



Current Status of Turkey (*Meleagris Gallapavo*) Production and Management in Chitwan, Nepal

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Abstract

Turkey farming; being a new farming enterprise in Chitwan, is going through its juvenile stage of development. This study was aimed at assessing current status of turkey production in Chitwan. Thirty-seven turkey farmers were identified in the study area. The data were collected from June 2018 to July 2018 through personal interview with the household leaders with semi-structured questionnaires. The result showed that the ownership of turkey farm under the study area was dominated by males (66.67%). Majority (67.6%) of the households were adopting turkey farming as their passion followed by 24.3% commercial households. Out of the surveyed households average flock size of turkey was reported as 57.05 ± 25.74 in which majority (91.89%) of farmers have flock size up to 100 birds. Information on breeding method implies that majority of farmers are solely dependent on natural breeding method than artificial insemination (AI). Age of first puberty of tom and hen was 198.95 ± 7.3 and 200 ± 3.1 days, respectively. Similarly, average weight of the tom and hen at puberty was 7.6 ± 0.67 and 5.3 ± 0.36 kg, respectively. The hatchability of egg ranged between 10-90% with an average of $52.4 \pm 6.9\%$. Lower hatchability of turkey eggs in this study was reported due to use of common incubator for both chicken and turkey eggs at a time. Plumage color was major selection criteria for 78.4% turkey rearing households while selecting breeding stock. Results on turkey housing showed that majority (83.8%) of the farmers reared turkey in semi-intensive system followed by intensive system (16.2%). Feeding of turkey was dominated by commercial feed used by majority (70.3%) of farmers. Findings revealed comparatively low prevalence of turkey disease in study area as compared to other commercial chicken. Majority of farmers mentioned that the main advantage of rearing turkey over other poultry species was low disease, low mortality and high economic value. The result indicates that turkey production is still at infantile stage characterized by poor breeding, feeding, housing and marketing. So, vigorous public extension service, training, research and marketing strategies are immediately needed to improve this sector in Chitwan. It also calls for strengthening public extension services to enhance production, productivity and profitability of turkey production in the study area.

Keywords: Turkey; Breeding; Hatchability, Housing; Marketing

Introduction

Nepal agriculture is characterized by typical crop-livestock mixed farming system. About two third of the population of the country is being engaged in agriculture sector. According to the central Bureau of Statistics (2017), agriculture sector alone, contributes more than one third (27.04%) to total national Gross Domestic Product (GDP). The agriculture sector is pivotal to increase income, alleviate poverty and uplift the living standard of the Nepalese people. Livestock farming is an important agricultural sub-sector in Nepal. Livestock covers approximately about 31 per cent of Agricultural Gross Domestic Product (AGDP) and about 11.5 percent of total country GDP.

Livestock, including poultry is an integral part of the agricultural part of the agricultural production system in Nepal. Poultry keeping is a popular farming activity of rural household that provides family income for the small, marginal and landless poor. Poultry sector alone shares about 4 per cent to the total GDP of the country. The common poultry species reared in Nepal are chicken, pigeon, geese, turkey, and ostrich [1], contributing to the available meat supplies. Turkey farming, although not a popular farming business in Nepal but due to urbanization turkey products are going popular in Nepal because of its new taste. The potential of local turkeys cannot be overlooked considering the huge foreign

