

MANAGEMENT PRACTICES, DISEASE INCIDENCE, USES OF INDIGENOUS KNOWLEDGE, AND CONDITIONS AND PROBLEMS OF THE POULTRY FARMERS IN RAJSHAHI, BANGLADESH

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Abstract: Data on management practices, incidences of common diseases, uses of indigenous knowledge (IK) and conditions and problems of the poultry farmers in some selected areas of Rajshahi, Bangladesh, were investigated. Data from small, medium and large poultry enterprises situated in the urban, semi-urban and rural areas at six Upozillas of Rajshahi District viz., Boalia, Godagari, Motihar, Mohonpur, Poba and Rajpara were collected. An indigenous (IND), four exotic (EXO) viz. Cob 500 breed of broiler, Cockerel, Fayoumi (FAY), and Rhode Island Red (RIR), and a crossbred (CRO) called Sonali (derived from RIR cock × FAY hen) chicken breeds were included in the study. Eighteen parameters on management practices, 13 diseases, 20 indigenous knowledge (IK) items, 3 major conditions, 11 problems encountered and top 10 opinions of the poultry farmers were identified. Satisfactory to good management practices were recorded for IND in Godagari and that for EXO and CRO in Rajpara. All the remaining farms practiced moderate to unacceptable management practices. Bacillary white diarrhoea (39.56%), omphalitis (57.40%) and hypervitaminosis (55.56%) were the most frequent diseases whereas common cold (10.16%), bacillary white diarrhoea (32.82%) and bacillary white diarrhoea (27.62%) were the least frequent diseases for IND, EXO and CRO chickens, respectively. However, no incidence of bird flu (avian influenza) was recorded during the survey period. Uses of broody hens (82.25%), changing of waterier (62.45) and vaccination (49.19) were found to be the prevalent IK items for IND, EXO and CRO birds. Separating healthy *versus* diseased respectively, chicks (26.45%), feeding maize grain (52.45%) and feeding molasses (49.10%) were healthcare IK items for the chicken breeds, respectively. Majority of the poultry farmers of IND, EXO and CRO breeds had respectively primary (50.08%), graduate (47.18%) and higher secondary (45.77%) education levels. Agriculture (60.71%), miscellaneous (46.14%) and miscellaneous (35.50%) were dominant occupations among the three categories of poultry farmers. IND farmers predominantly had cultivable land (50.16%) in comparison with the cultivable landholdings by the EXO (21.69%) and homestead landholdings by their CRO (31.16%) counterparts. Poor housing (44.86%), disorganized and unreliable marketing system (52.05%) and lack of institutional credit facilities (47.89%) were identified to be the major problems for the IND, EXO and CRO farmers respectively, who opined strongly in favour of improved native breeds (30.04%), proper breeding facilities (49.90%) and government co-operation (48.01%). The impacts of these findings on the poultry enterprise in Rajshahi have been discussed.

Key words: Management practices, disease incidence, indigenous knowledge, conditions, problems and opinions of poultry farmers.

