ABSTRACT

Present study was done to know the rearing system, management practice, problems and prospects of turkey farming in different turkey farms of Rangpur Sadar Upazilla. Data were collected from 12 turkey farms by using a preformed questionnaire under Rangpur Sadar Upazilla. The observation was taken of status of farmers, source of technical support, the turkey flock size (according to age variation), feed intake, housing system, feeding system, quantity of feed supplied to each turkey/day, floor space , feeder space, waterer space, turkey marketing age, weight, price of turkey. Among 12 farms only 66% farms maintain a common vaccination schedule, other farms use only new-castle disease vaccine. Most of the turkey farmer rear turkey in small scale semi-intensive system (50%) was generally practiced by the rural farmers. They have very little idea about breed and variety of turkey and prevention of diseases of turkey. But farmer have very little knowledge about turkey management procedure. There is no specific feeding standard for turkey. Farmers used to feed their turkey according to broiler and layer feeding manual. So, research needed to improve the status of turkey.

Key words: Turkey, Vaccine, Semi- intensive rearing system, Feeding standard.

CHAPTER-I

INTRODUCTION

Turkey (*Meleagris Gallopavo*) is a large gallinaceous bird of the family Meleagridae that is native of North America, domesticated in Europe and are now important source of food in many parts of the world. As an agriculture-based developing country like Bangladesh have approximately 304.17 million poultry. The majority of these poultry are indigenous chickens and ducks (DLS, 2016). Diseases and predators are main factor for loss of productive performance in poultry (Nakamura *et al.*,1990) due to higher nutritional demand and lower disease resistance, exotic pure breeds did not perform satisfactory in scavenging system (Haque *et al.*,1999). Therefore, in addition to indigenous poultry, rural and semi-urban people required a suitable species of bird which can be reared easily with little investment and play an important rule to provide more economic return within a very short time. Thus, it is crying need to search the alternative protein source to meet up the increasing demand. In order to maximize food production and meet protein requirements in developing countries, variable options need to be explored and evaluated (Owen *et al.*, 2008).

Turkey occupies an important position next to chicken, duck & production of turkey is also a promising branch of poultry with great potentials like large body size fast growth rate, high fecundity and excellent meat quality which is found to be of higher percentage protein than the carcass of chicken. Turkey production is an important and highly profitable agricultural industry with a rising global demand for its products and they are adaptable to wide range of climatic conditions (Yakubu *et al.*, 2013). Moreover, the turkey has high dressing percentage that could amount to 87% of slaughter weight (Turkey management guide 2012). Turkey bird has a promising potential to be an alternative to livestock in meat production. This may be due to its high rate of carcass yield under intensive system of management (Nixey,1986). Turkey is an

excellent insect forager and most crops that are troubled by insect population including vegetables are candidates for insect control by turkeys. Turkey thrives better under arid conditions, tolerates heat better, ranges farther and has higher quality meat (Yakubu *et al.*,2013). Despite its huge potential over other poultry species, turkey production has not been fully exploited in Bangladesh.

In fact, turkey introduced newly as a poultry species in Bangladesh. Till now most of the farmers are rearing turkey as an ornamental bird with a limited extent. Most of the farmers are rearing turkey without having prior experience. But now the situation changed gradually and many interested farmers started commercial turkey farming. During study period it was found that lots of people very much interested with turkey farming. But there are no proper guidelines available for the upcoming farmer. Considering these facts the present study is designed with following objectives:

- To investigate the present status and production system of turkey farming.
- To identify the problems and prospects of turkey production in Bangladesh.

CHAPTER-II

MATERIALS AND METHODS

Study area

The study was conducted at 12 selected turkey farm under Rangpur Sadar Upazilla, Rangpur. The study area was selected as part of my internship program to complete internship production report.

