International Journal of Advanced Multidisciplinary Research (IJAMR)
ISSN: 2393-8870
www.ijarm.com

Research Article
Production and Economic Performances of Broilers Farming with or without Bio-security Management Intervention during winter.

Younus Ali[1], Dr. Syed Sarwar Jahan[1], Dr. Akhtarul Islam[1], Dr. Md. Aminul Islam[2]

[1]Department of Animal Husbandry and Veterinary Science, University of Rajshahi, Rajshahi 6205
,[2]Department of Dairy & Poultry Science, Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur1706, Bangladesh

Corresponding Author : *Syed_jahan@yahoo.com*

Keywords

Broiler farming;
production;
winter season;
profitability;
farm size

Abstract

A survey study was undertaken to determine the productive and economic performances of broiler farming with or without bio-security managementconditions during winter season reared in different locations; Pabna, Rajshahi and Kishoregonj of Bangladesh having 20 broiler farms in each location. Data were collected from a total 60 broiler farms by using semi structured questionnaire.According to bio-security standard of small broiler farm, those farms that got above 60 marks were treated bio-secured farms and below 60 non-bio-secured farms (out of 100). Of 60 farms, 18% farms of 500 broilers, 15% of 600, 18% of 700, 17% of 800, 15% of 900 and 17% of 1000 broilers. In case of productive performance, body weight, FC and FCRshowed better trends as the farm size increased and significant differenceswere found among the farm sizes. When farms of similar sizes were maintained with bio-secured conditions,overall, FCR tended to be better than non bio-secured managed farm.Benefit cost ratio were found higher trends as the farm size increased for both conditions. Raising farm sizes (500,600) had smaller (or no) profit under non-bio-secured conditions but profitability may ensure if bio-security intervention is practiced in winter season.Overall performance was better in winter comparison to the summer. Analysis of cost and returns showed that cost of farming per bird decreases and return increases as the farm size increases for both conditions. Concluded that satisfactory productive performance is achievable and profitability may be improved from broiler farming if bio-secured intervention is made during winter.

Introduction

Bangladesh is an agriculture based tropical country where more than 80% of the country's 150 million people are living in rural areas and are highly dependent on agriculture. Poultry farming is one of the major activities in rural areas as it provides immense employment opportunities to the local communities especially for youth & women that helps in poverty reduction, ensures food security and improves the nutritional status. Commercial broiler farming, currently, has become a promising and dynamic industry with vast potential and serves as a tool for poverty reduction through self-employment and income generation for unemployed family members (Raha,2007). Due to short life cycle, low capital investment and quick return in broiler farming may be a good source of income to rural farmers throughout the year (Bhende, 2006). Broiler farming plays a significant role in improving the livelihood of the farmers that reflects to improve socio-economic conditions and increase women empowerment among rural people of Bangladesh (Rahman et al., 2006).

Consumption of protein of animal origin is much lower in Bangladesh than in some other countries of the world. According to Ali and Hossain (2012) with referring FAO statistics, the per capita availability of all meat is only 14.67-kg as against the requirement of 56 kg. The per capita poultry meat availability is approximately one-fifth of the consumed meat (3kg) which needs to be increased more than double to satisfy the current demand of 7.67kg (Begum et al., 2010).

So, there is a huge gap between requirement and availability of meat for human consumption. Statistics revealed that three is a big opportunity to increase the production through commercial broiler farming. The profitability of broiler farming is affected by various factors, for example flock size, management practices, technical knowledge, bio-security effect, quality chick & feed etc. Practicing of bio-security plays an important role for maximizing the profitability(Saleque and Rosen 2011).

