

## Chapter I: Introduction

The domestic turkey is a large poultry bird, one of the two species in the genus *Meleagris* and the same as the wild turkey. Turkeys (*Meleagris gallopavo*) are native to the American (North and South America) and Europe continent. They have been considered as traditional thanks giving and Christmas fare since the Pilgrims hunted wild turkeys to decorate their tables on the first Thanks giving Day (J.C. Moreki *et al.*, 2015). Male domestic turkey has referred to as toms, the female are called hens and chicks are referred to as poult.

Demand for poultry products has been increased rapidly in Bangladesh, and impelled by rising levels of income, population and urbanization (Asaduzzaman *et al.*,2017). Domestic turkey is a popular form of poultry. Turkey occupies an important position next to chicken, duck, guinea fowl and quail as the most striking sector (Turkey Management Guide, 2012). It plays an important role in provoking the economic and nutritional status of varied population (Turkey Management Guide, 2012).

Turkey rearing is really very fun and enjoyable and can be a dynamic educational activity and become a source of economical, high quality meat. Turkey production is an important and highly profitable agricultural industry with an evolving global demand for its products (Yakubu *et al.*,2013) and they are adaptable to wide range of climatic conditions (Ogundipe and Dafwang,1980). It is raised throughout temperate parts of the world, partially because industrialized farming has made it very cheap for the amount of meat it produces. It grows faster and become suitable for slaughter within a short time. Turkey farming for meat production is more popular than commercial egg production from turkey because their growth rate is more compared to chicken.

Turkey is a newly introduced poultry species in Bangladesh (Asaduzzaman *et al.*, 2017). It was first brought to Bangladesh as part of an exotic hobby. People are rearing turkey as an ornamental bird with a limited extent without having prior experience. Mainly interested farmers started turkey farming by importing day-old turkey chicks (Poult) from neighboring country, India (Asaduzzaman *et al.*,2017).It was still not so popular in Bangladesh because poultry or chicken market is already established. Many people do not know about the quality of turkey meat. The interest in turkey farming has increased significantly in Bangladesh. It

becomes a ray of hope for poultry farmers, who have been battling losses due to increasing prices of chicken and their feed in recent times. Now, several poultry farmers are taking initiative to set up new turkey farms.

Turkey farming is suitable for small and marginal farmers as it can be easily grown in free range or under semi-intensive system with less investment for shelter, equipment and management as well as less risk of diseases. The expenditure on turkey farming is very low (Turkey farming spreads wings). Farming system is similar to other poultry birds farming like chickens, ducks, quails etc. Turkey farming can easily be started by hatching eggs or by raising young poults. They can be grown and home processed without the use of expensive processing equipment, or they may be sold to live markets or to neighbors. The turkeys eat the same food that is available in the market for chicken. The birds also eat grass and vegetables. As a result, farmers do not have to depend only on the food available in the market. Turkeys are excellent insect foragers. Crops and vegetables that are troubled by a significant insect population can be control by turkeys (Grimes *et al.*,2007). Moreover, the birds can be kept in open areas. Diseases are also rare in turkeys.

It is essential to obtain stock from a known disease-free source. The care and management of turkey flocks depend on age, location, season, facilities, health, and many other factors (J.C. Moreki *et al.*,2015). The estimated chicken meat consumption in Bangladesh is to be about 48100 tons. Turkey meat consumption is more negligible than total annual chicken meat consumption. The interest in turkey rearing has increased significantly in Bangladesh. The district Chittagong occupies an important place in Bangladesh because of availability of all facilities. So, the report was develop to evaluate the existing management system of turkey farming for meat products and the breeding stock used to produce commercial poults and understanding the profitability of the turkey farmers. Continued research is necessary to provide additional information about the needs and preferences of turkeys along with exploring alternative or innovative practices. As new scientifically based economically feasible practices are developed, management should implement these methods into existing systems.

### **The specific objectives of the study**

- To study the farmer's socio economic status of turkey farming in Chittagong
- To identify the better management practices
- To determine the productivity, cost and return aspects of turkey farms.

## Chapter II: Materials and Methods

### 2.1 Description of the study area and duration:

The study was conducted at Chittagong district in Bangladesh. It is located in the south-eastern region of Bangladesh. The places of my study were Chittagong district. Data were collected from the turkey farms in Raozan and katgor. The study was carried out for the periods of 1 month from August 15, 2018 to September 15, 2018 in different areas under Chittagong district.