exchange implication of the importation of improved exotic stock [2]. Turkey rearing is very popular in many parts of the world especially Europe and America. They can be raised successfully almost anywhere in the world if they are well fed and protected against diseases, predators, and adverse weather conditions [3]. Internationally, about 4.7 million metric tons (mt) of turkey meat were produced in 1997 of which the U.S.A produced 2.3 million metric tons (FAO, 1999). Turkeys grow faster than broiler chickens and have a slaughter weight that is about double that of the broiler chicken at the age of twelve (12) weeks [4]. Turkey production is an important and highly profitable agricultural industry with a rising global demand for its products [5], and they are adaptable to wide range of climatic conditions [3]. Turkey thrives better under arid conditions, tolerates heat better, ranges farther and has higher quality meat [5]. Turkey farm and farmers supply turkey meat to local markets, restaurants and hotels. In order to maximize food production and meet protein requirements in developing countries, variable options need to be explored and evaluated. Karki [6] stated that consumption of turkeys and broilers as white meat was rising worldwide, and a similar trend also existed in developing countries. Smith [7] reported that carcasses of turkeys contain a higher percentage of protein than the carcasses of chickens. Turkey meat may be a one of the best options for alternative protein source in Nepal and can be a better source to improve the economic and nutritional status of Nepal with little investment for housing, equipment and management.

In fact, turkey is a newly introduced poultry species in Chitwan. Farmers are rearing turkey as passion with a limited extent without having prior experience. Mainly interested farmers started turkey farming by buying day-old turkey chicks from near farms. Since the popularity of turkey farming is increasing gradually because of gamey flavor of meat with lower fat content, it may have high potential for production and marketing in Nepal. But turkey production has not been fully exploited in Nepal including other developing countries despite its huge potential over other poultry species. Most of the households in Chitwan are adopting turkey farming as their passion rather than commercial purpose. There is need for both genetic improvement and better management practices to enhance the performance of turkey. However, effective breeding strategies and management practices to achieve improvement in turkey production cannot be achieved without basic information on flock structure and current rearing practices. Information on feeding, housing, breeding and marketing management of turkey among turkey farmers is limited. There is scanty research being

carried out in Chitwan regarding production and management of turkey species. Therefore, the main objective of our study is to obtain the information regarding demography of turkey farmers, production system including feeding, housing, breeding, production management and their level of knowledge about turkey production and management.

Materials and Methods

Duration and Site of Study

The study was conducted from June 2018 to July 2018 in different Clusters including Tandi, Parsa, chainpur, kholesimal, Jutpani, kailashnagar, Phoolbari, Shivaghat, Rampur, Mangalpur, chanauli, covering east, mid and west Chitwan.

Tools and Checklists used in the Study

Semi-structured questionnaire for household survey to collect information from turkey farmers. Checklist prepared for key informants' interview (KII) to triangulate and validate the information on Turkey production and management collected during household survey.

Data collection and analysis

Primary data regarding to demographic information, production system including feeding, housing, breeding, production management and their level of knowledge about turkey production and management were collected by personal interview with the Turkey farm owner using the questionnaire. In addition, key informants' interviews were performed to triangulate and validate the data collected.

Results and Discussions

Demographic information about turkey farmers

The result of present study reflected that majority (81.1%) of turkey farmers were from Bharatpur Metropolitan city followed by Kalika (8.1%), Rapti (8.1%) and Khaireni Municipality (2.7%). The average age of the respondent farmers was 44.72 ± 2.23 years ranging from 21 - 77 years. Similarly, respondents of present study were dominated by Hinduism (86.11%) followed by Buddhism (13.89%). Results of this study also revealed that the ownership of turkey farm under the study area was dominated by males (66.67%). Similarly, turkey farming was mostly popular among the farmers having secondary level education (48.6%) followed by college level (21.6%) and primary level (18.9%) whereas about 11% illiterate farmers were also engaging in turkey production in

the research area (Figure 1). The study revealed that average duration of turkey farming of the respondents was 17.05 ± 3.19 months. Farming was found to be primary occupation among 66.67% of turkey farmers followed by Business (22.22%). Purpose of turkey rearing Turkey rearing is a new farming activity in Chitwan. The study showed that the principal reason for going into turkey production was passion (67.6%). Only 24.3% of farmers were raising turkey for generation of income.