Poultry sector especially in commercially level of Bangladesh grew by 20% annually up to 2007 and has been supporting to livelihood of 6 million people directly and indirectly through 1,50,000 commercial farms. The total direct investment in this sector is about TK. 15000 crore (US$ 2.14 billion) (Nutritional Poultry Policy 2008). However, between 2007 and 2008, outbreaks of avian influenza affected seriously both commercial and households poultry and resulted a huge loss of TK. 4000 crore (US$ 600 million) (BLRI, 2008). HPAI and other diseases still remain due to various factors as multi age production practices, mixed farming, unstructured intensive poultry framing, contact with migratory and wild birds, large imports of poultry and poultry products, frequently cross border movement of people, high regional farm density and unregulated wet markets. Bio-security demands for policy intervention, networking with public and private partnership, enhanced practice and promotion by the all stakeholders in order to protect poultry farming for maximizing the profit, producing safe food and also exploring the opportunity to enter into export market (Saleque and Rosen 2011).

Due to high price of chick and feed, farmers are often failing to get fair price of live broiler. Thus, farmers are demotivated to continue the farming. Besides, some farmers are non-trainedand they do not have adequate knowledge about bio-security managementof broiler farming and how to make profitability production. The farm sizes are also affected to their management procedure and consequently their profit. The Government and NGOs always encourage of rural farmers for poultry production but the minimum farms size for profitability production is yet to be determined. It is therefore important to generate information on profitability from broiler farming currently in practice under bio-secured and non- bio-secured conditions during winter season. Therefore, the present study was taken to determine the productive and profitability performance of bio-secured and non-bio secured broiler farming during winter seasonunder field conditions reared in different locations of Bangladesh and to compare seasonal variations in constraints faced by the farmers.

Materials and Methods

For obtaining information from farmers who reared broilers under bio-secured and non bio-secured condition during winter season at different locations in Bangladesh, field level data were collected from a total of 60 broiler farmers by using semi-structured questionnaire throughdirect interviewing. Total 03 districts; Rajshahi, Pabna and kishorgonj were selected having 20 broiler farms in each.The data were collected using a questionnaire survey between January 13 and December, 2013. Total60 broiler farms were selected as two categories; biosecurity and non- bio-secured by using measures of biosecurity standard which were based on marks. These farms were selected under consideration feed and broiler strain of the same company in that areas.Within total of 60 farms, 30 were bio-secured and 30 were non bio-secured in the three districts.According to bio-security standard of small scale broiler farm, those farms that got above 60 marks were treated bio-secured farms and below 60 marks non bio-secured farms out of 100 marks (sources: Third meeting 12 November, 2009 of PTDDP Biosecurity Standard Development Committee, Bangladesh Livestock Research Institute (BLRI), Savar, Dhaka).Among 60 farms, 11 broiler farms size were 500 birds, 09 of 600 birds, 11 of 700 birds, 10 of 800 birds, 09 of 900 birds and 10 of 1000 birds respectively. Farms with non-bio-secured intervention had a number of weakness in bio-security management of which frequent entrance of visitors, no using foot bath, no using lime around the farm, no maintain vaccination schedule, no proper disposal of dead chick, lake of ventilation, no spray visitor before entering, indiscriminate use of antibiotics were in major problems. Analysis of data was performed by SPSS 11.5 (2003) and comparisons of the results were made between farms with bio-secured and non-bio-secured intervention in terms of productivity and profitability.

Results and Discussion

Production Performance

Table 1 shows the highest feed consumption was observed in farm size of 700 than that of other farm sizeshaving bio-secured intervention. Lowest marketable body weight with higher FCR was observed in 500 farm size for both interventions. In 500 farm size ate more feed but comparatively lower FCR trends value were in 600, 700, 800,900 and 1000 farm sizes in both management conditions in Table 2 & 3. Relatively lower FCR was observed in bio-secured managed farm in compared with non bio-secured. Insufficient technical knowledge, low level education, little or no training might have resulted in poor management practices in small- medium size farms that might be the reasons of higher FCR. Average FCR value of different farms was found 1.74 (Table 3) in non bio-secured management intervention which is close to the early report (2.00) of Jaim and Islam (2008) and slightly lower than those of Chand et al. (2009) who reported that the values to be 1.93 to 1.94. Small-scale broiler operation in Botswana field survey primary data also reported that the inferior feed efficiency values (2.72 kg feed/kg broiler) was result of the poor managerial practices, feed wastage and variable quality of feed (Badubi et al., 2004).