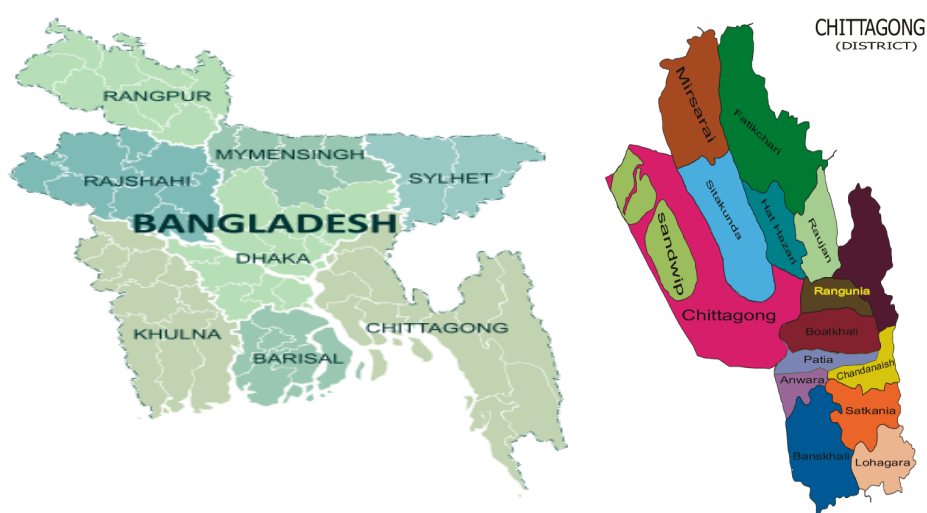


Figure 1: Geographical area of study

### 2.2 Sources of data

Data were obtained from both primary and secondary sources. The primary data used in the study were generated from field survey of the study area which includes turkey farmer's personal information; housing, feeding, breeding, management, disease, marketing, problems and profitability of the turkey farm. The secondary data were obtained through review of literature from official documents, Journals, libraries, research institutes, internet etc.

### 2.3 Methods of data collection

Direct observation, interview and analytical methods were applied during collection of data for the study. Data were collected through direct interview schedule with the aid of structured

questionnaires. The questionnaire was carefully designed keeping in mind the objectives. Before launching the survey, the questionnaire was pretested and improved accordingly.



**Figure 2:** Data collection

## **2.4 Statistical analysis**

Collected data were compiled, tabulated and analyzed and qualitative data were converted into quantitative forms by means of suitable score whenever needed and the local units were converted into standard unit scales.

## **2.5 Common management practices**

### **2.5.1 Poult collection**

Owner of the farm collected poult from other farmers. Price of poult varies from time to time. It would vary from 300 TK (Minimum) to 350 TK (Maximum).

### **2.5.2 Brooding**

Brooding was maintained in farms. Farmer used chick guard around the poults and hoover above the poults. The temperature during brooding period was maintained according to the broiler brooding system.

### **2.5.3 Feeding**

All the farmers provide both commercial broiler layer feed available in the market and vegetables. Farmers maintain the following time schedule to provide feed.

### **2.5.4 Vaccination**

Those farmers who did vaccination was maintained the following schedule.

**Table 1: Vaccination Schedule for turkey**

<b>Name of disease</b>	<b>Name of vaccine</b>	<b>Age of administration</b>
ND	ND – B1 Strain	Day Old
Fowl pox	Fowl Pox	4 <sup>th</sup> & 5 <sup>th</sup> Week
ND	ND – (R2B)	6 <sup>th</sup> Week
Cholera	Cholera Vaccine	8 – 10 Week

## Chapter III: Results

### 3.1 Socio-economic condition of the farmers

Different factors associated with socio-economic condition of the farmers of Chittagong district are listed in table and specific findings of the study also describe below:

**Table 2: Factors associated with socio-economic status of the farmers in Chittagong district**

Variables	Categories	No. of farm/ Farm owner	Percentage (%)
Type of farmer	Small	2	50
	Medium	1	25
	Large	1	25
Occupation	Business	3	75
	Private service	1	25
Sex	Male	4	100
	Female	0	0
Source of investment	Own	4	100
	Loan	0	0
Training	Yes	0	0
	No	4	100
Family Type	Single	3	75
	Joint	1	25
Education	Illiterate	1	25
	SSC	0	0
	Above HSC	4	75
Level of farm management skill	High	1	25
	Medium	3	75
	Poor	0	0

### **3.1.1 Socio-economic status in terms of land**

About 50% small, 25% medium and 25% large farmers were involved in Turkey farming in Chittagong district (Table 2).

### **3.1.2 Occupation of farm owner**

The present study showed that, about 75% farm owner deal with business, and 25% private service .

