | 45 | 1.73 | 0.09 |
| 1.72-1.84 | 13 | 32.5 | | |
| 1.85-1.93 | 9 | 22.5 | | |

4.23 Bio-security practice

In the study area about 15% farmers strictly followed, 65% generally followed and 20% was never followed bio-security practice (Table 22).

Table 22: Bio-security practice

| Group | Quail farmers | |
|--------------------|---------------|----|
| | No. | % |
| Strictly followed | 6 | 15 |
| Generally followed | 26 | 65 |
| Never followed | 8 | 20 |

4.24 Future plan

In the study area, it was showed that 90% farmers want to expand their farm and 10% want to stop farm (Table 23).

Table 23: Future plan

| Group | Quail farmers | |
|---------------------|---------------|----------------|
| | No. | Percentage (%) |
| Want to expand farm | 36 | 90 |
| Want to stop farm | 4 | 10 |

4.25 Comparative costs benefit analysis

Table 24: Comparative costs benefit analysis of 1000 quail and 1000 sonali

| Field of costing | Cost of 1000 quail rearing (taka) | Cost of 1000 Sonali rearing (taka) |
|-------------------------------|--|--|
| Feed cost | 150kg×38 =5700 | 2000 kg×40 =80000 |
| Day Old Chick cost | 1000×7 =7000 | 1000×16 =16000 |
| Medicine and vaccination cost | 6000 | 9000 |
| Litter cost | 1000 | 1500 |
| Electricity cost | 1200 | 1500 |
| Transportation cost | 2000 | 2000 |
| Others cost | 600 | 1000 |
| Total cost | 23500 | 1,11,000 |
| Total sale | 920×34 =31280 | 1,42,569 |
| Profit | Total sale-total cost =31280-23500 =7780 | Total sale-total cost =1,42,569-1,11,000 =31,569 |
| Benefit-Cost ratio | 31.10 % | 28.44 % |

Quail farming require less investment to start and also provide higher cost benefit compare to the sonali farming (Own analysis). Production cost of per 1000 quail is 23500 Tk, where the production cost of 1000 sonali is 1,11,000 Tk. Due to lower production cost and comparatively higher pricing quail farming provide higher cost benefit ratio (Table 19).

4.26 Some common features in the study area

4.26.1 Litter

Most of the quail farmers use deep litter system: Most of the farmers use rice husk for bedding materials of their birds. Rice husk is used due readily availability of the rice mill and availability of the rice husk in the entire round and for cheaper cost of the rice husk.

4.26.2 Brooding

Brooding management is poor in the study area though brooding is the most important factor quail farming. Most of the farmers follow spot brooding, some of them follow whole house brooding. Many of the farmers does not use thermometer as a result proper temperature is not maintain during period.

4.26.3 Ventilation

Most of the farmers does not keep proper ventilation system in the shed. Most of the shed covered with polythene or cloth and as a result ammonia gas is entrapped with in the shed and produced different diseases like ascites, respiratory problems and others.

4.26.4 Lack of capital

It is a very common problem for the farmers. Due to lack of adequate capital they take their chick, feed and medicine from dealer at high price and as a result they become less profitable.

4.26.5 Antibiotic uses

Many of the farmers use antibiotics indiscriminately and at improper doses. In such cases the organisms become resistant against this antibiotics and when the diseases become outbreak it cannot be controlled by this antibiotics.

4.26.6 Improper biosecurity management

It is observed that in most of the farms strict biosecurity management did not maintain properly. Visitors and others personnel could easily enter into the farms. The farmers did not use foot bath. Wild birds, rodent and insect controlling in poor in these farms.

4.26.7 Recommendations to improve quail farming

- a) Training is necessary to all quail farmers for better brooding management, feeding and other management to get better production.
- b) Proper vaccination schedule against common diseases should be ensured.
- c) Good quality of Day Old Chick (DOC) should be supplied to the farmers. Vaccine and medicine should be available in the market.

- d) Government should give financial and technical support to farmers for rearing quail.
- e) Biosecurity management is the most important part in quail farming. Proper biosecurity management should be ensured to reduced disease prevalence and for optimal weight gain of the quail.
- f) Government should establish strict rules and regulation against feed, vaccine and medicine companies to ensure quality.
- g) Government should ensure proper market price of the ready birds.
- h) Quail rearing in the rural areas of Bangladesh could be a good source of income, nutrition and employment generation, especially for the unemployed youth and the small-marginal farmers.

4.26.8 Essential operations to be carried out prior to receiving chicks

- Cleaning and disinfection of quail house.
- Spreading litter material.
- Form a circle of about 5 feet diameter with brooder guard which can hold about 200 to 250 chicks.
- Newspaper, heat source, feeder and waterer arrangements inside the brooder guard.
- Spread ground maize or fine mash / crumble feed on the newspaper.
- Check the brooder for proper temperature of 90 to 95⁰ F.