Table 1: Effect of farm size on growth performances of bio-secured broiler farming in winter season

Variable					
Farm size	**MB WT (kg)/broiler**	**Marketing age (day)**	**FC (Kg)**	**FCR**	**Survivability**
500	1.80b	33.17	2.92[b]	1.63[a]	97.18
600	1.86b	34.25	2.97[b]	1.60[a]	92.22
700	1.93a	35.75	3.15[a]	1.64[a]	96.99
800	1.86b	35.25	3.05[a]	1.64[a]	96.75
900	1.99a	34.20	3.11[a]	1.56[ab]	95.44
1000	1.94a	33.40	2.95[b]	1.52[b]	92.73
SED	0.023	0.376	0.024	0.018	0.814
Level of significance	**	NS	*	*	NS

FC, Feed consumption; Means having dissimilar superscript differ significantly; **, P<0.01; *, P<0.05; NS, Non-significant.

Table 2: Effect of farm size on growth performances of non- bio-secured broiler farming in winter season

Variable					
Farm Size	**MB WT (kg)/broiler)**	**Marketing age (day)**	**FC**	**FCR**	**Survivability**
500	1.65[b]	34.25	3.13[a]	1.90[a]	93.95
600	1.74[a]	33.80	2.92[b]	1.68[c]	94.96
700	1.77[a]	34.25	2.77[c]	1.57[c]	93.72
800	1.73[a]	33.60	3.13[a]	1.82[b]	96.75
900	1.70[a]	34.00	2.81[bc]	1.66[c]	94.07
1000	1.75[a]	36.00	3.05[a]	1.74[b]	91.83
SED	0.022	0.297	0.051	0.038	0.370
Level of significance	**	NS	*	**	NS

FC, Feed consumption; Means having dissimilar superscript differ significantly; **, P<0.01; *, P<0.05; NS, Non-significant.

Table3: Effect of farm category on growth performances of broiler farmingduring winter

	Variable				
	MB WT (kg)/broiler	**Marketing age (Day)**	**FC Kg/bird**	**FCR**	**Survivability %**
Farm Category (FC)					
Bio-secured managed Broiler Farm	1.89	34.21	3.02	1.60	95.28
Non Bio-secured managed Broiler Farm	1.72	34.05	2.97	1.74	94.72
SED	0.02	0.30	0.05	0.04	0.37
Level of significance	**	NS	NS	**	NS

FC, Feed consumption; **, P<0.01; NS, Non-significant.

Feed consumption had decreasing trends with increasing farm size of the farm and higher marketable body weight gain resulted lower FCR trends under both management conditions (bio-secured and Non bio-secured) which is similar to findings of Kawsar et al. (2013). Significant differences were found (P<0.01) of body weight and FCR between the farm categories (bio-secured & non bio-secured). Feed conversion ratio decreased trends as the size of the farm increased in the non bio-secured condition and it showed lower trends of bio-security intervention in compared with non bio-secured .This may have been due to the fact that larger bio-secured managed farmers were

trained on technical support with bio-security management practices of broiler farming and thus bio-security intervention was practiced properly. Survivability was found to be satisfactory under both conditions probably due to the fact that the broiler farmers were more aware of vaccination. Chand et al. (2009) also suggested that the profitability is enhanced if farmers are properly trained to improve FCR value thereby reducing production cost and if bio-security is strengthened to reduce mortality under field condition. Sonaiya (2009) indicated low bio-security as being one of the technical factors contributing to productivity and profitability of smallholder family poultry. Jaim and Islam (2008) concluded that feed consumption was lower and efficiency was higher in technically bio-security supported farms than that of non-supported farm. FCR values of bio-security managed farm at field level in the present study were 1.80 to 1.66 approximately similar to the value of 1.6kg feed/kg weight gain that would be expected for modern broiler strain at ages of five weeks under improved management conditions (Anon 2001).