General information of Respondent

		Percentage
Address	Bharatpur Metropolitan City	81.1%
	Kalika Municipality	8.1%
	Rapti Municipality	8.1%
	Khaireni Municipality	2.7%
Age	20-50 years	75%
	51-77 years	25%
Religion	Hinduism	86.11%
	Buddhism	13.89%
Gender	Male	66.67%
	Female	33.33%
Education	Illiterate	10.8%
	Primary	18.9%
	Secondary	48.6%
	College	21.6%
Marital Status	Married	91.66%
	Unmarried	8.33%
Primary occupation	Farming	66.67%
	Business	22.22%
	Salary earners	11.11%
Rearing Purpose	Business	24.3%
	Livelihood	8.1%
	Passion	67.6%
Experience	Up to 2 years	81.1%
	> 2 years	18.91%

Table

Breeding Management

Flock structure

The results obtained from the study on flock structure are presented in Table 1. The flock structure ranged between (5 - 650)

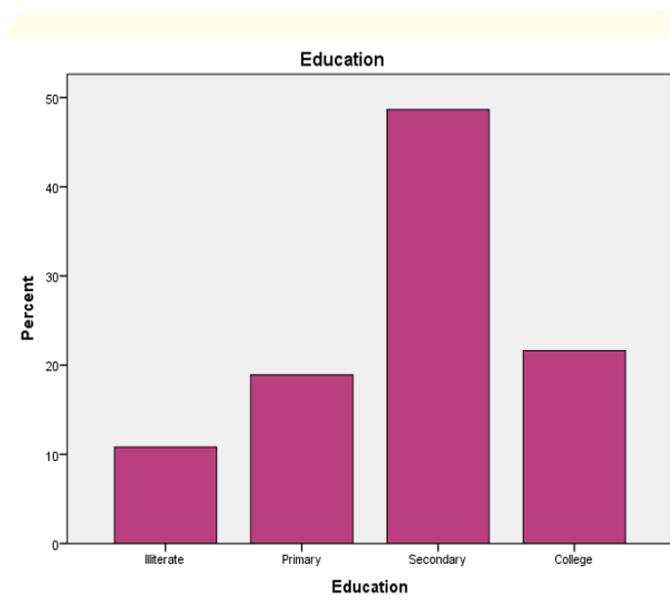


Figure 1: Education level of interviewed turkey farmers of Chitwan.

birds. Majority (91.89%) of farmers have flock size up to 100 birds and only 8.1% of farmers have flock size greater than 100. The average flock size of turkey was 57.05 ± 25.74 where number of male (Tom) and female turkey (hen) ownership were 18.06 ± 7.48 and 41.76 ± 20.83 , respectively.

Breeding methods

Among all the interviewed farmers, majority (45%) of farmers are solely dependent on natural breeding method than artificial insemination (AI) for reproduction of turkey. Only few (5%) of the farmers used artificial insemination (AI) as an assisted reproductive technique for breeding purpose whereas 50% turkey farmers had recently started farming and turkeys hadn't reach mating stage. All of the farmers were depended on personally bred toms for breeding purpose. For AI purpose semen were collected from farmer's own tom and AI was performed by farmers themselves in their own farm with little guidance from technicians.

Purchase stage and awareness

The study showed that majority (48.6%) of farmers had starting turkey farming with poult of few weeks followed by day old poult by 40.5% of farmers. Information on exotic breed showed that majority (97.3%) of the farmers were unaware of exotic breeds. Only few (2.7%) of farmers were aware of exotic breeds.