সারংশ: এই গবেষণায় রাজশাহী জেলার নির্বাচিত কিছু মুরগি খামারের ব্যবস্থাপনা চর্চা, সাধারণ রোগের প্রাদুর্ভাব, দেশজ জ্ঞানের ব্যবহার এবং খামারীদের অবস্থা ও সমস্যা পর্যালোচনা করা হয়েছে। রাজশাহীর শহর, আধা-শহর এবং গ্রামে অবস্থিত ছয়টি উপজেলা যথা: বোয়ালিয়া, গোদাগাড়ী, মতিহার, মোহনপুর, পবা ও রাজপাড়ায় অবস্থিত ছোট, মাঝারি ও বড় মুরগি খামারগুলির তথ্য-উপাত্ত সংগ্রহ করা হয়। একটি দেশী, চারটি বিদেশী (কব ৫০০ ব্রয়লার, ককরেল, ফাউমি ও আর.আই.আর.) এবং একটি সংকর জাত (আর.আই.আর. মোরগ × ফাউমি মুরগি থেকে উৎপন্ন সোনালী) গবেষণায় অন্তর্ভুক্ত করা হয়। এখানে ১৮টি ব্যবস্থাপনা চর্চা, ১৩টি রোগব্যাদি, ২০টি দেশজ জ্ঞানের বিষয়, মুরগি খামারীদের ৩টি মুখ্য অবস্থা, ১১টি সমস্যা এবং ১০টি মতামত সনাক্ত করা হয়েছে। গোদাগাড়ীতে দেশী মুরগির ক্ষেত্রে এবং রাজপাড়াতে বিদেশী ও সংকর মুরগির ক্ষেত্রে সন্তোষজনক থেকে ভালো ব্যবস্থাপনা চর্চা লক্ষ্য করা গেলেও অবশিষ্ট খামারগুলির ব্যবস্থাপনা চর্চা ছিল মধ্যমপন্থা থেকে অগ্রহণযোগ্য মানের। দেশী, বিদেশী ও সংকর জাতের মুরগিতে যথাক্রমে ব্যাসিলাসী সাদা ডাইরিয়া (৩৯.৫৬%), অ্যামফালাইটিস (৫৭.৪০%) ও হাইপার ভিটামিনোসিস (৫৫.৫৬%) রোগ ছিল সর্বোচ্চ, আর সাধারণ ঠান্ডা (১০.১৬%), ব্যাসিলাসী সাদা ডাইরিয়া (৩২.৮২%) এবং ব্যাসিলাসী সাদা ডাইরিয়া (২৭.৮২%) ছিল সর্বনিম্ন। যাহোক, জরিপ চলাকালে বার্ড-ফ্লু রোগের কোন প্রাদুর্ভাব পরিলক্ষিত হয়নি। তিন জাতের মুরগিতে যথাক্রমে দেশজ জ্ঞানের ব্যবহার হিসেবে কুঁচু মুরগি (৮২.২৫%), পানি পাত্রের পরিবর্তন (৬২.৪৫%) এবং টিকাদান কর্মসূচী বেশী পরিলক্ষিত হয়; আবার স্বাস্থ্য সচেতনতার ক্ষেত্রে সুস্থ মুরগিকে রোগাক্রান্ত মুরগি থেকে আলাদা রাখা (২৬.৪৫%), খাদ্যে ভুট্টা দানা (৫২.৪৫%) ও বোলাগুড় (৪৯.১০%) পরিবেশনা ছিল উল্লেখযোগ্য। অধিকাংশ দেশী, বিদেশী ও সংকর মুরগি খামারীদের শিক্ষাগত যোগ্যতা যথাক্রমে ছিল প্রাথমিক (৫০.০৮%), স্নাতক (৪৭.১৮%) ও উচ্চ মাধ্যমিক (৪৫.৭৭%) পর্যায়ের। তিন ধরনের খামারীদের মধ্যে যথাক্রমে কৃষি (৬০.৭১%), বিবিধ (৪৬.১৪%) এবং বিবিধ (৩৫.৫০%) ছিল মুখ্য পেশা। দেশী খামারীদের চাষযোগ্য জমি (৫০.১৬%), বিদেশী খামারীদের চাষযোগ্য জমি (২১.৬৯%) এবং সংকর জাত খামারীদের বসতবাড়ীর জমির (৩১.১৬%) তুলনায় তুলনামূলকভাবে বেশী ছিল। নিম্নমানের গৃহ ব্যবস্থাপনা (৪৪.৮৬%), অসংগঠিত এবং অনির্ভরযোগ্য বিপণন ব্যবস্থাপনা (৫২.০৫%) এবং প্রাতিষ্ঠানিক ঋণের অভাব (৪৭.৮৯%) যথাক্রমে দেশী, বিদেশী ও সংকর জাতের মুরগি খামারীদের প্রধান সমস্যা হিসাবে পরিলক্ষিত হয়। খামারীরা উন্নত দেশী জাত (৩০.০৪%), যথার্থ প্রজনন সুবিধাদি (৪৯.৯০%) এবং সরকারের সহযোগিতার (৪৮.০১%) পক্ষে জোরালো মতামত ব্যক্ত করেন। প্রবন্ধে রাজশাহী জেলার মুরগি খামার ব্যবস্থাপনায় প্রাপ্ত ফলাফলের প্রভাব আলোচিত হয়েছে।

Introduction

Now-a-days it became imperative to know the techniques of scientific poultry keeping and to combine scientific principles with arts of poultry keeping for reaping the best harvest (Das et al. 2008). The principal objective of the commercial poultry enterprises is to secure the maximum number of quality day-old chicks out of the eggs set for hatching and to ensure their rearing up to marketing. The quantitative traits in

poultry have variation among breeds, varieties and individuals within breeds and they largely depend on a number of variables like genetic, physiological and environmental factors (Jull 1970). Management practices often influence the effect of breeds on egg fertility, hatchability and the development of chicks (Singh et al. 1983; Jayarajan 1992).