Climatic condition of the study areas

The climatic conditions of Rangpur Sadar Upazilla are more or less similar to the average condition of Bangladesh. The climate is tropical; mild winter (October to March); hot, humid summer (March to June); humid, warm rainy monsoon (June to October). The day temperature ranges from 7 to 12°C in the cool months, and in the other months, it varies between 23 and 30°C.

Time of study

This study was performed prospectively during internship period from February 2018 to March 2018.

Data collection procedure

Direct observation, farmers interviewed through a structured questionnaire and farm record were applied during collection of data for the study. For primary data information on some parameters like housing, feeding, breeding, management, disease, marketing, problems and prospects were taken from turkey farmers. The sources of secondary data were review of literature from official documents, Journals, libraries, research institutes, internet etc.

Statistical analysis

All the obtained data from Rangpur Sadar Upazilla were organized, structure and analyzed with the help of Microsoft corporation, 2010 windows package. The obtained information was loaded and stored on to the excel spread sheet. Then collected data were analyzed.

CHAPTER-III

RESULTS AND DISCUSSIONS

Study was conducted at selected farm under Rangpur sadar upazila. I visited 12 turkey farms during study period.

Status of the farmers in the study area

Status of farmers involved with turkey farming was studied by using different parameters like education, training on turkey farming, experiences, work forces, family size etc.

Table 1 Status of the farmers in the study area

Parameter	Conditions	No. of respondent	Percentage (%) of respondent
Education	Primary Level	1	8.33
	Secondary Level	4	33.33
	Graduate Level	7	58.33
Training on Turkey	Yes	3	25.00
	No	9	75.00
Experiences	Below 2 years	5	42.00
	2 years or above	7	58.00
Work forces	Owner of the farm	6	50.00
	Owner & family members	4	33.00
	Others	2	16.00
Farm size	Small farm(below 300 birds)	8	66.00
	Medium farm(300-500	3	25.00
	Large farm(above 500 birds)	1	9.00

It is revealed that, the majority (58.33 %) of the respondents was graduate, 33.33 % respondents were having secondary education and the remaining (8.33 %) were having primary education (Table 1). This result indicates that that the maximum farmers handling turkey farms were graduate which is consistent with the previous report of (Asaduzzaman *et al.*, 2017). Among the turkey farmers, only 25 % have the training on turkey farming and the majority of the farmers did not have any training on turkey farming. About 58 % farmer had experience for above 2 years while the rest had below 2 years. Indeed, this is very positive because inexperience farmer can

learn primary knowledge from experienced one. More interestingly, it was reported that 50 % farmers were working alone in their farm without any help from family member while the reverse was the case for the 33 % of the farmers (33 %). This is indicates that turkey farming in Rangpur district is generating employment at farmers and family level. Present study revealed that most of the turkey farm (66 %) was small in size, followed by medium (25 %) and large (9 %) size farms.

Purpose of Turkey rearing in Rangpur sadar

Purpose of turkey rearing in Bangladesh are classified into three categories; ornamental, meat and egg production and both ornamental and meat-egg purpose. In this study, it was found that most of the farmers (66.66%) reared turkey for meat and egg purpose, while 8.33 and 25 % farmers reared ornamental and both purpose, respectively (Table 2).

Table 2 Purpose of Turkey rearing in Rangpur sadar

Purpose	No. of respondent (n=12)	Percentage (%) of respondent (n=12)
Ornamental purpose	1	8.33
Meat & egg purpose	8	66.66
Meat, egg & ornamental purpose	3	25

Available technical support for the turkey farmers Sources in Rangpur sadar

Table 3 shows the different sources of available technical supports that are received by farmers. Majority of farmers received technical support from both DLS and internet (41.66 %). Only 8.33% farmers took technical support from DLS. Around 33.33 and 16.31 % farmers relied on both internet and other farmers and other farmers, respectively.

