Case Report

Feeding and Management System of Turkey in the Sylhet Region, Bangladesh

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Abstract | The present study was done to know the feeding system, management practice, problems and prospects of turkey farming in different turkey farms of Sylhet district of Bangladesh. Data were collected from 6 turkey farms under the Sylhet region. 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 uses in turkey marketing age, weight, price of turkey. Among 6 farms only 66% of farms maintain a common vaccination schedule, other farms use only new-castle disease vaccine. Most of the turkey farmers 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 farmers 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.

Introduction

Turkey is a newly introduced poultry species in Bangladesh. Main advantages of turkey rearing over other poultry species include lower incidence of the diseases, high market price, lower feeding cost, and low mortality according to 41.3,28.3,17.4 and 13.1% farmers (Asaduzzaman et al., 2017). From the last decade, demand for poultry products has been increased rapidly in Bangladesh and propelled by rising levels of income, population, and urbanization. Experience shows that the climate of Bangladesh is suitable to rear different poultry species. Poultry meat alone contributes 37% of the total meat production in Bangladesh (Begum et al., 2011). Poultry transforms feed into animal protein very rapidly. Turkey meat may be one of the best options for alternative protein source in Bangladesh. Turkey production is an important and highly profitable agricultural industry with rising global demand for its products (Yakubu et al., 2013). Karki (2005) stated that consumption of turkeys and broilers as white meat was rising worldwide and a similar trend also existed in developing countries. In the whole world, the total production of turkey meat was 5.6 million tons in 2012, which was higher than 5.1 million ton in 2003, a decade earlier (FAOSTAT, 2012). Turkey is an excellent insect forager and most crops that are troubled by insect population including vegetables are candidates for insect control by turkeys (Grimes et al., 2007). Turkey thrives better under

arid conditions, tolerates heat better, ranges farther and has higher quality meat (Yakubu et al., 2013). But turkey production has not been fully exploited in Bangladesh including other developing countries despite its huge potential over other poultry species.

Turkey (*Meleagris Gallopavo*) is a large gallinaceous bird of the family *Meleagridae* that is native of North America, domesticated in Europe and are now an important source of food in many parts of the world. Columbus took specimens to Spain in 1948. Reports on turkey were there in Germany in 1530 and in England by 1541. Turkey is synonymous with Christmas. Nowadays it is very popular in the United States of America, Canada, Germany, Italy, France, Netherlands, and the United Kingdom.

Objectives
- To know the feeding system of Turkey in Sylhet region
- To know the management system of turkey in the Sylhet region.

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 a 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. Asaduzzaman et al., 2017 reported that disease frequency and mortality is low in Turkey. For this reason's turkey is becoming popular gradually in developing countries like in Bangladesh. Anandh et al., 2012 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. The 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).

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 a huge opportunity to expand the turkey market in Bangladesh as well as in abroad.

An 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 a good opportunity for unemployed youths to start farming and earn income. 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 a high dressing percentage that could amount to 87% of slaughter weight (Turkey management guide, 2012).

In fact, turkey is a newly introduced poultry species in Bangladesh. Farmers 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 a neighboring country, India. Its popularity is increasing gradually because of the

gamey flavor of the meat with lower fat content. So, it may have a high potential for production and marketing in Bangladesh.

Materials and Methods

Study areas
The study area included Dakshin Surma, Biswanath, Golapgonj, and Tilagar under the Sylhet District of Bangladesh. These areas are suitable for turkey rearing. We visited six farms during our study period.

Sample size

Name of areas	No. of the farmers house	No. of birds
Baluchor, Sylhet	1	64
Biswanath, Sylhet	1	12
Dhaka Dakkin, Golapganj, Sylhet	1	25
Silghat, Golapganj, Sylhet	1	34
South Shurma, Sylhet	1	75
Alurtol Tilagarh	1	100

Time of data collection
The data were collected during the period from 1 October 2018 to 5 February 2019.