Diseases causing mortality are more prominent in growers and adults, while predation and exposure to

unfavorable environmental conditions are major causes of mortality in village chickens (Henning et al. 2007). In developing countries the majority of poultry is still kept by smallholders in less intensive systems that make a significant contribution to poverty alleviation and household food security (Khan 2008). However, smallholders' poultry is affected by many technical factors including low bio-security, restriction to live bird markets, inadequate sources of inputs and services, especially sources of technical information as well as lack of genetically improved breeds (Sonaiya 2009). In addition, the efficiency and profitability of family enterprises using indigenous and/or native poultry are limited by disease, production constraints, and external factors (Bell 2009). Improved management practices not only increase egg production, but also contribute to higher household income. So, the development and achievement of bio-security measures against the common diseases require a multidisciplinary and participatory approach (Bleich et al. 2009).

There is substantial technical, allocative and economic inefficiency in poultry production in Bangladesh (Begum et al. 2010) that faced a terrific financial loss in 2007 and 2008 due to the incursion of bird flu or avian influenza, which was estimated to be at US\$ 38580 million (Alamal et al. 2010). According to a recent study, major factors that influence improved poultry production identified include genotype, education, land, labour, feeds and other investment expenses (Ali and Hossain 2010). To get some clear-cut conception about the poultry production, the present study was undertaken to evaluate the management practices of the available chicken breeds and to know disease incidence, indigenous knowledge (IK), and conditions and problems and opinions of the poultry farmers at small, medium and large-scale production units in Rajshahi, Bangladesh.

Materials and Methods

Experimental design: Poultry enterprises of the urban, semi-urban and rural areas of the Rajshahi District were chosen at random to facilitate the purpose of the study. A schedule interview was conducted with the poultry farmers to study the management practices, disease incidences, uses of indigenous knowledge (IK), farmers conditions (education levels, occupation, training and extension facilities), problems encountered by the poultry farmers and opinions regarding improvement of poultry farming in the study area. The interview schedules appeared to be reliable because of the consistency of the parameters used and results obtained or observations recorded throughout the investigation.

Source and description of the farms: The small (n=18), medium (n=18) and large (n=18) poultry farms (one Government and 54 private farms) consisting of EXO

and CRO chickens, and village houses (n=18) that reared IND chicken at six Upozillas of Rajshahi District viz., Boalia, Godagari, Motihar, Mohonpur, Poba and Rajpara, were surveyed. For surveying the disease incidence, uses of indigenous knowledge (IK), farmers' conditions and opinions, the poultry farmers were interviewed and the data were collected using interview schedule designed for the purpose. Data were collected during the period from July 2009 to June 2010.

Parameters studied: Eighteen parameters on management practices viz., chicken providers, methods of transportation, brooding temperature, vaccination programme, room temperature, feed supply, use of disinfectants, bio-security measures, boundary wall, exhaust fan, sources of water, human residence, disposal of excreta, disposal of dead bodies, access to wild animals, previous disease record, prevailing poultry diseases, and availability of veterinary services were recorded using a 5 scale scoring system where score 5 was considered excellent, 4 as good, 3 as satisfactory, 2 as not good and 1 as unacceptable. Moreover, existing 20 indigenous knowledge (IK) items involving food and feeding practices and healthcare, 13 diseases, three conditions of the poultry farmers involving their education, occupation and landholding, 11 problems encountered by the farmers and top 10 opinions of the farmers on improving poultry farming in the study area were recorded to assess the current status of poultry farming in Rajshahi.

Statistical analyses: The qualitative and quantitative data collected from the visited farms were subjected to statistical analyses for interpretations. Mean±SD values on the management parameters were used for graphical representations. For the rest, percentage calculations were used in tabular forms. A statistical package (SPSS version 11.0 for Windows) was used for analyzing the data.

