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Family poultry production and consumption patterns in selected households of Bangladesh

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Family poultry production accounts for most of the poultry production system in Bangladesh, but progress is not satisfactory. The present study assessed the existing poultry production and consumption patterns and constraints of poultry rearing of rural farmers in selected Northern areas of Bangladesh. A total of 50 households; 25 from Parakochua and 25 from Baraticry village in the Gaibandha district were selected for this study. The correlations coefficient was computed to determine the relationships among the dependent and independent variables. The findings showed that the average populations of chickens, ducks, and pigeons were 8.4, 7.19, and 6 respectively. Approximately 64% of the farmers were low producers compared to 30% for medium, whereas only 6% higher producers. In terms of consumption, the average among all birds was 8.1, and the highest proportion (74%) of them was in the low consumption category. With regard to poultry knowledge, approximately 78% of the farmers had poor overall poultry knowledge. The three most frequently cited problems faced by farmers in the process of rearing poultry were high prevalence of poultry diseases, inadequate supply of vaccine and medicine and scarcity of feed. Correlations between dependent and independent variables indicated that age, education, farm size, and annual income of the farmers were significantly related to the consumption of poultry, whereas poultry production was positively related to the farmers' poultry knowledge. It is concluded that poultry production, consumption and rearing knowledge are not satisfactory. Therefore, a need-based extension program should be introduced among the farmers giving more focus on building awareness and ability about poultry production and consumption.

Key words: Production, consumption, constrains, family poultry.

INTRODUCTION

Poultry plays an important role in human nutrition, national income, employment, and income generation in Bangladesh. The importance of poultry as a source of income for the landless and marginal farmers, particularly women, has become increasingly recognized (Ogunlade and Adebayo, 2009). Gueye (2009) reported that poultry in rural areas is an important system for supplying the fast-

growing human population with high-quality protein and providing additional income to resource-poor small farmers, especially women. Saleque and Mustafa (1996) studied possibilities for women's participation in poultry development and concluded that most of the rural and landless women (70%) are directly or indirectly involved in poultry rearing activities, but they have little

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experiences. In a latest study, Ali (2012) noted that 70% of women in Gezira Scheme Sudan are involved in chicken rearing.

Bangladesh is highly deficient in food of animal origin, such as meat and eggs. Therefore, malnutrition and hunger are serious problems in the country. According to FAOSTAT (2009), the country has a population of approximately 221.3 million chickens and 24.00 million ducks, respectively. The production of chicken and duck meat is estimated at 156,800 and 23,000 tons, respectively, whereas total egg production is 219,700 tons with hen egg (in shell) production of 154,000 tons in 2009 (FAOSTAT, 2009). The average per capita meat, poultry meat, and egg consumption in Bangladesh are 3.62, 1.09 and 1.32 kg, respectively, whereas per capita consumption of meat and egg in India and Korea are 3.62 and 2.07kg, and 55.85 and 10.34 kg, respectively, per year (FAOSTAT, 2007). Poultry meat alone accounts for 29% of the total meat production in the country (FAOSTAT, 2007). Ninety percent of the rural household in Bangladesh raised a small number of poultry under scavenging or semi-scavenging system. During the daytime, these birds scavenge and eat household waste, crop residues, insects and other available feedstuffs, and sometime a small amount of supplemented feeds offered by the flock owner (Das et al., 2008). Huque et al. (1999) stated that 75.06 and 86.05% of eggs and meat, respectively, come from these scavenging birds. Overall production of meat and eggs from indigenous poultry appears to be much lower, yielding only 35 to 40 eggs with poor egg mass (35 to 37 g/egg), and 1 to 1.5 kg meat per year (Das et al., 2008). On the other hand, about 95% of the ducks reared are of the indigenous type, weight at onset of lay is 1.36 kg and lay 39 eggs per year (Huque and Hussain, 1994). Although productivity of these birds is low, family poultry production systems are financially economic because of lower production cost and higher market price of eggs and live birds (Ershad, 2005).