Production performance and rearing seasons

Significant seasonal variations were found in case of body weight, feed consumption and feed conversion whereas survivability was not affected by season (Table 4). Birds reared in winter gained more weight (1.82 kg/bird)thansummer (1.73 kg/bird). Growth depression recorded in the study during summer than winter season which could be explained by the reduced feed intake as regulated by elevated environmental temperature and relative humidity (Scott et al., 1982; Sundararasuet al., 1989). Ferket and Gernal (2006) reported that environmental stresses had the most profound effects on flock-to-flock variation of feed intake that influenced both the body weight and feed conversion in meat type poultry. Due to in-house comfortable condition and higher feed intake during winter more amount of nutrients were available for maximum body tissue synthesis that resulted in higher growth of broilers (Baghel and Pradhan 1989a).

Table 4: Seasonal variation in growth performance of broilers

Parameter	Season (SE)			SED	Level of significance
	Summer		Winter		
Body weight (kg/bird)	1.73		1.82	0.016	**
Feed consumption (kg/bird)	3.13		3.00	0.028	*
Feed conversion ratio	1.82		1.66	0.022	**
Survivability (%)	94.57		95.04	0.339	NS

**, P<0.01; *, P<0.05; NS, Non-significant

Economic performance

According to Table 5 &6, size of the farm had a negative relationship with cost of raising broiler. So, larger the flock size resulting lower the production cost was observed having bio and non-bio-secured conditions. Benefit cost ratio was higher trends with an increase in the size of the farm in accordance with Islam et al. (2010) and this was found for the both conditions. In case of farms without bio-security, BCR in 500 farm size was 1.01, 600 farm size was 1.07, 700 farm size was 1.12, 800 farm size was 1.08, 900 farm size was 1.11 and 1000 farm size was 1.29 which indicates that farming had smaller/or no profit while bio-security management intervention practiced the profit as the size of the farm increased (Table 6). Begum et al. (2009) reported that the net return per broiler was more and 1.4 times higher in scientifically managed farm than that of private farm that reared broiler without management intervention. Those results are also in agreement with the result of Badubi et al. (2004) who reported that a better trained class of farmer, who could effectively seek out and process new information and who could keep accurate financial record, earned higher profit. Jaim and Islam (2008) studied, the impact of technical intervention on profitability of village based medium-scaled broiler enterprise in Bangladesh. On the basis of comparative profitability analysis between with and without bio-security intervention, they concluded that technical intervention could make a significant contribution in alleviating rural poverty by enhancing profitability. In the present study, the results showed that total production cost/ broiler decreased trends as the farm size increased. Significant difference (P<0.01) was found of BCR between the farm categories in Table 7. Return/ broiler increased with increasing size of the farm when the farms were significantly bio-secured managed. But this was not great in non bio-secured management broiler farming. The present study also showed that, as the farm size increased, the BCR was higher trends indicating the possibility of more return if the farm size is further increased. Therefore, the profitability of broiler farm containing 700 broilers is more than those of 500 and 600 farm sizes. It seems reasonable to advise the farmers to increase their farm size more than 700 capacity and the farmers are to be trained and/or provided with technical support to earn profits. Regular monitoring on bio-security management practices of the broiler farming may be an added benefit to enhance the production as well as increase profitability.