Questionnaire

Sl. No:	Date:
Name of the Farmer:	Occupation:
Address:	Mobile no:
Farm size:	Breed:
Age:	Month
No. of Tom:	No. of Hen:
No. of poult:	Materials use:
Types of housing:	Management Practices:
Feed supply:	Health status:
Name of Disease:	Vaccine:
Marketing System:	Income:
Investment:	Feed cost:
Housing cost:	Others cost:
Profit (average):	

Data collection procedure
For successfully acquisition of the study, the farmers were selected randomly, and data were collected through direct field observation and face to face interview with the pre-tested questionnaire. A direct questionnaire was composed of the number of turkeys in the farm, rearing system, breeding system, feeding system, housing system of turkey, utensils used as feed ingredients, brooding pattern, poult rearing system and information regarding the marketing system of turkey eggs and meat, cost and annual income from turkey, were recorded effectively as possible. Moreover, information about diseases and vaccination was also recorded.

Data analysis
The data were evaluated in total and mean form.

Results and Discussion

Numbers of turkey farm
In Sylhet, the turkey rearing farms are very few. Most of them started their farm with one or two pairs of turkey. But now they have many turkeys.

Table 01: *Turkey rearing Farm.*

Farms	Name of Farmer	Number of turkeys
F1	Sfafiq Ahmed	64
F2	SumonMiah	12
F3	Jakir khan	30
F4	RuhelHasan	34
F5	Nurul Islam	75
F6	Olid Ahmed	150
Total		365
Mean		60.83

The number of turkeys in different category
Most of them farmer prefers to sell their turkey eggs in the local market and that's why the number of poults is few. They also sell Tom and Hen in the local market.

Table 2: *Turkey in the different category.*

Farms	Number of Tom	Number of Hen	Number of Poult
F1	12	48	4
F2	3	7	2
F3	8	7	15
F4	4	18	12
F5	10	35	30
F6	35	55	60
Total	72	170	123
Mean	12	28	20.5

Litter materials of Turkey
Most of the farmer does not use litter for their turkey. They rear their turkey on ground. Very few farmers

Table 3: *Amount of feed supply per day.*

Farms	Types of Turkey	Feed Ingredients	Amount of feed
F1	Tom and Hen	Rice Grain, Barn, Nourish Layer grower, Grasses, Water	6 kg, 1 kg, 2kg, Through scavenging, Available
	Poult	Broiler starter, Water	0.5 kg, Available
F2	Tom and Hen	Rice polish, Rice Bran, Pellet, Grasses, Water	200 g, 200g, 250g, Through scavenging, Available
	Poult	Rice polish, Rice Bran, Pellet, Water	50g, 50g, 50g, Available
F3	Tom and Hen	Rice polish, Soyabean meal, Maize, Oyester shell, Grasses, Water hyacinth, Water	1kg, 150g, 1kg, 20g, Through scavenging, Available, Available
	Poult	Nourish broiler Finisher, Water	1 kg, Available
F4	Tom and Hen	Rice, Rice polish, Pellet feed, Grasses, Water	1kg, 1.5kg, 2 kg, Through scavenging, Available
	Poult	Rice polish, Pellet, Water	0.5 kg, 800g, Available
F5	Tom and Hen	Rice polish, Rice Bran, Pellet feed, Grasses, Water	4 kg, 4 kg, 2.5 kg, Through scavenging. Available
	Poult	Rice polish, Rice Bran, Pellet, Water	0.5kg, 0.5 kg, 250g, Available
F6	Tom and Hen	Wheat, Maize, Nourish layer feed, Ca, Soybean meal, Dry fish, Grasses, Cabbage, Water	5.6 kg, 5.6 kg, 2.4 kg, 0.8 kg, 0.8 kg, 0.8 kg, 30 kg, 2kg (when available), Available
	Poult	Broiler starter, A mixture of feed grain, Water	1.5 kg, 1 kg, Available

use litter materials. They use sawdust, soil, rice husk as litter materials. 50% farmer does not use any litter material. 17% farmer use soil, 16% farmer use rice husk, 17% farmer use sawdust for litter material. They change the litter in every 15-20 days.