Table 3 Available technical support for the turkey farmers in Rangpur sadar

Source of receiving technical support	No. of total farm	No. of respondent (n=12)	Percentage (%) of respondent(n=12)
Department of Livestock Services (DLS)	12	1	8.33
Both internet and DLS	12	5	41.66
Internet and other farmers	12	4	33.33
Other farmers	12	2	16.66

Types of housing system used by the farmer in the Rangpur sadar

In Table 4, results on turkey housing showed that 33.33, 50 and 16.66 % farmers were raising turkey in free range, semi-intensive and intensive system, respectively. Almost half of the farmers' choose semi-intensive rearing system of turkey. That is how they maintained both cost effectiveness & better management.

Table 4 Types of housing system used by the farmer in the Rangpur sadar

Housing system	Total no of farm	Followed housing system	Percentage(%)
Free range	12	4	33.33
Semi-intensive	12	6	50.00
Intensive	12	2	16.66

Types of Feed used by the farmer in Rangpur sadar

The study showed that 25.0, 8.33 and 66.66 % farmers used commercial, homemade, and both homemade and commercial feed, respectively for feeding their turkey (Table 5) which is lower than the percentage reported of (Asaduzzaman *et al.*, 2017). None of the interviewed turkey

farmers calculated feed efficiency. Most of the farmers (66.66 %) fed both homemade and commercial broiler and layer feed for feeding turkey. In case of homemade feed, they used a mixture of maize, wheat, broken rice, calcium, soyabean, dryfish and vegetables as well as grass. Most of the farmers supplied concentrate feed in the morning and evening. Supply of ad libitum water was not practiced in all the farms. It was observed that they did not follow nutrient requirement rules for turkey; even most of the farmers did not know it.

Table 5 Types of Feed used by the farmer in Rangpur sadar

Feeding System	Total farm no	System followed	Percentage (%)
Commercial (pellet type)	12	3	25.00
Homemade (mash type)	12	1	8.33
Both	12	8	66.66

Floor space used for turkeys in Rangpur sadar

Table 6 shows that, 1.25 sq. ft/bird floor space was provided to the birds during 0-4 weeks of age. For grower and finishers, 2.5 and 4.0 sq. ft/bird was provided, respectively. Floor space used for turkey breeder was 5.0 sq. ft/bird which support the data stated by (Howlider *et al.*,1999).

Table 6 Floor space used for turkeys in Rangpur sadar

Rearing stage	Age (weeks)	Floor Space (Sq. ft)
Starter	0-4	1.25
Grower	5-16	2.5
Finisher	16-29	4.0
Turkey breeder	16 -48	5.0

Feeder space used for turkeys in Rangpur sadar

Feeder space used by the farmer during early stage (0-4 weeks) of life was on an average 2.5 cms/bird (Table 7). Feeder space used by the grower and finisher was 5.0 cms/bird & 6.5 cms/bird, respectively. Feeder space used for turkey breeder was 5.0 cms/bird which is similar to the data reported by (Nixey .1986).

Table 7 Feeder space used for turkeys in Rangpur sadar

Rearing stage	Age (weeks)	linear feeder space (cms)
Starter	0-4	2.5
Grower	5-16	5.0
Finisher	16-29	6.5
Turkey breeder	16-48	7.5

Waterer space used for turkeys in Rangpur sadar

Result shown at Table 8 that, waterer space used by the farmer during early stage (0-4weks) of life was on an average 1.5 cms/bird. Waterer space used by the grower (5-16 weeks) & finisher (16-29 weeks) was 2.5 cms/bird & 2.5 cms/bird respectively. Waterer space used for turkey breeder was 2.5 cms/bird which is similar to the data reported by (Nixey, 1986).

Table 8 Waterer space used for turkeys in Rangpur sadar

Rearing stage	Age (weeks)	linear waterer space (cms)
Starter	0-4	1.5
Grower	5-16	2.5
Finisher	16-29	2.5
Turkey breeder	16-48	2.5

Types of litter used by farmers in Rangpur region

In the present study area, maximum farmer used rice husk as litter material and changed the litter material in every 20 days. This study showed that among 12 farms, 58 % used saw dust as litter materials while other 42% farmers used rice bran as litter material which is similar to the report (DLS., 2016).