Table5: Effect of farm size on profitability of bio-secured broiler farming during winter

	Economic parameter						
Farm Size	**Total cost/broiler**	**Return/ broiler**	**Droppings return/broiler**	**Gross return/broiler**	**Benefit cost ratio**	**Net return/ broiler**	**Net return/ Kg**
500	209.36[a]	234.22	1.33	235.33[d]	1.13	24.85	13.12
600	209.73[a]	241.15	1.30	242.45[c]	1.17	31.42	16.90
700	204.32[ab]	250.90	1.79	252.69[b]	1.24	46.58	24.09
800	197.79[b]	241.48	1.17	242.35[c]	1.23	43.69	23.26
900	195.76[b]	258.96	1.83	260.79[a]	1.34	63.20	31.52
1000	183.08[c]	252.20	2.02	253.81[b]	1.40	69.12	35.57
SED	3.00	2.95	0.12	3.03	0.03	4.42	2.20
LS	**	NS	NS	*	NS	NS	NS

LS, Level of significance; Means having dissimilar superscript differ significantly; **, P<0.01; *, P<0.05; NS, Non-significant.

Table 6: Effect of farm size on profitability of Non bio-secured broiler farming during winter

	Economic Parameter						
Farm size	**Total cost/ broiler**	**Return/ broiler**	**Droppings return/ broiler**	**Gross return/ broiler**	**Cost benefit ratio**	**Net return/ broiler**	**Net return/ Kg**
500	213.39	214.18[e]	0.92	215.09	1.01	0.79	0.57
600	212.11	225.94[c]	1.15	227.09	1.07	13.83	7.90
700	207.03	230.10[a]	1.51	231.61	1.12	23.07	12.88
800	208.70	224.38[c]	1.32	225.70	1.08	15.68	8.78
900	200.79	220.35[d]	1.49	221.84	1.11	19.56	11.89
1000	177.24	227.50[b]	1.32	228.82	1.29	50.26	28.72
SED	3.38	2.80	0.08	2.83	0.02	3.34	1.90
LS	NS	*	NS	NS	NS	NS	NS

LS, Level of significance; Means having dissimilar superscript differ significantly; *, P<0.05; NS, Non-significant.

Table 7: Effect of farm category on profitability of broiler farming during winter

	Parameter						
Farm Category (FC)	**Total cost Tk./broiler**	**Return (Tk./broiler)**	**Droppings return (Tk./broiler)**	**Gross return (Tk./broiler)**	**Cost benefit ratio**	**Net return (Tk./broiler)**	**Net return (Tk./Kg)**
Bio-secured managed broiler farm	199.92	246.26	1.59	247.68	1.25	46.34	23.97
Non Bio-secured managed broiler farm	207.84	223.66	1.26	224.92	1.09	15.82	9.03
SED	3.00	2.95	0.12	3.03	0.03	4.42	2.20
LS	NS	**	*	**	**	**	**

LS, Level of significance; **, P<0.01; *, P<0.05; NS, Non-significant; 1 US$ = BDT 78

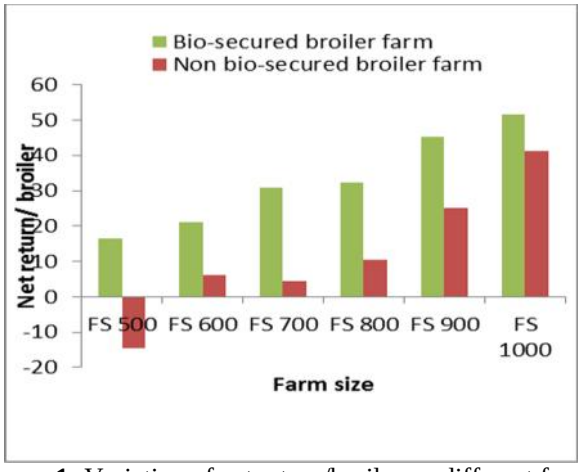

Figure 1: Variation of net return/broiler on different farm sizes under different farm bio & non bio-secured condition