Productive and reproductive performance

Productive and reproductive performances of turkey are presented in Table 2. The study showed that both tom and hen attained puberty at the same age and it was 198.95 ± 7.3 days for male and 200 ± 3.1 days for female. Mounting was found to be predominant sign of puberty in male. In addition to that, dancing, spreading feathers and black hair on chest were other behavioral characteristics shown by tom on the onset of puberty. In case of female the sign of puberty was standing still and sitting on ground. The study showed that female turkey (hen) start to lay egg from 180 days with average age of first lay 210 ± 3.08 days. A hen laid on an average 48.17 ± 6.78 eggs in one laying season. Average egg lay duration was 124.29 ± 7.83 days. Sitting on ground was found to be sign of broodiness shown by majority (77.78%) of hen after laying 10-20 eggs. Weight at day 1 ranged from 30 gram to 56 gm with average of 44 ± 5.71 gram. Average weight of the tom and hen at puberty was found 7.6 ± 0.67 and 5.3 ± 0.36 kg, respectively. Most of farmers start marketing of turkey from 8 months to 12 months and average age of marketing was 10.24 ± 0.3 months. The hatchability of egg ranged between 10-90% with an average of $52.4 \pm 6.9\%$. Lower hatchability of turkey eggs in this study was reported due to use of common incubator for both chicken and turkey eggs at a time.

Turkey plumage and selection criteria

The predominant plumage color in study area was black followed by white. Plumage color was major basis for selecting breeding stock used by majority (78.4%) of farmers followed by hatchling size and body weight used by 16.2% and 5.4% of farmers, respectively.

Housing management, Feeding and marketing

The results on management practices, marketing and consumption of turkey eggs are presented in Table 3. Results on turkey housing showed that majority (83.8%) of the farmers reared turkey in semi-intensive system followed by intensive system (16.2%). It was found that 90% of turkey farms have facility of ventilation and separate watering facility with 64.9% farmers doing regular cleaning of farm. Knowledge of biosecurity is lacking among most of the farmers. Only 13.5% farmers have idea of biosecurity.

Feeding of turkey was dominated by commercial feed used by majority (70.3%) of farmers followed by locally available food waste and grain and homemade formulation used by 16.2% and 13.5% farmers, respectively (Figure 2). The sale of turkey is done

throughout the year while slightly more sale is done during festive season like Dashain, Tihar etc. Information on marketing on study area showed that most of sale (75%) is done to local butchers followed by Hotels (18.8%) and local farmers (6.3%). Consumption of turkey egg is done by 89.5% of farmers where prime reason for consumption is due to its taste.

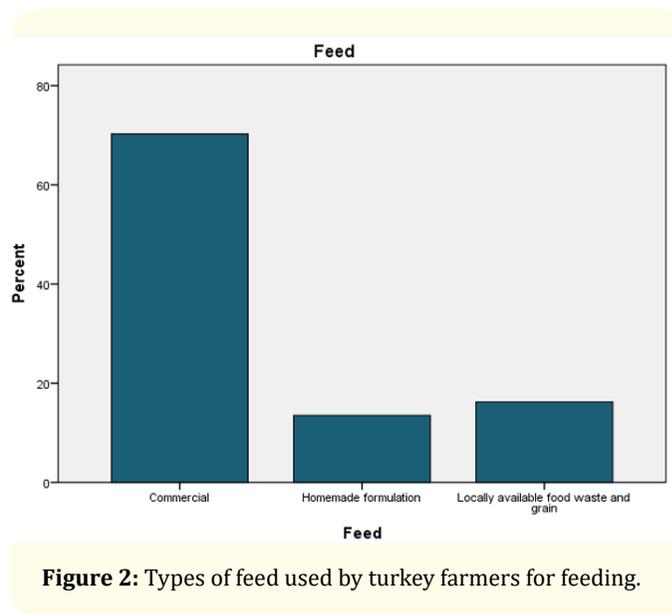


Figure 2: Types of feed used by turkey farmers for feeding.

Health management

Findings revealed comparatively low prevalence of turkey disease in study area as compared to other commercial chicken. Majority (78.4%) of farmers had encountered diseases like Fowl pox, CRD, Black head etc. while 21.6% farmers hadn't experienced any disease. The most common disease was found to be fowl pox, experienced by 82.75% of farmers. Knowledge of disease was lacking in study area. Routine deworming was practiced by 59.5% of farmers with average age of deworming 63.95 ± 6.67 days (Table 2). The commonly used medication for deworming were Albomar, Piperazine, Pipravet etc. Medication is done by veterinary doctors in majority (51.4%) of farms followed by farmers own knowledge in 41.6% of farms. The study revealed that in 78.4% of farms there were no outbreak of disease in past however there was low mortality in farms that had encountered disease in past. Majority of farmers mentioned that that turkey is more resistance to disease than other species of poultry and the main advantage of rearing turkey over other poultry species was low disease, low mortality and high economic value.