Amount of feed supplied to rearing Turkey
See in Table 3.

Number of times serves feed for Turkey
67% of farmers serve the feed three times and 33% farmer serve two times in a day.

Table 4: *No. of times serves feed.*

Farms	Times of feeding		
	8 am	12 pm	4 pm
F1	1	1	1
F2	1	-	1
F3	1	-	1
F4	1	-	1
F5	1	-	1
F6	1	1	1

Most of the farmer rear turkey on ground. Very few farmers use sawdust, soil, rice husk as litter materials. 50% of the respondent farmer does not use any litter materials. 17% farmer use soil,16%farmer use saw

dust as litter materials that were changed in every 15-20 days.

Table 5: *Litter materials of turkey.*

Farms	Litter Materials
F1	No
F2	Soil
F3	No
F4	No
F5	Rice Husk
F6	Saw dust

Feed ingredients for turkey
33.33% of farmers use commercial feed, 16.67% farmer use homemade and 50% farmer use both commercial and homemade feed for their turkey.

Vaccination
67% of the farmers vaccinate their turkey regularly and 33% of the farmers vaccinate irregularly. They mostly collect ND vaccine from Upazila Veterinary Hospital. Some farmer also uses Fowl Pox vaccine for their turkey. They use BCRDV at 3-7days and a booster dose at 21 days as the eye drop, RDV at 1.5-3 month of age and booster dose after 6 months of age as intramuscularly.

Egg production

The egg production of turkey is usually between 80-100 eggs per year. But the average production is 90 per year. In my study, the production is beyond their standard production. This may be due to inadequate feed and management system, stocking density, lack of scientific knowledge, diseases, improper treatment, ignorance of vaccination, etc. In F1, 35 hens give 3045 eggs and average. egg production is 87% roundly for each hen. In F2, 6 hens give 490 eggs and average. egg production is 82 per year roundly for each hen. In F3, average. egg production is 72% which is lower than F2. It's may due to the age of flock or improper management. The lowest % of egg production in F5 than the others. It's may due to improper feeding and management.

Table 6: *Egg production.*

Farms	No. of laying hen (Number)	Annual egg production (Number)	% of egg production
F1	35	3045	87%
F2	6	490	82%
F3	5	360	72%
F4	12	815	68%
F5	25	1625	65%
F6	40	2800	70%
Total	123	9135	74.26%
Mean	20.5	1522.5	74%

Marketing

The meat of turkey has nutritional and sensorial properties which make it an almost ideal raw material for rational and curative nutrition. The turkey can produce 30gm of digestible protein from the 100gm feed. The dressing percentage of turkey is 80-87%, which is highest of all farm species.

- The body weight of tom and hen turkey at the 16th week is 7.26 kg and 5.53kg. This is the optimum weight for marketing the turkeys.
- The cumulative feed efficiency at the marketing should be 1:2.8 for toms and 1:2.7 for hens.

In our study area, we found that the farmer used to TAKA 300-350 for selling four egg. The poult price may vary but commonly TAKA 140-150 (15 days) and TAKA 700-800 (2 months) for per young. Price of adult one varies with weight. 8 kg bird regards at 5000-5500 TAKA.

Economics and outline for F6 are given below
Materials required: *Necessary capital *150 turkey *Turkey house *Available feed; *Feeder and waterer *Therapeutic and preventive facilities

1. Input
A. Capital expenditure
- Land for house ……. = Personal
- Turkey house construction of 250 sq. ft for 150 turkeys… TK 10000
- Feeder, waterer and laying nest boxes…..TK 2000

B. Recurring expenditure
- Poult cost …… TK 5000
- Feed cost for 150 turkey for one year @ 110g/ turkey
- daily require (110×150×365) = 5874 kg @ TK 20/ kg …. TK 117400
- Labor cost for one year @ TK. 1500/- per month ×12 ……. TK 18000
- Veterinary expenses and drugs and vaccine cost …….TK 1500