Poultry production in rural areas suffers from serious problems including issues with housing, feeding, diseases, and other facilities, as well as, lack of knowledge of rural farmers regarding different aspects of poultry production, such as quality of feed, disease prevention and control techniques. Hai et al. (2008) determined that in the rural areas, increased literacy, farm size, livestock population, increasing income and better knowledge regarding health and nutrition should increase per capita poultry consumption. Latif (2001) reported that the production of rural poultry under scavenging systems is desirable for rural people as an additional source of income and nutrient supplement, and help the generation of both wages and self-employment. However, information regarding rural poultry production and consumption patterns, constrains and farmer's livelihood in Bangladesh is very scant. With these ideas in mind, the principal objective of the present study was to evaluate the existing poultry production and consumption

patterns, socio-economic condition of farmers and constraints of poultry rearing in selected areas of Bangladesh.

MATERIALS AND METHODS

Sampling method

A total of 50 farmers/households were selected from two villages (14% of total families), namely Parakochua and Baraticry under Gobindagonj upazila in the Gaibandha district of Bangladesh. Farmers were randomly selected and categorized into marginal (0.01- < 0.50 acre), small (0.51- < 2.49 acre), medium (2.50- < 7.49 acre) and large (> 7.50 acre) farms (Uddin, 2003), representing the distribution picture of farmers via proportionate stratified sampling technique or methods applied to two villages.

Collection of data

Data were collected from both primary and secondary sources from January to March 2010. The researchers collected primary data by questioning the selected farmers directly using a test questionnaire; secondary data were available from various sources, including, books, thesis, reports, journals, official records, and statistical yearbooks of Bangladesh. Simple and direct questions were used to obtain information. Information regarding the demographic characteristics of farmers, production and consumption of poultry meat and eggs, problems and scope of increase associated with these production and consumption characteristics were also collected.

Measurement of dependent and independent variables

Production and consumption of poultry are dependent variables, whereas age, education level, family size, farm size, level of the farmers' poultry knowledge and annual income of the respondents were considered independent variables in the study. Poultry knowledge of a respondent was measured by computing a score on the basis of his responses to 20 selected questions. Knowledge of poultry production included knowledge of scientific information in four aspects of poultry rearing, namely, breeding, feeding, housing and prevention and control of diseases. Points assigned for correct responses to different question varied from 1 to 8, according to the nature of the question. However, for correct responses to the entire question, a respondent could get a total score of 25, while for wrong responses to all questions he could get zero. The scores obtained by a respondent in all the four aspects were added together to obtain his/her composite poultry knowledge score, which ranged from 0 to 100; 0 indicated no knowledge and 100 very good knowledge.

Data analyses

Quantitative data were compiled, tabulated, and analyzed. Data were analyzed using descriptive statistics which are percentage, frequency distribution, mean, standard deviation, and also correlation analysis. The correlation analysis is specified as:

$$Y_1 = f (X_1; X_2; X_3; X_4; X_5; X_6) \quad (1)$$

$$Y_2 = f (X_1; X_2; X_3; X_4; X_5; X_6) \quad (2)$$

Where; Y_1 = production; Y_2 = consumption; X_1 = age of farmers; X_2

Table 1. Major socioeconomic characteristics of the farmers.

Socioeconomic indicators	Category	Poultry farmer		Mean	SD
		Number	%		
Age (year)	Young (up to 35)	19	38	38.60	14.80
	Medium (36-50)	22	44		
	Old (51 years and above)	9	18		
	Total	50	100		
Education	Illiterate (0)	19	38	5.06	4.70
	Primary (I-V)	11	22		
	Secondary (VI-X)	15	30		
	Higher Secondary	5	10		
	Total	50	100		
Family size	Small (up to 4)	30	60	4.40	1.58
	Medium (5-6)	15	30		
	Large (7 and above)	5	10		
	Total	50	100		
Farm size (acre)	Marginal (0.01-<0.50)	18	36	1.802	2.15
	Small (0.51-<2.49)	20	40		
	Medium (2.50-<7.49)	9	18		
	Large (>7.50)	3	6		
	Total	50	100		
Annual income (BDT) ¹	Low income (up to 24000)	13	26	47060	24230.53
	Medium income (24001-48000)	13	26		
	High income (48001-above)	24	48		
	Total	50	100		

¹BDT = Bangladeshi taka (currency); 1 US\$ = 81.20 BDT (as of November 25, 2012).

= poultry knowledge; X₃ = farm size; X₄ = family size; X₅ = household income; X₆ = Level of education.