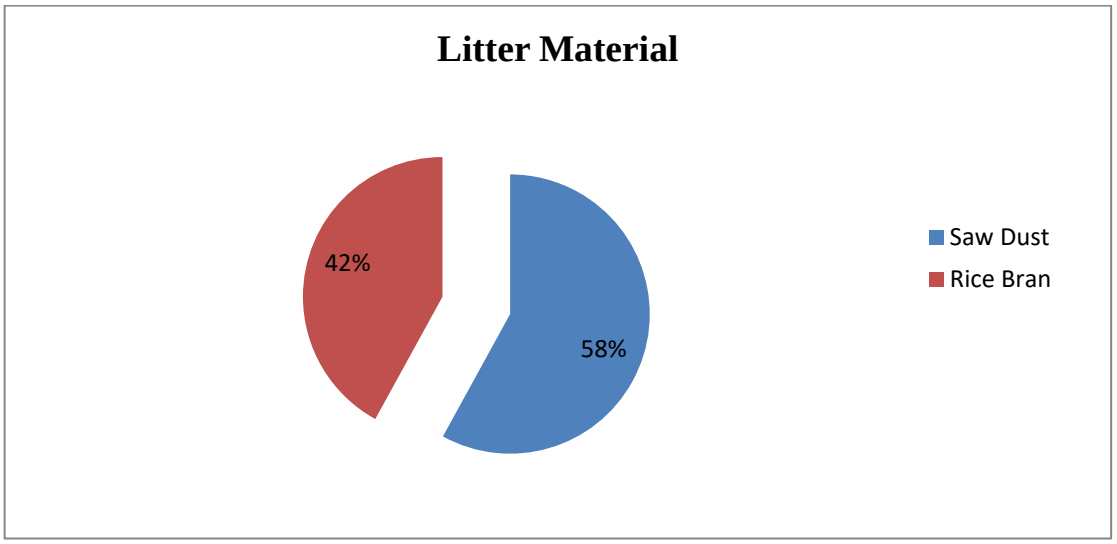

Figure 1: Litter used by farmers in Rangpur region

Disease incidence and medication

Farmers were faced diseases problems with the birds while rearing those at their farming condition. These were assumed to be bacterial, viral, fungal or parasitic infections. The birds were seemed to be affected by the various diseases New Castle disease, Fowl Pox and Fowl Cholera diseases etc. as per the sign and syndromes shown by the birds recorded in the farms. Farmer himself or registered veterinarian gives the treatment of these cases. Treatment is given by the mainly on the clinical signs and symptoms or by post mortem findings. It seems that local turkeys are like indigenous chicken which are hardy and have high level of immunity against disease which is support by the report of (Asaduzzaman *et al.*, 2017) who stated farmers had encountered diseases like New Castle disease, Fowl cholera, Fowl pox, Mycoplasmosis etc.

Problems of turkey farming

Low fertility and hatchability

It has been reported that the hatchability of medium sized turkey eggs is better than that of small or large eggs (Kaygisiz *et al*., 1994). Age of the breeder is important factor which affects egg weight, internal and external quality egg, hatching performance and the quality of poult. It was reported that as hen age increases, the weight of egg increases and both shell quality and internal egg quality decrease (Erensayın, 2000). In addition to low egg yield, unsatisfactory egg fertility and hatchability constitute a major problem for turkey breeding enterprises (Ozcelik *et al*., 2009).

Inadequate access to technical information and support

The farmers did not have adequate access to necessary information regarding turkey rearing and in case of problems they did not get enough technical support from different government and non-government line agencies. This situation is also prevailed in other developing countries. Mbanasor & Saampson. (2004) also reported that there was obvious lack of information on specific requirements for turkey production in Nigeria.