* Sub-total of recurring expenditure …….TK 141900
*Grand total for expenditure ………….TK 153900

2. Income
- Sale of eggs- 2800 per year from 55 hen @85 per egg
- (85×2800) …… TK 238000
- Sale of 105 poults @ taka 150 per poult …. TK 15750
- Sale of adult 12 turkey @ 5500 per turkey …… TK 66000
- * Total income …...TK 319750
- * Net profit for first year = (income – expenditure) = TK 319750- TK 153900= TK 165850/-

Summary

Problems of turkey farming

Low fertility, hatchability and use of turkey reproduction technology: From the present study, it was found that none of the farmers used AI technique and even they had not heard about it earlier regarding turkey breeding. In fact, the adult body weight of tom has been increased over time due to advance researches and become too large to achieve natural fertilization. Anthony, 2001 reported that modern White Turkey was developed for rapid growth rate through a selection process, which makes it so different from their wild ancestors that they are

Table 7: *Selling number of eggs, poult and adult turkey with price.*

Farm	No. of selling eggs/year	No. of egg consumed / year	No. of selling Poult / year	No. of selling adult turkey / year	TAKA earns from egg / year (85tk/egg)	TAKA earns from selling poult /year (150tk/poult)	TAKA earns from selling adult turkey /year (5500 to/ turkey)	Total TAKA earns from farm/ year
F1	2500	545	60	5	(2500+545) × 85=258825	60×150=9000	5×5500=27500	295325
F2	350	140	25	-	(350+140)×85=41650	25×150=3750	-	45400
F3	200	160	50	2	(200+160)×85=30600	50×150=7500	2×5500=11000	49100
F4	600	215	30	3	(600+215)×85=69275	30×150=4500	3×5500=16500	90275
F5	1200	425	40	8	(1200+425)×85=138125	40×150=6000	8×5500=44000	188125
F6	2200	600	105	12	(2200+600)×85=238000	105×150=15750	12×5500=66000	319750
Total	7050	2085	310	30	776475	46500	165000	987975
Mean	1175	347.5	51.67	5	129412.5	7750	27500	164662.5

unable to mate naturally because of their heavyweight and AI has become necessary. Age of the breeder is an important to factor which affects egg weight, internal and external quality egg, hatching performance and the quality of poult. Anandh et al., 2012 reported that egg hatchability rate is overall 52.85%. 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 also prevails in other developing countries. Mbanasor and Saampson, 2004 also reported that there was an obvious lack of information on specific requirements for turkey production in Nigeria.

Low marketing facilities
The market of turkey is unlike broiler and layer in Bangladesh. There is an absence of a well-organized market for turkey and its products. No structured market value chain has been identifiesd 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. Although turkey meat is being sold in department stores in capital city Dhaka, many 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 based on assumption. Moreover, they were not aware of using suitable litter materials and their management. Many farmers did not take special care during an extreme hot and cold situation which ultimately hampered the production performance of birds.

Nonavailability 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 home-made 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 happened in Nigeria as reported that turkey production in Nigeria has largely remained at the smallholder level due to the high cost of feed, inconsistency in the feeding program, as well as lack of knowledge of the adequate levels of the 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 the 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 (2007) reported that lack of knowledge of limitations of feed ingredients used in turkey feeds leads to poor growth.

Inadequate capacity building facilities
Stakeholders are not aware enough about turkey farming in Bangladesh, farmers are not getting

the required knowledge and skill. Therefore, they are using the 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).

Conclusions and Recommendations

There is considerable scope for turkey rearing in Sylhet region, 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 equipment's, and it is a viable and sustainable bird both for the backyard and commercial venture in an economic point of view. Turkeys are suitable birds for the 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.

Acknowledgments

Author's Contributions

It is clearly stated that all author has contributed significantly to the study.

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