Results and Discussion

Management practices: The qualitative data on the management parameters for the experimental chickens were converted into quantitative data to obtain scores on management practices and graphically presented in Fig. 1. Satisfactory to good management practices were recorded for IND in Godagari and that for EXO and CRO in Rajpara. All the remaining farms practiced moderate to unacceptable management practices. The IND chickens were reared mainly in the traditional houses of the study area where the poor farmers kept small number of birds. It is one of the oldest methods and is generally adopted where there is available space in homestead land. In agreement with Riise et al. (2005), poultry production in most tropical countries is based mainly on scavenging production systems and it has been estimated that 80% of the poultry population

in Asia and Africa are based on traditional scavenging systems. This is also similar to the findings of Haunshi et al. (2011) who reported that rearing of the Indian native breeds in the free-range system is a profitable enterprise in which the birds find appreciable amount of feed from the surroundings during daytime and take shelter in the house during night.

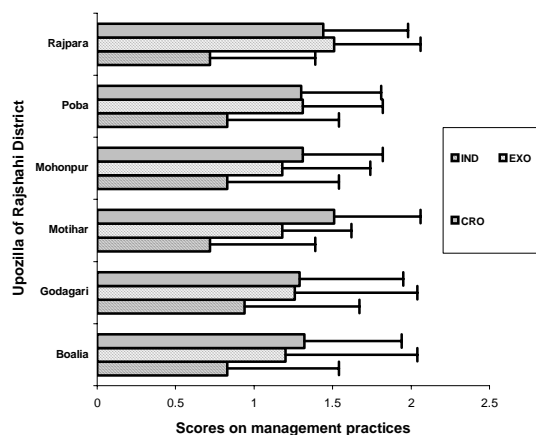


Figure 1 Management practices (mean±SD scores) adopted for the indigenous (IND), exotic (EXO) and crossbred (CRO) chickens at six Upozilla of Rajshahi District

Although IND chickens are more resistant to diseases, the farmers arrange vaccination programme against common diseases like bacillary white diarrhoea, Newcastle and fowl cholera which are reported to be major constraints to the development, survival and productivity of village poultry. Farmers used broody hens for hatching purpose but it was found that non-broody hens produced more eggs than the broody ones (Jiang et al. 2010). The broiler breed (Cobb 500) was found to be reared mostly in the small and medium poultry farms than the larger farms and the situation was also observed by Islam et al. (2010), who found that the independent small-scale broiler farming was a profitable venture for rural farmers. Cockerel was reared in the private farms with similar management practices like that of broiler as the meat quality of the former was affected by age.

Management practices also influence the transmission of poultry diseases which is strongly linked to moving live birds, contaminated carcasses or litter in vehicles contaminated with infective bacterial and viral particles. Therefore, the farmers kept their rearing houses and equipments thoroughly cleaned and disinfected before the arrival of day-old chicks. Holt et al. (2011) reported that season, hen breed, flock age,

and flock disease-vaccination status interacted to affect safety and quality of the poultry birds. It was observed in the present study that the chicks were procured from reliable breeders and disease-free flocks. Overcrowding was avoided, and measures were adopted to ensure good feeding and maintenance of hygienic and sanitary conditions in the farms. The litter was kept dry as far as possible and the litter was changed before placing new broods. Meluzzi et al. (2008) suggested that the control of environmental conditions, particularly litter quality, appears to be a key issue for broiler welfare while Wilkinson et al. (2011) reported that poultry litter aged up to 6 weeks supports increased *E. coli* densities. Feeders and waterier were cleaned daily to avoid contamination as *Campylobacter* are the primary cause of food poisoning (Sparks 2009). As precautions described by Caglayan et al. (2009) long storage periods were avoided, the infected eggs were not incubated for hatching and the incubators were sterilized properly. The infected houses were not used for rearing new birds at least for a fortnight or a month. The droppings and excreta were disposed with utmost care to check the spread of infection. An 'all in and all out' management practice was adopted to control the poultry diseases in the farms under study.