### **3.1.3 Sex of farm owner**

In present study it was revealed that about 100% farm owner are male.

### **3.1.4 Sources of investment of the farm owner**

The present study showed that 100% farmer invest their own money in farming.

### **3.1.5 Training**

The present study showed that 100% did not take any training at all about farming.

### **3.1.6 Level of farm management skill**

Most of the farmers have 75% medium level of management skill and 25% have high level of farm management skill.

### **3.1.7 Literacy level of the farmers**

Table 1 showed the literacy level of the farmers. There were found 25% illiterate and 75% above HSC.

**Table 3: Educational status of farmer's children**

Particulars	Frequency	Percentage (%)
Class 1-10	2	50%
Above SSC	2	50%
Total	4	100%

### **3.1.8 Sources of drinking water and latrine condition**

In present study it was revealed that about 75% of the farmer uses their own deep tube well and 25% use water from WASA (Table 4).

**Table 4: Sources of drinking water and condition of latrines**

Particulars	No. of farmer	Percentage (%)
<i>Sources of drinking water</i>		
Own deep tube-well	3	75
WASA	1	25
<i>Latrine condition</i>		
Semi-sanitary	0	0
Sanitary	4	100

No farmer use semi-sanitary and 100% use sanitary latrine.

### 3.2 General description of the farm

It was revealed that 25 % farms have less than 50 birds, 50% farm size are 50-100 birds and 25% farm rearing 100 birds. About 50% turkeys are farm borne and remaining 50% turkeys from outside of the farm. During study it was found that farm had 50% Broad breasted white turkey, 25% Broad breasted bronze turkey and 25% Royal palm turkey.

**Table 5: Analysis of different parameters related to farms**

Variables	Categories	No. of farm	Percentage (%) of farms
Farm size	<50	1	25
	50-100	2	50
	> 100	1	25
Source of bird	Farm borne	2	50
	External	2	50
Breed	Broad breasted white	2	50
	Broad breasted bronze	1	25
	Royal palm	1	25
Number of turkey	Tom	105	21
	Hen	390	79



### 3.3 Management practices followed by the owners of turkey

#### 3.3.1 Housing

Housing in turkey farm is an important input and major component of the initial capital investment. The main reason to provide housing for birds is to provide protection from the weather. Housing also provides protection from predators, reduces the spread of pathogens and provides protection from vandalism. Good housing with all types of essential facilities available is very necessary for commercial turkey production. The structures are constructed and designed in consideration of bird welfare and efficiency of production.

**Table 6: Different parameters related to housing**

Variables	Categories	No. of farms	Percentage (%) of farms
Rearing system	Intensive	4	75
	Semi-intensive	1	25
Element of house	Bamboo	2	50
	Tin	1	25
	Brick+Wood	1	25
Type of litter used	Rice husk	2	50
	Saw dust	1	25
	Sand	1	25
Cleaning frequency of floor	Once Daily	2	50
	2 times daily	1	25
	Once weekly	1	25
Cleaning frequency of feeding trough	Once Daily	1	25
	2 times daily	3	75

### 3.3.2 Feeding management

Food resources are also major input in turkey farming. Good and nutritious feed keeps the bird healthy and productive. All the farmers fed their turkeys with commercial feeds and vegetables. The farmers fed their breeder turkeys with different classes of commercial chicken feed. All farmers provide vegetables to their turkeys. Turkey consume vegetables about 75% of total feed.

**Table 7: The types of feed offered to turkeys**

Type of feed	No. of farms	Percentages (%)
Commercial feed	3	75
Commercial+Homemade feed	1	25
Type of commercial feed offered		
Layer rations	3	75
Broiler ration	1	25

**Table 8: Quantity of feed taken by turkey**

Farm No.	Ingredients	Quantity(gm)/bird/day	
		Poult	Adult
Farm 1	Commercial feed	20	80
	Vegetables	30	100
Farm 2	Commercial feed	40	70
	Vegetables	60	120
Farm 3	Commercial feed	25	60
	Vegetables	30	100
Farm 4	Commercial feed	30	80
	Vegetables	60	130

### 3.3.3 Breeding

In natural mating the male; female ratio is 1:5 for turkeys. On an average 40-50 poults is expected from each breeder hen. Toms are rarely used for mating after first year due to reduced fertility. There is a tendency in toms to develop affinity towards a particular female.

All the interviewed farmers followed natural breeding for reproduction of turkey. None of the farmers used artificial insemination (AI) as an assisted reproductive technique for turkey breeding.