4.26.9 Essential operations to be carried out after receiving chicks

- After arrival of chicks, moist the beak and leave the chicks under heating source.
- Maintain a brooder temperature of 90 to 95⁰F for the first week and then reduce 5⁰F every week until it reaches the room temperature.
- First and second day provide electrolytes and vitamins in drinking water to overcome stress.
- Watch the behaviour of chicks in order to find out whether temperature provided is correct or less or more.
- In case of too much temperature, we can reduce the heat by reducing the power of the bulb or we can raise the heating element.

- In case of too low temperature, we have to supplement more heating source or we can further down the heating element.
- 24 hours lighting programme may be adopted during 0-8 days of age.
- One hour darkness may be provided to train the chicks in case of any power failure.
- Remove the old newspaper after 3 days and destroy it by burning. If necessary, spread another set of newspaper.
- Remove brooder guard after 7 to 10 days depending upon the season.

CHAPTER V

CONCLUSION

The study concluded that most of the farmers are middle aged. Proper biosecurity management should be maintained in the study areas. Government should provide necessary steps to improve the production systems. In the study area, the farmers were not taken any training on the farming method. So government should provide them necessary training on quail production. Quail rearing knowledge such as breeding, feeding, housing, prevention and control of diseases are not satisfactory of the farmers. Therefore, a need-based extension program should be introduced among the farmers giving more focus on building awareness and ability about quail production. Recognizing the innermost potentiality of quail as an alternative to chicken in providing gainful employment, supplementary income and assay valuable sources of meat and egg, quail farming should be encouraged and promoted in Bangladesh. However the major constraints of quail farming throughout the country which brought about many challenges to the researchers, academicians and professional people to adapt the strategies to make quail farming economically and commercially viable in near future in Bangladesh.

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APPENDICES

INTERVIEW SCHEDULE

Department of Dairy and Quail Science
Hajee Mohammad Danesh Science and Technology University,
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Questionnaire (English version) for conducting survey to assay “Present Status, Problems and Prospect of Quail Farming in Bogura and Naogaon District”

Date:.....

1. Farmers information:

Farmer's name.....

Mobile no.....

Father's /Mother's/Husband's name.....

Village.....

Post office.....Union.....

Upazilla.....

2. Age.....years

3. Occupation:

Main occupation.....

Secondary occupation.....

4. Educational qualification:

a. Illiterate

b. Up-to primary

c. Above primary up-to secondary

d. Above secondary

5. Did you take any training before starting quail farming? () Yes / No

If yes then from where.....

a. GO

b. NGO

c. University

d. Others

6. Major income sources:

Secondary income.....

1. From cultivable land.....tk/year
2. From livestock.....tk/year
3. From quail.....tk/year
4. From fishery.....tk/year
5. From service.....tk/year
6. From business.....tk/year
7. From others sources.....tk/year

7. Counseling:

- I. From where do you take your technical support?
- None / NGO/ Technical graduate / Private Expert / Dealer

8. Cost benefit:

Are you benefited? : (Yes / No)

- Capital: Own capital / Loan
- Labor use.....Man/500 birds
- Labor cost.....tk
- Feed cost.....tk
- Litter cost.....tk
- Medicine cost.....tk
- Day Old Chick(DOC) cost.....tk
- Others cost.....tk
- Total salestk

9. Do you have the power supply? (✓)Yes / No

10. Source of land:

1. Homestead
2. Own land under own cultivation
3. Own land give to other /barga

- 4. Land taken from others /barga
- 5. Land taken from others or lease
- 6. Lease

10. Land size of the farm :.....(Decimal)

12. Farm size on basis of no. of birds reared by the farmer (√):

- I. Very small (<500)
- II. Small(501-1000)
- III. Medium(1001-2000)
- IV. Large(2001-above)

13. Information about quail reared in the farm:

| Type of birds | No. of shed | No. of birds / shed | Sources of DOC | Price of DOC (tk/chick) |
|---------------|-------------|---------------------|----------------|-------------------------|
| Quail | | | | |

14. What kind of problems do face in case of collecting quality chick?

.....

.....

.....

15. Information about feed:

What type of feed is generally being used? (√)

- 1. Readymade formulated feed /
- 2. Own mixed feed

Do you follow any feeding standard? (√) [1.Yes / 2.No]

Do you use growth promoter? (√) [1.Yes / 2.No]

Have you any feed mixing machine ? (√) [1.Yes / 2.No]

Do you use unconventional feed? (√) [1.Yes / 2.No]

19. Production:

- How many batches do you rear in a year?.....
- At how many days do you sell your birds ?.....days
- What is the average body weight of the birds?
 - Weight at 1st day.....gm
 - Weight at selling days.....gm
- Total feed intake of the birds.....kg
- Total body weight of the birds.....kg
- Feed Conversion Ratio (FCR):.....

20. Mortality..... %

21. Some management queries:

- a) Rearing system: () 1.Cage, 2.Litter
- b) Ventilation type: () 1.Natural air flow system 2.Mechanical air movement
- c) Brooding system:() 1.spot brooding; 2.whole house brooding; 3.partial house brooding;
- d) Brooding period.....days
- e) Lighting system.....
- f) Numbers of feeder and drinker uses/1000 birds:feeder ,
.....drinker

Please mention some diseases which appear on frequent basis on your farm

.....
.....

From your point of view socio-economic impact of quail farming in our personal life.....

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