Disease incidence: Poultry farmers at the study area reported that the contagious and infectious diseases were the major constraints to the poultry development. Common diseases recorded in the visited farms are presented in Table 1. The IND breed was found to suffer mostly from bacillary white diarrhoea (39.56%), Newcastle disease (38.89%), and fowl cholera (32.29%), and the least from common cold (10.16%), but predation by wild animals also provided negative impact on rearing the breed. In contrast, the EXO breeds suffered the most from omphalitis (57.40%) and the least from bacillary white diarrhoea (32.82%); while the CRO had the highest incidence of hypervitaminosis (55.56%) and the lowest of bacillary white diarrhoea (27.62%). These findings corroborate with Hossain et al. (1996), who reported that Newcastle disease (Ranikhet), fowl cholera, fowl pox and eimeriasis were the main diseases of chicken breeds prevailing in Bangladesh, and also with Alexander (2003), where the mortality rate of poultry breeds was the highest due to Newcastle disease. Parallel results were deliberated by Henning et al. (2007) reporting that the most important constraints to rearing poultry were the occurrence of chicken diseases followed by exposure of chickens to extreme weather conditions and occurrence of predators.

Table 1 Disease incidences of the indigenous, exotic and crossbred chickens in different Thanas of Rajshahi District

Diseases	IND	EXO	CRO
Bacillary white diarrhoea (BWD)	39.56	32.82	27.62
Newcastle disease (Ranikhet)	38.89	33.28	27.83
Fowl cholera	32.29	39.66	28.05
Coccidiosis	25.05	46.07	28.88
Gumboro	23.38	45.34	31.28
Fowl pox	21.53	42.69	35.78
Salmonellosis	19.05	48.13	32.82
Fowl typhoid	14.98	46.19	38.83
Brooder pneumonia	11.26	56.16	32.58
<i>E. coli</i> infection	11.11	49.73	39.16
Common cold	10.16	47.32	42.52
Omphalitis	0.00	57.40	42.60
Hypervitaminosis	0.00	44.44	55.56

Figures are in percentage; chicken breeds are represented by IND= indigenous, EXO= exotic, and CRO= crossbred; each breed had 18 replicates.

Uses of indigenous knowledge (IK): Various IK items have been developed very widely for the food and feeding practices and healthcare to increase livestock in accordance with the climate, agro-ecosystem, soil and socio-economic opportunities in Bangladesh. The present results are presented in Table 2 and are described under the following two broad heads.

Table 2 Existing indigenous knowledge (IK) items practiced by the poultry farmers in Rajshahi, Bangladesh

IK items and their purposes	IND	EXO	CRO
<i>A. Food and feeding</i>			
1. Purchase of chicks from reputed farms maintaining high yielding varieties of chicken breeds: To get improved and high yielding varieties of chicken	21.56	45.36	33.08
2. Put the chicks under broody hen properly and observe it regularly: To ensure proper brooding	82.25	14.24	3.51
3. Increasing floor space according to chickens' age: To provide adequate space	3.36	58.25	38.39
4. Changing of waterier in accordance with the chicks' age: To provide adequate water supply	2.25	62.45	35.30
5. Vaccination of birds from day-old chick to adult: To protect the birds against various life-threatening diseases	5.55	45.26	49.19
6. De-beaking from the 6 th to 10 th days: To prevent feed wastage, feather picking and cannibalism	2.23	50.16	47.61
7. Supplementation of self-made and ready-made feed and feeders: To ensure proper growing up	5.78	48.65	45.57
8. Maintaining temperature and humidity of the incubator: To provide proper incubation	25.30	35.25	39.45
9. Maintaining setting date and transfer date of eggs for hatching: To provide proper hatching	26.85	36.45	36.70
10. Making wooden laying nests with space and hole for several chickens: To provide dark and secure place for the incubated eggs	16.25	40.78	42.97
<i>B. Health care</i>			
1. Feeding limestone, bone meal, oyster shells and marble chip: To provide cheapest source of calcium (Ca)	3.56	51.56	44.88
2. Feeding groundnut cake: To provide the requirement for crude protein	1.26	50.45	48.29
3. Feeding maize grain: To provide attractive colour to the egg yolk and leg skin	5.56	52.45	41.99
4. Feeding molasses: To provide adequate crude protein, Ca and phosphorus (P)	2.65	48.25	49.10
5. Feeding rice polish: To provide required crude protein, fibre, Ca, P and lysine	6.62	45.36	48.02
6. Feeding de-oiled rice polish: To provide required amount of the essential amino acid (methionine)	4.25	49.27	46.48
7. Separating healthy and diseased chickens: To prevent from Newcastle disease	26.45	38.56	34.99
8. Maintaining proper room temperature during winter season: To achieve the required growth and egg production	7.50	43.75	48.75
9. Applying proper materials in making litter and to keep the litter dry: To avoid coccidiosis	26.45	40.48	33.07
10. Apply balanced diet and fresh water: To maximize egg production	15.26	43.25	41.49

Figures are in percentage; chicken breeds are represented by IND= indigenous, EXO= exotic, and CRO= crossbred; each breed had 18 replicates.