This analysis is made in order to determine the relationships between the dependent and independent variables.

RESULTS AND DISCUSSION

Socioeconomic characteristics of the sample households

The farmers were classified into three categories according to their age, in a range from 20 to 90 years (Table 1). The literacy rate (62%) seemed to be higher in study area compared to the national average literacy rate of 53.5% (UNDP, 2009). In the present study, the average family size was 4.4, which was similar to the national average (4.4) in Bangladesh (Kulkarni, 2011). The farmers in the two villages were classified into three categories: the majority (60%) of the farmers belonged to small-sized families, 30% to medium-sized families, and the remainder (10%) to large-sized families. In agreement with present results, Hai et al. (2008) conducted a survey in the Mymensingh district of Bangladesh and found that

58% of families were small and 36% medium-sized. Yang (1965) stated that farm size plays an important role in resource allocation in agricultural productions. It appears from Table 1 that the average farm size was 1.802 acres for farmers. The present results showed that 36% of the farmers were marginal, 40% small, 18% medium, whereas 6% of the farmers were large holders. Agriculture was the principal source of income and livelihood in the study areas. The annual income of farmers ranged from Tk. 14,000 to Tk. 100,000, with an average of Tk. 47,060 (Table 1). The farmers were categorized into low, medium, and high-income groups. The numbers of farmers under low, medium, and high-income groups were 26, 26 and 48%, respectively. The average annual income of the farmers to be higher than the national average of Tk. 40,710 (UNICEF, 2009). This may be the reason that the majority of the farmers are engaged in various types of business activities and higher production from land by utilizing scientific methods. However, Mozumdar et al. (2009) reported that small-scale broiler farming significantly develop socio-economic status, as well as, rural livelihood of the farmers up to 72%.

Table 2. Distribution of poultry farmers according to their population of chickens, ducks, and pigeons.

Category (birds/family/year)	Chicken farmer		Duck farmer		Pigeon farmer		Composite population	
	Number	%	Number	%	Number	%	Number	%
Low producer (up to 10)	36	72	25	70	2	100	32	64
Medium producer (11-20)	13	26	10	27	0		15	30
High producer (above 21)	1	2	1	3	0		3	6
Total	50	100	36	100	2	100	50	100
Mean		8.4		7.19		6		13.82
Standard deviation		5.42		5.67		2.00		8.37

Table 3. Distribution of poultry farmers according to their consumption of chickens, ducks, and pigeons.

Consumption (birds/family/year)	Chicken		Duck		Pigeon		Composite consumption	
	Number	%	Number	%	Number	%	Number	%
No consumption	15	30	41	82	45	90	8	16
Low consumption (up to 25)	30	60	9	18	5	10	37	74
Medium consumption (26-50)	5	10	0	-	0	-	5	10
High consumption (above 50)	0	-	0	-	0	-	0	-
Total	50	100	50	100	50	100	50	100
Mean		6.8		1.6		0.68		8.1
Standard deviation		7.74		3.86		2.25		9.31

Production pattern of poultry birds

Sixty-eight percent of the farmers in the study area reared chickens and ducks, 28% reared only chickens while only 4% of the farmers reared all three (chicken, duck and pigeon) types birds (data not shown). All the farmers reared chickens, the population of chickens per family ranged from 2 to 28 birds, with a mean and standard deviation of 8.4 and 5.418, respectively (Table 2). Approximately 72% of the farmers were low producers, compared to 26% medium producers and 2% high producers. The number of duck raisers was 36, and the population of ducks per family ranged from 1 to 19 with a mean of 7.19 and a standard deviation of 5.67. Like chickens, approximately 70% of the farmers were producers, 27% medium producers and only 3% high producers. Only two farmers raised pigeons, and their population per family ranged from 4 to 8 with a mean and standard deviation of 6 and 2, respectively. The production of pigeon was very poor. This may be due to a lack of knowledge about pigeons rearing. When the chickens, ducks, and pigeons were considered collectively, production ranged from 2 to 34, with a mean and standard deviation of 13.82 and 8.37, respectively. Data in Table 2 indicate that 64% of the farmers were low producers, 30% medium producers and only 6% high producers. The mean value as shown in Table 2 also indicates that farmers reared only 13.82 birds on average per year per family. The average number of poultry reared per farm nationally was 6.8 in 1988 to 1989 (Alam, 1997), which was lower compared to the current results.