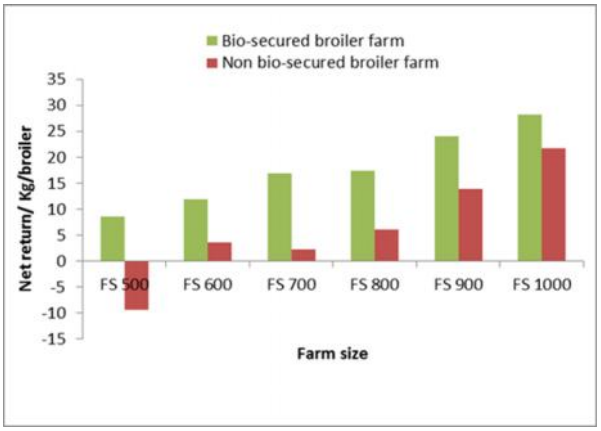

Figure 2: Variation of net return/kg/broiler on sizes under bio& non bio-secured condition

Effect of season on profitability

Significantly (P<0.001) highest gross return (Tk. 237.92) was found during winter season in compared with summer.Moreover, production performance was also higher in the same season (Table 4). Variation in market price of live broiler was the major contributing factor affecting gross return in different seasons. The average market price was BDT.129.00/kg in winterand BDT 109.00/kg in summer at producer level at the study areas. Most of the religious programme including get together ceremony are held in winter season so average broiler market price are found highest in compared with summers season. In addition, during summer season, broiler mortality is found slightly higher than winter due to heat stroke because of temperature raised 35-42^{0}C in summer at the study areas.

Table 8: Effect of season (SE) on profitability of broiler farming

Parameter	Season (SE)			SED	Level of significance
	Summer		Winter		
Variable cost (Tk/bird) Total cost (Tk./Br)	204.81		203.31	1.76	NS
Return (Tk./Br)	224.33		236.57	2.04	**
Droppings return (Tk./Br)	1.48		1.44	0.06	NS
Gross return (Tk./Br)	225.70		237.92	2.06	**
Benefit cost ratio	1.11		1.18	0.02	*
Net return (Tk./Br)	19.52		33.26	2.94	*
Net return (Tk./kg)	10.25		17.57	1.58	*

**, P<0.01; *, P<0.05; NS, Non-significant. I US$ = BDT 78.00

Significantly highest net profit per broiler or kg was found in the winter season when compared with that of summer season. During winter, broiler farming achieved highest performance in body weight, FCR and also in survivability. Therefore, highest net profit was attributed during winter than summer. Even sometimes it became loosing concern and farmers became disappointed and left production process. This happened due to the wide fluctuation of market price of live broiler that was mostly controlled by the middle men involved with this business. Fluctuation in market price of broilers affected the profitability, as pointed out by some other researchers as well (Roy, 2000; Raha, 2007). Tahura (2004) also described unstable and undeveloped broiler market as a top listed problem for broiler farming.

Conclusion

It was concluded that satisfactory productive performance and profitability of the broiler farms is achievable in rural households of the farmers if biosecurity intervention is made.In respect of farm sizes and farm category, the results of growth performance and cost and returns trend were found better in winter to the compared with summer. Excessive colds, low price of live broiler, poor management due to insufficient technical knowledge of the farmers, were the main constraints of broiler farming during winter.However, analyses of BCR values from cost and return indicate that a minimum farm size of 700 birds may be considered for profitable production.

Acknowledgments

The authors are grateful to Dr. AbdurRahman Howlider, Professor, Department of Poultry Science, Bangladesh Agricultural University, Mymensingh for helping with statistical advice. Partially financial support was extended by the Concern Worldwide, Bangladesh.

References

Ali, M. M. & Hossain, M. M. 2012. Problems and Prospects of Poultry Production Industry in Bangladesh: An Analysis. AIUB Bus Econ working Paper. Series, 2012-01, http://orp.aiub.edu/Working Paper/Working Paper/aspx?year=2012.

Bhende, M. J. 2006. Production and cost of broiler meat: A case study. Karnataka Agricultural Development and Rural Transformation Center, Research Report 9/ADRT/118. Institute for Social and Economic Change, Bangalore, India, March 2006.