(a) *Food and feeding*: For IND, most farmers used to put their eggs under broody hens to ensure proper brooding and hatching (82.25%). De-beaking was the least common practice for this breed (2.23%). Majority of the farmers that reared EXO, changing waterier was the most frequent practice (62.45%) but use of broody hens was the least common (14.24%). Vaccination programmes were the most frequent for CRO (49.19%), where de-beaking was the least practiced IK (3.51%). All the remaining IK practices were found vary a lot between chicken breeds under study.

(b) *Healthcare*: Separating healthy chicks from diseased ones and keeping the litter dry were the most practiced healthcare IK (26.45%) whereas feeding groundnut cake was the least common (1.26%) for IND chickens. In contrast, feeding maize grain (52.45%) and separating healthy chicks (38.56%) were respectively the most frequent and least preferred IK practices for EXO breeds. Feeding molasses (49.10%) and keeping the litter dry (33.07%), however, were found respectively the highest and the lowest IK items for CRO chickens.

The aforesaid IK technologies applied to poultry birds proved to be the means of survival the natural and induced calamities of the country. Rahman et al. (1999) observed that farmers offered concentrate molasses for their livestock to increase feed intake and profitability. Saadullah and Hossain (2000) described such IK in terms of landholding, family labour, resources, type of animals, and their benefits. They also noted that the IK in agriculture in Bangladesh are characterized by long-term practical experiences for minimizing risk within farmers' own domain using existing facilities. Regrettably, little attention has been paid to the values of rural IK that could be utilized for sustainable production of such vital livestock as poultry.

Farmers' conditions

(a) *Education*: Personal information on the poultry farm owners revealed that most of the IND farmers were educated up to primary level (50.08%) whereas majority of the EXO farmers were graduates (47.18%) and the CRO farmers (45.77%) belonged to the higher secondary level (Table 3). A considerable proportion of the IND farmers were illiterate. (b) *Occupation*: Agriculture (60.71%), miscellaneous (46.14%) and miscellaneous (35.50%) were dominant occupations for IND, EXO and CRO poultry farmers, respectively. (c) *Landholding*: IND farmers predominantly had cultivable land (50.16%) in comparison with the cultivable land for the EXO (21.69%) and homestead landholdings for the CRO (31.16%)

counterparts. The present results are slightly different from those of Saadullah and Hossain (2000) who observed that the average cultivable land of different farm owners' families varied from one location to another, ranging from 0.07 to 6.42 acres. This might be due to the differences in study areas as well as the changes in poultry enterprise of the country over time. But in agreement with the present study, Saadullah and Hossain (2000) also reported that the cultivable landowners did not use their land exclusively for fodder production.

Table 3 Conditions of the poultry farmers in Rajshahi, Bangladesh

Farmers' conditions	IND	Farm owners	
		EXO	CRO
<i>Education (%)</i>			
Graduate	14.32	47.18	38.50
Higher secondary	24.21	30.02	45.77
Secondary	37.32	31.92	30.76
Primary	50.08	27.91	22.01
Illiterate	99.99	0.005	0.005
<i>Occupation (%)</i>			
Agriculture	60.71	21.78	17.51
Business	48.31	20.53	31.16
Miscellaneous	18.36	46.14	35.50
<i>Landholding (acre)</i>			
<i>Homestead land (%)</i>			
Have	48.31	20.53	31.16
Have not	18.36	46.14	35.50
<i>Cultivable land (%)</i>			
Have	50.16	21.69	28.15
Have not	16.27	45.22	38.51

Figures are in percentage; chicken breeds are represented by IND= indigenous, EXO= exotic, and CRO= crossbred; each breed had 18 replicates.