Low marketing facilities

Market of turkey is unlike broiler and layer in Bangladesh. There is absence of well-organized market for turkey and its products. No structured market value chain has been identified yet in Bangladesh. Farmers buy and sell turkey mainly through personal communication, Internet services (bikroy.com, Facebook etc.) and at the market of ornamental birds. Turkey selling problems is also identified in other developing countries as stated by Peters *et al*. (1997) in a study conducted on small holder local turkey production in Ogun State Nigeria, found that sale of turkeys were more during Christmas and festive period than other periods of the year. Although, turkey meat is being sold in department stores in capital city Dhaka, a large numbers of consumers were not habituated of taking turkey meat.

Poor housing

Farmers did not know the scientifically accepted space requirement for rearing turkey. They gave space on the basis of assumption. Moreover, they were not aware of about using of suitable litter materials and their management. Many farmers did not take special care during extreme hot and cold situation which ultimately hampered the production performance of birds. Non availability of manufactured feeds and feeding standard Feeds for turkey are not manufactured by any feed mill in Bangladesh. So farmers fed their turkeys by their homemade feed as well as a mixture of homemade and broiler/layer feed. They did not know the scientific requirement of energy, protein and other nutrients for different categories of turkey. Similar things was happened in Nigeria as reported that turkey production in Nigeria has largely remained at the smallholder level due to high cost of feed, inconsistency in feeding program, as well as lack of knowledge of the adequate levels of nutrient requirement (Ojewola *et al*., 2002). Although turkey is a good forager, some of the farmers did not know this fact so that they could not reduce feeding cost. Farmers did not have expertise to formulate balanced rations for turkey, thereby relying on rations originally formulated for layer and broiler chicken, with the assumption that chicken feed could bring same or better results. In this connection Etuk (2005) reported that lack of knowledge of limitations of feed ingredients used in turkey feeds leads to poor growth. But proper nutrition is a basic prerequisite for successful poultry production (Kekeocha, 1984), to increase resistance to diseases and explore genetic potentiality.

Inadequate capacity building facilities

There is absence of opportunity for capacity building of turkey farmers in terms of receiving training, getting information, participating in workshop and seminar. As most of the concern stakeholders are not aware enough about turkey farming in Bangladesh, farmers are not getting required knowledge and skill. Therefore they are using traditional procedure for rearing turkey. But egg weight, fertility,

hatchability and late embryonic mortality varied greatly between traditional and modern breeding management system (Lariviere et al., 2009).

Prospects of turkey farming

Adapted to the climate of Bangladesh

Turkey is a unique bird which is suitable for rearing in hot humid climatic condition like in Bangladesh. But due to unknown reasons it has not been explored in Bangladesh and other developing countries. In fact, turkeys are adaptable to wide range of climatic conditions and can be raised successfully almost anywhere in the world if they are well fed and protected against diseases and predators. The meat of turkey is considered by many as a luxury meat. Moreover, it has an aesthetic value due to their beauty (Ogundipe and Dafwang, 1980). For this reason turkey is becoming popular gradually in developing countries like in Bangladesh. Anandh et al. (2011) reported that commercial turkey farming is becoming popular in India.

Low disease prevalence

Turkey is more disease resistant in comparison to other poultry species like chicken, duck and quail. Mortality rate of turkey is very low in comparison to other poultry bird. Sampath (2012) reported that turkeys are resistant to Marek's and Infectious bronchitis and commonly encountered with other diseases like mycoplasmosis, fowl cholera, erysipelas and hemorrhagic enteritis. Farmers mostly do vaccination only for New Castle disease and Fowl cholera.

Low feeding cost

In fact, feed cost represents two thirds of the total costs in a poultry production system and consequently it would be valuable to identify animals that eat less but perform at the same level as their contemporaries. Turkeys are good foragers and it could reduce feeding cost. However, other poultry species such as geese and turkey can obtain added nutrients from forage because they are better able to digest fiber due to larger microbial population in their digestive tracts (Brad et al., 2010).