Parameter	Mean SEM
Age of farmers(years)	44.72 2.23
Experience of turkey farming (months)	17.05
Flock size (number)	57.05
Male Turkey (number)	18.06
Female Turkey (number)	41.76

Table 1: Average data on general farming management of turkey farming in Chitwan.

Parameter	Mean SEM
Age at first puberty Male (days)	198.95
Age at first puberty Female (days)	200
Age at first lay (days)	2103.08
No of eggs in one laying season (No)	48.176.78
Egg lay duration (days)	124.297.83
Weight of day one poult (gram)	44
Weight at puberty Tom (Kilogram)	7.6
Weight at puberty hen (Kilogram)	5.3
Age at marketing (months)	10.24
Hatching percent of turkey egg (%)	52.4
Age of deworming (days)	63.956.67

Table 2: Average productive and reproductive performance of turkey farming in Chitwan.

Parameters		Percentage
Housing	Intensive	16.2%
	Semi-intensive	83.8%
Ventilation	Yes	89.2%
	No	10.8%
Regular cleaning	Yes	64.9%
	No	35.1%
Biosecurity	Yes	13.5%
	No	86.5%
Separate watering	Yes	97.3%
	No	2.7%
Feed	Commercial	70.3%
	Homemade formulation	13.5%
	Locally available food waste and grain	16.2%
Marketing	Anytime	95.2%
	Festive period	4.8%
Egg consumption	Yes	89.5%
	No	10.5%
Market	Farmers	6.3%
	Local butchers	75%
	Hotel	18.8%

Table 3: Management practices, marketing and consumption of Turkey in Chitwan.

Discussions

Turkey farming is emerging farming enterprise in Chitwan. Comparatively young and middle age population are involved with this farming. This shows that the majority of the turkey producers in the study area were in the productive and active age and average age of the respondent farmers was around 45 years and hence they are likely to adopt new practices and techniques. Similarly, ownership of farming mostly belonged to male farmers (66.67%). Although female labor force participation is more than 50% in agricultural sector woman ownership in farming is low which might be due to lack of formal education, limited access to economic resources, and most women are engaged in unpaid, home based labor. Attah and Gbede [8] work on swine production in Katsina-Ala local government area of Benue State revealed that women were more involved in crops than in livestock production. The present results on gender difference in the ownership of turkey agrees with the report of Yakubu, *et al.* [5] who observed a higher number of male than female among turkey keepers in Nassarawa state, Nigeria. Analysis of education data revealed that 90% farmer respondents received formal education ranges from less than Secondary School Certificate to College level. The results indicate that participation of women in turkey farming is low in study area and most of farmers are educated and able to run the business efficiently while some of them have prior experiences too. So, there is big possibility to flourish turkey farming by these farmers in near future. The present study showed that although most of the farmers were rearing turkey for Passion (67.6%). But there is a big opportunity to increase production for business purpose because of its increasing demand to consumers of Chitwan.