Problems encountered by the poultry farmers: Poor housing (44.86%), disorganized and unreliable marketing system (52.05%) and lack of institutional credit facilities (47.89%) were identified to be the major problems for the IND, EXO and CRO farmers, respectively. On the other hand, lack of credit facilities (3.01%), lack of capital (28.12%) and poor housing pattern (26.06%) were identified to be the minor problems for the three groups of farm owners, respectively (Table 4). It is therefore apparent from the results that the owner of the small and medium farms complained for capital, institutional credit facilities, medicine and veterinary services as their birds frequently suffered from various diseases causing high mortality to their raising flocks. Unlike the present findings, Hafez (2001) found that salmonellosis in poultry resulted in severe economic losses, which were caused by high mortality during the first four weeks of age. It has been suggested that more attention should be given to smallholder producers

together with interventions in housing (Wang et al. 2009), sanitation, nutrition, immunological response (Niranjan et al. 2008; Tactacan et al. 2009) and disease control which would greatly increase output and have a positive impact on human health and nutrition and the smallholder producers would be the principal beneficiaries of these interventions in improvements to food security and nutritional status and in reduced production risk (Wilson 2010).

Table 4 Problems encountered by the poultry farmers in Rajshahi, Bangladesh

Nature of the problems	IND	Farm owners	
		EXO	CRO
Poor housing pattern	44.86	29.08	26.06
Lack of capital	41.86	28.12	30.02
Outbreak of diseases	16.02	45.16	38.82
Disorganized and unreliable marketing system	12.78	52.05	35.17
High cost of day-old chicks and price variation	9.27	44.71	46.02
Scarcity of feeds and/or high cost of feed	8.86	49.07	42.07
Non-availability of good quality feed	6.32	48.02	45.66
Lack of training and extension services	6.07	46.27	47.66
Lack of adequate vaccines and medicines	5.56	48.66	45.78
Power (electricity) interruptions	5.11	48.03	46.86
Lack of institutional credit facilities	3.01	49.10	47.89

Figures are in percentage; chicken breeds are represented by IND= indigenous, EXO= exotic, and CRO= crossbred; each breed had 18 replicates.

Opinions regarding improvement of poultry farming: Poultry farmers opined strongly in favour of improved

Table 5 Opinions of the poultry farmers for improvement of poultry enterprise in Rajshahi, Bangladesh

Farmers' opinions	IND	Farm owners	
		EXO	CRO
Improvement of breeds by suitable genetic methods	30.04	36.05	33.91
Proper vaccination programme	25.03	38.02	36.95
Proper management and veterinary training for farmers	16.05	42.90	41.05
Low cost processed feed requirement	8.50	46.49	45.01
Assurance of easy bank loan system	7.90	46.01	46.09
Organized markets for buying and selling	7.50	46.90	45.60
Availability of medicinal and veterinary services	5.16	48.86	45.98
Subsidy on poultry feed	4.50	48.00	47.50
Proper breeding facilities	2.22	49.90	47.88
Direct co-operation from the Government	2.19	49.80	48.01

Figures are in percentage; chicken breeds are represented by IND= indigenous, EXO= exotics, and CRO= crossbred; each breed had 18 replicates.

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native breeds (30.04%), proper breeding facilities (49.90%) and government co-operation (48.01%) as shown in Table 5. The larger private farms used to rear the EXO and CRO chickens for breeding purposes. Saleque and Mustafa (1996) reported that poultry production was controlled by the integrated functions of the breeders, rearers, feed sellers and vaccinators. The productivity of the study area was hampered primarily due to disorganized marketing system of poultry and poultry products, and non-availability of high quality feed. The supplementary feed was found essential for a better productivity of poultry. On the other hand, the farm owners commented that with proper vaccination programmes, coupled with the low-cost processed feed and subsidy on poultry feed were essential for the development of poultry enterprise in the study area.

Conclusions

Only a small proportion of poultry farms in the study area were found to maintain satisfactory management practices which must be monitored regularly to increase productivity. In addition, proper vaccination programmes against the most frequent diseases like bacillary white diarrhoea, omphalitis and hypervitaminosis are to be launched. The existing IK practices are to be preserved and the farmers need to be encouraged and/or motivated to use them. Most importantly, attentions are to be paid to the problems and opinions put forward by the poultry farm owners of the study area.

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