Badubbi, S.S.,Ravindran, V. and Reid, J. 2004.A survey of small scale broiler production systems in Botswana.*Tropical Animal Health and Production* 36:823-834.

Begum, I. A., Buysse, J., Alam, M. J. and Vanhuylenbrooeck, G. 2010.Technical, allocative and economic efficiency of commercial poultry farms in Bangladesh. *World's Poult. Sci. Journal* 66: 465-475.

BLRI (Bangladesh Livestock Research Institute) Report 2008.A study on Highly Pathogenic avian influenza in Bangladesh.

Baghel, R.P.S. and Pradhan,K.1989a. Seasonal effect on carcass traits organ weight and processing loss in broilers.*Indian J. Anim Sci.* 59: 476-478.

Begum, I. and Alam, M. .J. 2009. Is vertically integrated poultry farming system pave the way of small scale poultry farmers in Bangladesh? *Revue Africanie De Sante de Productions Animales*.http://www.eismv.refer.sn

Chand, V., Chowdhury, S.D., Saha, M.K. and Hossain, M.K. 2009. IFC-SEDF sector studies a baseline surveys in poultry in Bangladesh. *Final report.* Associates for development Services limited, Dhaka, Bangladesh.

Ferket, P.R. and Gernat,A.G.2006. Factors that affect feed intake of meat birds: A review. *International J. of Poult. Sci*.5:905-911.

Islam, M.S., Takashi, S. and Chabbi, K.Q.N. 2010. Current scenario of the small scale broiler farming in Bangladesh: Potential for the future projection. *International J. of Poult. Sci*.9: 440-445.

Jaim, J. and Islam, M. N. 2008. Impact of technical intervention on profitability of village based medium scaled broiler enterprise in Bangladesh. *Progress. Agric.* 19 143-153.

Kawsar, M.H., Chowdhury, S.D., Raha, S.K. and Hossain, M.M. 2013. Impact of management intervention on productive performance and profitability of small-scale broiler farming in Bangladesh. *Livestock Research for Rural Development* 25 (5) 2013.

National Poultry Development Policy 2008.Ministry of Fisheries and Livestock, Government of Bangladesh.

Rahaman, S.M.A., Sayeed, M.A., Sarkar, N.R. and Alam, J. 2006.Impact of improved poultry management technique on socio-economic condition of broiler beneficiaries.*J. of Bangladesh Agric. Univ.* 4: 401-411.

Roy, B.C. 2000. Identification of constraints to broiler farming. *MS in Poultry Science Thesis*. Department of Poultry Science, Bangladesh Agricultural University, Mymensingh.

Raha, S.K. 2007. Broiler industry in Bangladesh: some issues. *Proceedings of the 5th International Poultry Show and Seminar.*World's Poultry Science Association, Bangladesh Branch, Dhaka, Bangladesh. pp. 1-9.

Saleque, M.A. and Rozen, S.M. 2011. Biosecurity: demand for policy, partnership, practice and promotion to protect poultry. *Proceedings of Seventh International Poultry Show and seminar*, WPSA-BB, Dhaka, Bangladesh.

Scott, M.L., Neshiem,M.C. and Young,R.J. 1982. Nutrition of the chicken. 3rd Edn., M.L. Scott and associates Publishers, Ithaca, New York.

Sundarasu, V. R and Prabakaran, 1989. A study on the effects of strains and seasons on commercial broiler production- an economic approach. *Indian J. of Poult. Sci*.24: 12-14.

Sonaiya, E.B. 2009. Some technical and socio-economic factor affecting productivity and profitability of smallholders family poultry. *World Poult. Sci. Journal* 65:132-138.

SPSS, INC. (2003). SYSTAT Statistics.Version 11.5. SPSS Inc. Chicago, NL.

Tohura, S. 2004. Economics scale of commercial broiler farming in SadarUpazila of Rangpur district. *M S Thesis*, Department of Agricultural economics, Bangladesh Agricultural University Mymensingh, Bangladesh.