Brant [9] reported that different varieties of turkey are grown for pleasure and for competition at shows and exhibitions by hobbyists and fanciers in America. Majority of farmer’s interviewed informed that turkey is a new species to them, so they do not have adequate awareness, knowledge and skill on it. It was observed that none of the farmers received any kind of training on turkey rearing. The present study revealed that information about new breeds was poorly disseminated and majority of the farmers had to rely on information received from other farmers. Information on exotic breed showed that majority (97.3%) of the farmers were unaware of exotic breeds. Only few (2.7%) of farmers were aware of exotic breeds. The probable reason for farmers’ lack of interest in rearing turkey in the study area may be due to the poor public extension service in Chitwan. Average flock size of turkey was small which might be due to newness of the enterprise. Information on flock structure shows that greater no. of female turkey reared than male turkey which shows that majority of farmers are involved in farming with the aim of selling egg and new hatchling rather than meat. Information on breeding method implies that

majority of farmers are dependent on Natural breeding than artificial insemination technique. Although commercial livestock species completely dependent upon artificial insemination (AI) for fertile egg production (Juliet and Bakst, 2008), none of the respondent farmers used this technique. Low fertility in turkeys, due to unsuccessful mating caused by large body size of the tom and reduced libido is a serious and costly problem in the production of hatching turkey eggs [10]. As a result, AI has become the only method for economic poultry production and about 95% of this success results from an artificial insemination breeding program [11].

It was observed that majority of farmers had purchased poult of few weeks to start business than day old. The turkey farmers experience revealed that the day old poults are very fragile and delicate to handle and should be treated with care. They have poor vision and may take several days before vision is complete and this makes it difficult for them to eat and drink at first which led to early death of their poults due to starvation.

Information on productive and reproductive performance shows that the hatchability of eggs was lower because insufficient knowledge of farmers on turkey breeding and egg incubating procedure and using a common incubator for both chicken eggs.

Majority of farmers are reared black turkey followed by only few white turkeys. But white turkey is the most favored globally for meat [12]. Feeding of turkey was dominated by commercial broiler and layer feed. In case of homemade feed, they used a mixture of maize, wheat, broken rice and grass. They also allow turkey flock for foraging. 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.

Results on health management indicates low prevalence of turkey disease in study area. Use of vaccine as preventive measure is low for turkey disease. Only few farmers used vaccines mainly for fowl pox disease. It shows that turkey is more resistance to disease than other species of poultry. Another reason of low disease prevalence might be that lower concentration of turkey farming in study area. Poult stage was found to be the most vulnerable stage for disease attack. It might be due to improper temperature and humidity during incubation and poor nutrition of parents. Peters [13] reported that 74 (77.9%) out of the 95 interviewed turkey farmers had no record of disease attack in their flock in Nigeria. It was

found that most of the farmers did not follow deworming schedule for turkey as like chicken. Medication used were common for both chicken and turkey. There is no specialized medicine particularly available for turkey in markets and there is lack of technical manpower specialized in turkey.

Problems of turkey farming

From the present study it was found that only few farmers used AI technique and even they had not heard about it earlier regarding turkey breeding. It results in low fertility and hatchability. Similarly, 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. So, majority of farmers hesitate to start turkey farming at first. There is absence of well-organized market for turkey and its products. Selling and buying is done solely through personal communication. Farmers themselves have to deliver meat and poult to customers as there is absence of supply chain. Farmers lacks the knowledge regarding space requirement for rearing turkey. They don't have knowledge about housing management and idea of biosecurity which is pivotal to prevent disease. Regarding feeding, there is no separate feed available in market for turkey. Farmers did not have expertise to formulate balanced rations for turkey, thereby relying on rations originally formulated for layer and broiler chicken which alters the mature weight gain. Requirement of large space for foraging is another problem for turkey production in city area where farmers have limited space. Similarly, farmers have to wait for 6-7 months before they reach puberty stage and start to lay eggs as compared to commercial broilers which gives quick return within few months. So many farmers go for commercial chicken production rather than turkey.

Conclusion and Recommendation

Turkey production is still at infantile stage characterized by poor breeding, feeding, housing and marketing. So, vigorous public extension service, training, research and marketing strategies are immediately needed to improve this sector in Chitwan. Market outlets should be created where turkey rearers can dispose off their birds. There is need for genetic improvement and characterization of our turkey strain so that their performance and productivity can be improved. It also calls for strengthening public extension services to enhance production, productivity and profitability of turkey production in the study area.

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