### 3.3.4 Health management

Some common diseases of turkeys include Newcastle disease (ND), Fowl cholera, Fowl pox, Mycoplasmosis etc. The study showed that 75% are New Castle disease and 25% are Fowl pox. Most of the time, they treat the infected turkeys by local veterinarian.

**Table 9: Percentage of some common diseases in turkeys**

Diseases	No. of farms	Percentages (%)
Newcastle Disease (ND)	3	75
Fowl pox	1	25

### 3.3.5 Vaccination

Vaccination is not performed routinely by most of the farmers. In the study area, 75% farmers did ND vaccine, only 25% performed Fowl pox.

**Table 10: Distribution of vaccinated and non-vaccinated farms**

Name of Vaccine	Vaccine given or not	
	Yes (%)	No (%)
ND	3(75%)	1(25%)
Fowl pox	1 (25%)	3(75%)

### 3.4 Costs and returns:

The estimated costs and return of turkey farming shows the profitability of the farmers. Here, variable cost, fixed cost (only depreciation cost), total cost, income from selling turkey and cost-benefit ratio were analyzed to calculate the farm profitability. The cost-benefit ratio of the farms are 2.02, 1.87, 1.90 and 1.95 respectively.

**Table 11: Cost-benefit analysis of the farms**

<b>Parameters/Items</b>	<b>Farm 1</b>	<b>Farm 2</b>	<b>Farm 3</b>	<b>Farm 4</b>
<b>1. Variable Cost</b>				
Total Poult cost (Tk)	21000	60000	15750	25600
Feed cost (Tk/kg) on an average	40	35	40	35
Total feed intake (Kg)	1500	6000	925	2400
Total Feed cost (Tk)	60000	210000	37000	84000
Medicine (Tk)	5000	10000	5000	6000
Miscellaneous (Tk)	10000	5000	5000	4000
Total variable cost(TVC)	96000	285000	62750	119600
<b>2. Fixed Cost</b>				
Depreciation cost on housing	25000	30000	5000	15000
Labour		20000		10000
Depreciation cost on equipment	4500	6500	3000	5000
Total fixed cost(TFC)	29500	56500	8000	30000
<b>3. Total cost (TC)= TVC+TFC</b>	125500	341500	70750	149600
<b>4.Total revenue from selling of turkey and egg (TR)</b>	254000	641250	135000	292000
<b>Gross Margin (GM) =TR-TVC</b>	158000	356250	72250	172400
<b>Net Income(NI) = GM- TFC</b>	128500	299750	64250	142400
<b>Profit Margin (%) = NI/TR×100</b>	50.59	46.74	47.60	48.76
<b>Benefit Cost Ratio (BCR) = TR/TC</b>	2.02	1.87	1.90	1.95

## Photo Gallery



**Fig 3.1.** Broad-breasted bronze turkey



**Fig 3.2.** Broad-breasted white turkey



**Fig 3.3.** Royal palm breed of turkey



**Fig 3.4.** Housing for turkey



**Fig 3.5.** Weighing of DOC



**Fig 3.6.** Egg of Turkey

## Chapter IV: Discussions

Turkey farming is a new farming concept in Bangladesh. The present study showed that although most of the farmers were rearing turkey for hatching egg and meat purposes, a large percent of farmers were raising turkey only for ornamental purpose. During farm observation it was found that farm had 50% Broad breasted white turkey, 25% Broad breasted bronze turkey and 25% Royal palm. The existing black and white birds would be the results of crossing between Broad Breasted Bronze, Broad Breasted White and Beltsville small white variety (Asaduzzaman *et al.*, 2017). About 50% turkeys are farm borne and remaining 50% turkeys from outside of the farm. It was revealed that 25 % farms size (Number of turkeys) are < 50, 50% farm size are 50-100 and 25% farm size are > 100.

For proper growth and management of turkey, good housing is a must. Both intensive and semi intensive system are suitable for raising turkey. Turkey housing design has similarity with chicken house. In rearing system, 75% in intensive system and 25% semi-intensive system. As turkeys are big sized poultry bird so cage rearing system is not suitable for them. Most farmers raise them in deep litter system. In this system it has to ensure 3-4 square feet space per bird for sheltering during the night (Turkey farming in india). In the farm about 50% case rice husk use as litter materials, 45% case saw dust, 25% case sand.

Farmers are unable to formulate their own ration and rely on rations originally formulated for chicken, with the acceptance that all feedstuffs used for chicken could also be used for turkey with the same or better results (Etuk, 2005). All farmers provide vegetables to their turkeys. The farmers fed their breeder turkeys with different types of commercial chicken feed probably because of insufficient knowledge of the levels of nutrient requirements of breeder turkeys (Ojewola *et al.*, 2002).