Rearing of poultry largely related to the extent of knowledge of poultry production and financial solvency. In a previous study, Huque and Ukil (1994) found that the number of chicken or ducks per farm was positively correlated with the farm size. Dafwang et al. (2010) studied rural poultry populations in the Plateau state of Nigeria and found that the farmers in this area owned an average of 20 chickens, 6 ducks, 0.3 turkeys, 1 pigeon and 1.2 guinea fowl per household, which are higher than in our study. The authors also showed that each household reared two or more strains of chickens and different types of poultry in the same backyard, similar to the scenario in Bangladesh.

Consumption of poultry birds

Table 3 shows the consumption scores for chickens, ducks, and pigeons separately, as well as, collectively. Approximately 60% of the farmers evidenced low chicken consumption followed by 10% medium consumers and 30% who did not consume chicken. The present data demonstrated that 82 and 90% of the farmers belonged to the no consumption category compared to 18 and 10% in the low consumption category for ducks and pigeons, respectively. Hai et al. (2008) compared poultry consumption in rural and urban areas of Mymensingh district and found that 50% of the respondents in the urban area and 60% in rural area were poor consumers (up to 20 birds/family/year). In disagreement with the present results, Hai et al. (2008) reported that 30% of the

Table 4. Distribution of poultry farmers according to their knowledge in respect of breeding, feeding, housing, and prevention and control of diseases.

Category	Farmers individual knowledge ¹								Farmers composite knowledge	
	Breeding		Feeding		Housing		Prevention and control of diseases		Number	%
	Number	%	Number	%	Number	%	Number	%		
Poor (up to 9)	37	74	35	70	39	78	40	80	39	78
Medium (9-12)	11	22	13	26	10	20	9	18	9	18
Good (above 12)	2	4	2	4	1	2	1	2	2	4
Total	50	100	50	100	50	100	50	100	50	100
Mean	7.52		6.62		6.44		5.94		25.38	
Standard deviation	2.60		2.61		3.32		2.61		10.16	

¹Farmers individual knowledge ranges from 0 to 25; 0 indicating no knowledge at all and 25 indicating very good knowledge. Farmers composite knowledge ranges from 0 to 100; 0 indicating no knowledge and 100 indicating very good knowledge.

respondents were medium (20 to 40 birds/family/year) and 10% high consumers (41 and above birds/family/year) in the rural area, dissimilar to our results.

The consumption statistics in our study area are not satisfactory. Mozumdar et al. (2009) reported that consumption of meat and egg increased in households who reared more small-scale poultry. Moreover, lack of knowledge on nutrition and poor purchasing ability affect the consumption of the respondents. Our findings indicate that it will be necessary to carry out extension work among the farmers toward building their awareness and ability to maintain the health of family members.

Knowledge of poultry production

Knowledge of breeding among the farmers ranged between 0 and 14, with a mean of 7.52 and a standard deviation of 2.60. Only 4% of the farmers in the study area had a good level of knowledge regarding poultry breeding (Table 4). In this study, most of the farmers reported that they did not rear exotic breeds due to the high mortality rate. The feeding knowledge score of the farmers ranged from 0 to 15 with an average score of 6.62 and a standard deviation of 2.61. Approximately 70% of the farmers had poor knowledge of feeding, 26% had a medium level of knowledge, whereas only 4% had a good level of knowledge. The housing knowledge score of the farmers ranged from 0 to 16, with an average of 6.44 and a standard deviation of 3.32. Data revealed that approximately 78% of the farmers had poor knowledge compared to 20% with medium knowledge and only 2% with a good level of knowledge about housing. The computed knowledge score for prevention and control of diseases ranged from 5 to 16 with a mean of 5.94 and a standard deviation of 2.61. Approximately 80% of the farmers in this study had poor knowledge in regard to the prevention and control of poultry disease compared to 18% with medium knowledge and only 2% with good

knowledge. When considered farmers composite knowledge about breeding, feeding, housing, and prevention and control of poultry disease, approximately 78% had poor knowledge, whereas 18% had medium and 4% had a good level of knowledge. Similar results were obtained by Hai et al. (2008) who observed a high prevalence of poor knowledge (70%) of health and nutrition in the rural farmers of Fulbaria upazila in Mymensingh district. Additionally, Yasmin et al. (1989) assessed the levels of knowledge of feeding, breeding, housing, and disease prevention and control of poultry of 100 poultry farmers in 10 villages, and found that approximately 17, 70 and 13% had low, medium and high level of knowledge of poultry rearing, respectively.