On the other hand, Soliven (1984) reported that according to opinion of farmers of the Philippines, turkey rearing is profitable as long as the poults are properly fed and taken care of, and cost of production is cheap as almost 50% of the feed they eat is green vegetables and field grasses as supplement to commercial feeds.

Higher market demand

At present turkey market is limited to some particular customers as an ornamental bird as well as for meat purposes; and its price is higher than other poultry species. There are a good number of Christian people in Bangladesh who are fond of turkey meat in Christmas day. So there is huge opportunity to expand turkey market in Bangladesh as well as in abroad.

Alternative source of income and protein

While broiler meat market is facing problems of higher diseases and lower taste, turkey meat could be an alternative for consumers. So it could be an effective alternative source of protein. Moreover, this bird is quite suitable for uplifting livelihoods of small and marginal farmers as it can be easily reared in free range and under both intensive and semi-intensive system with little investment for housing, equipment and management. It may create good opportunity for unemployed youths to start farming and earn income. Turkey bird has a promising potential to be an alternative to livestock in meat production (Nixey, 1986). In the context of competitive feeding and management cost different countries searched such alternative source for protein. Okoruwa et al. (2006) reported that with the continued rise in the cost of production of cattle, sheep and goat, which are the primary sources of animal protein in Nigeria, it has become very necessary to explore efficient and less common but potential sources of animal protein for economic viability. Male and female British United Turkey reached, at 16 weeks of age, 14.60 kg and 10.25 kg, respectively (BUT, 2005). Moreover, the turkey has high dressing percentage that could amount to 87% of slaughter weight (Turkey management guide, 2012).

Availability of educated farmers

Most of the surveyed farmers are comparatively educated and they were self-starter. So there is huge possibility to develop turkey entrepreneurs in Bangladesh. They will be able to receive technical knowhow on selection, brooding, breeding, feeding, housing etc. on turkey rearing easily.

CHAPTER-IV

RECOMMENDATIONS

Turkey farming should be encouraged as it is a valuable asset due to its numerous contributions to rural livelihood. There are some points to be emphasized which are given below:

1. Increasing veterinary services and facilities particularly in the remote areas.
2. Vaccines should be available to all the parts of the country with a reasonable price.
3. Animal husbandry and health extension service units should be strengthened to train chicken farmers to increase the level of awareness and benefits from turkey birds.
4. Productivity can be increased by means of breed upgradation.
5. People should be aware of proper vaccination, de-worming, regular disinfection of poultry house and surrounding as well as and veterinary care.
6. Free vaccination campaign should be carried out throughout remote corner of the rural areas.
7. Ensuring training on disease control, housing, equipment, feeding, genetic improvement and marketing, availing feed availability, credit facility and good parent stock by the government and non-government organizations.
8. For diseases control strategy both government and private organization should work together.

CHAPTER-V

CONCLUSION

There is considerable scope for turkey rearing in Bangladesh, as turkey can be reared in free range or semi intensive systems especially in rural areas for economic enhancement of landless laborers, marginal and small farmers. Free-range turkey rearing method requires low investment in facilities and equipments and it is a viable and sustainable bird both for backyard and commercial venture in economic point of view. Turkeys are suitable birds for tropical climate of Indian sub-continent. So, to improve the 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-VI

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CHAPTER-VII

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The author,

September, 2018

CHAPTER-VIII

BIOGRAPHY

Md.Rahabul Islam, Son of Md.Shafiqul Islam and Rojina Aktar. I passed Secondary School Certificate (SSC) examination from Collectorate School and College, Rangpur, Dinajpur in 2009 and then Higher Secondary Certificate (HSC) examination from Rangpur Government College, Rangpur, Dinajpur in 2011. I enrolled my internship program for Doctors of Veterinary Medicine (DVM) Degree in Chittagong Veterinary and Animal Sciences University (CVASU), Bangladesh. I have immense interest to work on enrichment of veterinary profession in Bangladesh.