According to Peter (2006), turkeys have a strong aversion to any change in their feeding routine and nature of their feed. Poults up to 10 weeks of age require ration containing approximately 23% crude protein (CP). The CP content of the ration should be gradually reduced to about 15% for mature turkeys. For the breeder hen, diets low in protein (14%) and low in energy (2600 Kcal/Kg ME) is required and also the hatchability of turkey eggs and quality of the poults depends greatly on the quality of feed given to them (Peter, 2006). The average daily feed intakes of poult and adult turkeys are 80g and 230 g respectively. In tropical countries, approximately 23 kg of feed is required to produce a 6.4 kg turkey at 24 weeks of age provided the birds were properly managed (Williamson and Payne, 1978).

Heavy hens at 14 weeks of age, weighing 7.7 kg would usually consume 17.4 kg of feed for feed conversion of 2.35 kg of feed for 1 kg of weight gain. Heavy toms at 16 weeks of age, weighing 12.30 kg would consume 28.85 kg of feed for a feed conversion of 2.29 kg of feed for 1 kg weight gain (Anon, 2005). The implication is that turkeys have specific nutritional needs (ARC, 1975; Maynard *et al.*, 1979; Aduku, 1993), which are somewhat different from that of broilers and growers on which most farmers base their turkey feeding.

In natural mating the male; female ratio is 1:5 for turkeys. On an average 40-50 poults is expected from each breeder hen. All the farmers followed natural breeding for reproduction of turkey. None of the farmers used artificial insemination (AI) as an assisted reproductive technique for turkey breeding.

Brooding of poults occur from one day-old to about 6 weeks of age. Poults are usually placed in brooder rings for the first 5 to 6 days. From 7 days to 5 weeks of age depending on the sex of the bird, they are given from 0.9 to 1.4 m<sup>2</sup> of floor space per bird. During this time, the poult needs supplemental heat, special starter feed, and protection from exposure to disease. The size of the guards is increased as poults get older to give them enough room to move about or to move away from brooder as temperature gets higher than they can tolerate. Poults are kept close to brooder stoves for heat, feed and water for the first 5 to 7 days of age or longer in colder weather. The lower light intensity helps to minimize cannibalism. After 3-7 days, lighting programs that reduce the number of hours of light a day during the growing period.

The most prevalent diseases are New-castle Disease(75%) and Fowl pox(25%). Most of the farmers had not used vaccines as preventive measure. Few farmers used vaccines mainly for New Castle disease and Fowl Pox diseases. 75% farmers did ND vaccine and 15% performed Fowl pox vaccine.

Different parameters like variable cost, fixed cost (only depreciation cost), total cost, income from selling turkey and cost-benefit ratio were analyzed to calculate the farm profitability. The cost-benefit ratio of the farms are 2.03, 1.87, 1.90 and 1.95 respectively. The study revealed that price of adult turkey and poults were higher in Bangladesh in comparison to international market. The main reasons are that turkey subsector is still at the beginning stage in Bangladesh and in some cases turkeys were sold for ornamental purposes while some buyer bought also turkeys for farming as well as consumption purposes. Poults were sold without identifying their sex at the age from day old to 4-5 weeks of age. Some farmers sold adult male-female for breeding purpose and adult male for consumption.

## **Chapter V: Limitations**

The study was conducted to investigate the farm management and profitability of the farm. The area and duration of the study was short. So, further extensive investigation should study on same topic to overcome the limitations of the current study and the real situation might be revealed.



## **Chapter VI : Conclusion**

In fact, turkey farming is a great opportunity for the youth as a means of income generation. Turkey production is still at primitive stage in Bangladesh which is characterized by poor housing, feeding, breeding and healthcare practices as well as inadequate availability of scientific information, technical services, credit facilities, training and marketing opportunities. Smallholder turkey farmers in Chittagong have not fully understood the nutritional requirements and appropriate feeding practices at the different stages of development of turkeys. So, to improve the efficient turkey production, vigorous public extension service, training for farmers, opening of different avenues for research on turkey and identifying marketing strategies, are immediately needed in Bangladesh.

## Chapter VII : References

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## Chapter IX: Biography



Jewel Dey, son of Mintu Dey and Rina Prava Dey at present is an intern doctor under the faculty of Veterinary Medicine in Chittagong Veterinary and Animal Sciences University obtaining session (2012-2013). He passed the Secondary School Certificate examination in 2009 from Chittagong Government High School and completed Higher Secondary Certificate examination in 2011 from Government City College. In future, he wants to be a good Veterinary Surgeon and provides proper services to the society as well as to the nation.