Poultry rearing and management practices

Poultry rearing and management practices in the selected areas were not satisfactory. Approximately 30% of farmers kept poultry in their living houses, 46% in earthen houses, 10% in wooden houses or tin sheds, 8% in wooden or bamboo houses, and 6% in concrete houses. Approximately 22% of farmers reported that they clean their poultry house everyday, 26% every other day, 22% twice per week, 28% once per week and 2% once per fortnight. Approximately 67% of farmers did not use litter materials for poultry production while the remainder (24%) used litter materials that is, ash, sand etc. About 80% of farmers did not use feeders and about 96% of farmers did not use drinkers. Similarly, Ali (2012) reported that rural farmers in Sudan rarely used proper feeders and drinkers and did not clean them every day. Generally, poultry picked up grains such as rice, vegetables, green grass, insect, earthworm etc. from the yard, as chickens were reared under scavenging system. Family-supplied feed was the most common type among the different farm categories studied (Table 5). Generally, poultry owners supplied only a carbohydrate source: that is, broken rice, rice, wheat, rice polish, etc. About 12% of

Table 5. Information on sources of poultry feed ingredients according to different farm categories.

Village name	Farm categories	Farmers responded	
		Own ¹	Purchase ²
Parakochua	Marginal	9 (75)	3 (25)
	Small	6 (100)	0
	Medium	5 (100)	0
	Large	2 (100)	0
	Total	22 (88)	3 (12)
Baraticry	Marginal	11 (73)	4 (27)
	Small	5 (100)	0
	Medium	4 (100)	0
	Large	1 (100)	0
	Total	21 (84)	4 (16)

Figures in parentheses indicate percentage. ¹Own = Rice/broken rice, Rice polish, Wheat bran and Paddy; ²Purchase = Rice polish, Wheat and Wheat bran.

farmers at Parakochua and 16% at Baraticry purchased rice polish, wheat bran, wheat, etc. Poultry in the study area mostly depended on scavenging feed that were insufficient for their requirement and contained low nutrient. In a previous study, Huque et al. (1992) reported that native chickens consumed 9 to 27 g/bird/day scavengeable feedstuffs, which is lower than standard requirement and contained low nutrients, and may be one of the important factors that cause low productivity of local poultry (Das et al., 2008). Eighty-six percent of the farmers in selected villages did not vaccinate their poultry, whereas the remainder vaccinated once or twice per year. The vaccination programs are mainly provided by local livestock personnel and other experts.

Approximately 94% of the farmers expressed their willingness to increase poultry production while the remainder mentioned that they would not increase their poultry production. The reasons given for not increasing poultry production included insufficient place for rearing, lack of available capital, outbreak of diseases and higher mortality rates.

Constrains of poultry rearing

Diseases and inadequate supplies of vaccines and medicine were identified as the most prominent problems in both villages. Similar situation was noted by Taimur et al. (1999) who observed that the quantity and quality of vaccines available against the major diseases are not up to the desired standard. When farmers were asked about problems they experienced in rearing poultry, 56% of the farmers at Parakochua and 64% of the farmers at Baraticry identified feed availability as a major problem (Table 6). Feed is one of the important factors in rural poultry production. Chowdhury et al. (2006) reported that

if the birds are raised only on scavenging feed resources, their productivity decrease. Predator problems were reported by 52% (Parakochua) and 60% (Baraticry) of the farmers, followed by lack of housing facilities in Parakochua (40%) and Baraticry (48%). The current results are consistent with that of Saleque and Mustafa (1996) who reported that without interventions, the mortality rate of poultry was 35 to 85% due to diseases and predators. In addition, Ahmed (1988) previously identified the problems connected with poultry production as diseases, feed, inadequate supply of vaccines and medicines, and the marketing of broilers and eggs. Furthermore, Hai et al. (2008) noted that the availability of chicks was the top problem in the rural area, whereas the supply of an optimal amount of feed and lack of medicine were ranked as second- and fifth-most important problems. Mozumdar et al. (2009) also reported that the first and foremost problem faced by the farmers was too much fluctuation of chicks and feed prices followed by high cost of medication and vaccination, and their poor quality.

Relationship between the variables

The correlation coefficients of six selected independent variables: Age, education, family size, farm size, income and poultry knowledge, and two selected dependent variables (production and consumption of poultry birds by the rural farmers) are provided in Table 7. The results demonstrated that the level of poultry knowledge among the farmers was related significantly to the production of poultry. This indicates that persons with greater knowledge of breeding, feeding, housing, and disease prevention and control can apply knowledge in rearing the poultry and can thereby benefit from it. Other variables such as age, annual income, family size, farm size, and level of education of farmers were not related with their production of poultry. Similarly, Ogunlade and Adebayo (2009) showed that age, educational level, marital status and occupation had no significant relationship with the level of participation of rural women in poultry production. However, Yasmin et al. (1989) observed that the level of knowledge of poultry production was correlated with many social factors such as education, family size, occupation, farm size, number of birds and extension contact. On the other hand, age, education, farm size, and annual incomes of the farmers were related significantly with the consumption of poultry birds. Other variables such as family size and level of knowledge of poultry production of the farmers were not related with the consumption of poultry, which implied that the variables were independent of the consumption of poultry among the farmers. Likewise, Hai et al. (2008) reported that age, level of education, farm size, livestock population, income, and knowledge of health and nutrition maintained significant positive correlations with poultry consumption in the rural areas.

Table 6. Problems faced by farmers' regarding the rearing of poultry under different farm categories.

Village name	Problems	Farm category				
		Marginal	Small	Medium	Large	Total
Parakochua	Disease	12 (100)	6 (100)	5 (100)	2 (100)	25 (100)
	Inadequate supply of vaccine and medicine	10 (83.33)	5 (83.3)	4 (80)	1 (50)	20 (80)
	Shortage of feed	10 (83.33)	4 (66.7)	-	-	14 (56)
	Predator	6 (50)	3 (50)	3 (50)	1 (50)	13 (52)
	Lack of housing facilities	8 (75)	2 (33.3)	-	-	11 (40)
Baratictry	Disease	15 (100)	5 (100)	4 (100)	1 (100)	25 (100)
	Inadequate supply of vaccine and medicine	12 (80)	4 (80)	3 (75)	1 (100)	20 (80)
	Shortage of feed	13 (87)	3 (60)	-	-	16 (64)
	Predator	9 (60)	2 (40)	3 (75)	1 (100)	15 (60)
	Lack of housing facilities	10 (67)	2 (40)	-	-	12 (48)

Figures in parentheses indicate percentage.

Table 7. Correlation coefficient analysis of independent and dependent variables in selected rural areas.

Independent variable	Dependent variables	
	Poultry production	Poultry consumption
Age	0.18 ^{NS}	0.376**
Poultry knowledge	0.329*	-0.003 ^{NS}
Farm size	0.160 ^{NS}	0.342*
Family size	-0.059 ^{NS}	0.169 ^{NS}
Income	0.261 ^{NS}	0.695**
Education	-0.123 ^{NS}	0.399**

^{NS}, Not significant; *, p < 0.05; **, p < 0.01.

Conclusion

A Level of consumption of poultry was quite low among the selected farmers. Correlations between dependent and independent variables indicated that an increase in the farm size, income and level of education could increase per capita poultry consumption in rural households. A positive correlation of age with poultry consumption implies that per capita poultry consumption is higher for older people. Correlations also indicate that only increased poultry knowledge could affect household poultry production. The majority of the farmers included in this study expressed their willingness to increase their poultry activities, although the highest proportions of the farmers were low producers and most of them did not use vaccines to prevent diseases. The major problems in family poultry production included diseases, inadequate supply of vaccines and medicine, shortage of feed and lack of appropriate housing facilities. In order to increase poultry production at the farmers' level, a systemic training program should be organized specifically for rural women. Furthermore, adequate arrangements should be

made for disease prevention and control. Additionally, extension and motivational work along with technical support should also be conducted in the villages to encourage farmers to rear and consume more poultry birds.

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