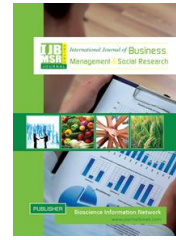




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Livelihood improvement of small farmers through family poultry in Bangladesh

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ABSTRACT

The present study was undertaken to examine livelihood improvement of small farmers through family poultry by income and employment generation. The data were collected from 60 family poultry farms families from two upazila of Mymensingh district through direct interview method. As analytical tools simple statistical measures, Cobb Douglas production function was used to observe the impact of explanatory variables on gross return while problem confrontation index (PCI) was calculated in order to ascertain the extent of severity of problems confronted by family poultry farmers. It was found that family poultry farming was chosen by 100% farmers as subsidiary occupation. Small farmers earned an income of Tk. 3705.95 per year as net return from family poultry farming and it generated on average 53.23 working man days per year as employment especially for women. As regards of livelihood improvement, family poultry farming changed food habit, increased knowledge and skill, savings, social status, recreational facility, improved food nutritional condition, family health and sanitation and enhanced women empowerment. Among the explanatory variables observed bird cost, feed cost, labor cost had positive and significant impact on gross return and impact of transportation & marketing cost was positive but insignificant. Outbreak of disease was found as the main setback in family poultry production.

Key words: Cost, return, profitability, employment generation and income generation

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I. Introduction

Bangladesh mainly depends on its agricultural sector and this sector is divided into various sub-sectors. Among various sub-sectors livestock is one of the most important sub-sectors in the economy. At present livestock contributes 2.50% to Gross Domestic Product (GDP). Livestock especially poultry

contributes significantly to the welfare of the people both at household level and national level. Overall, the annual average growth in poultry production from 2005 to 2011 was 3.7% (BER, 2011). Among poultries family poultry raising is common in the rural communities of low income countries. In Bangladesh 90% of rural households raise poultry (Sultana et al., 2012) and traditionally women and children are the raisers of these birds (Huque, 1999). Family poultry enables the poor farmers without substantial amounts of land, training and capital to earn income from birds scavenging on common property, village land or fed household waste. It has been shown as an important source of cash income to families in Asia (Ramm et al., 1984) and Latin America (Rauen et al., 1990). There are three production systems for family poultry - free range, backyard and small-scale intensive with productivity of 20-60, 30-100 and 80-150 eggs/hen/year, respectively. Body weights of 1.2 kg and 800 g were obtained at 32 weeks for normal size and dwarf breeds of local chickens in the free-range system (Sonaiya et al., 1999). The production system for indigenous chickens is smallholder backyard scavenging in nature with each family keeping an average of 6-7 chickens to meet family requirements and from which a cash income can also be derived when necessary. Among said indigenous chicken genetic resources non-descript Deshi Aseel and Naked Neck breeds are noteworthy. The non-descript Deshi chicken constitutes about 90% of the indigenous population. Also known as 'Murghi' they have undergone unknown periods of natural selection and are a reservoir of excellent genetic diversity (Bhuiyan et al., 2005).

In Bangladesh, the family poultry contributes to the improvement of diet for the people, to the livelihood of rural families and to the national economy. In 2004, 2 kg of the 4.6 kg per capita poultry meat consumption came from family poultry in Bangladesh. The annual egg production from the 'family poultry' is estimated to be 4.4 billion, which is 67% of the total egg production (Sultana et al., 2012). The Bangladesh Rural Poultry Development Programme clearly showed that families without poultry were poorer than those with poultry (Jensen, 1996) and that poultry was usually the first step in the drive towards increased incomes through the acquisition of larger animals like goats, sheep and cattle (Saleque and Mustafa, 1996). Thus the present study attempted to examine income generation, factors affecting income generation, to inspect employment generation, to observe the impact of family poultry on livelihood improvement and to identify the problems faced by family poultry farmers.

II. Materials and Methods

The present study was conducted in two upazilas viz., Trishal and Sadar of Mymensingh district. In the study area, among identified 300 small farms (0.05-2.49 acres land holding) that have family poultry, 60 farm families were selected randomly. Primary data were collected by a pre-tested structured interview schedule through direct interview method during the months of January to March, 2013. Simple statistical measures such as mean, average, percentage were used for categorization and calculation of data. Describing the impact of selected independent variables (bird cost, feed cost, labor cost, medicare cost, transportation and marketing cost) on gross return multiple regression analysis (Cobb Douglas production function) was employed. The annual depreciation cost was worked out as follows:

$$\text{Depreciation} = (\text{Original value} - \text{salvage value}) / \text{Life time of the asset}$$

In order to ascertain the extent of severity of problems confronted by family poultry farmers problem confrontation index (PCI) was calculated. The problem confrontation index of any problem could form score 0 to 300 where '0' indicating no problem, '300' indicating high problem and it was computed by using the following formula:

$$\text{Problem Confrontation Index} = Ph \times 3 + Pm \times 2 + Pl \times 1 + Pn \times 0$$

Where,

Ph = Total number of the small farmers expressed 'high' problem

Pm = Total number of the small farmers expressed 'medium' problem

Pl = Total number of the small farmers expressed 'low' problem

Pn = Total number of the small farmers expressed 'not at all' problem

III. Results and Discussion

To examine the impact of family poultry farming on the livelihood improvement, it is necessary to know the socioeconomic characteristics of the poultry farmers. The socioeconomic characteristics of farmers influenced their daily life. Some socioeconomic characteristics such as occupational status, farm size, etc., are discussed in the following sections.

Farm size

Table 01 reveals that the all family poultry farmers had homestead land and half (55%) of them had own crop land. It was observed that average farm size owned by family poultry farmers 1.74 acres. Thirty five percent farmers' possessed rented in land and 5% mortgaged in land.

Table 01. Land information of the family poultry farmers

Type of land	Average land holding	Number	Percentage
Homestead	0.21	60	100
Own crop land	1.08	33	55
Rented in	0.42	21	35
Rented out	-	-	-
Mortgaged in	0.03	3	5
Mortgaged out	-	-	-

Source: Field survey, 2013.

Occupational status of the family poultry farmers

In the case of occupation the highest proportions (43%) of the family poultry farmers were engaged in agricultural sector as main occupation followed by business (20%), service (10%) and others (27%). Others occupation means rickshaw pulling, day labor, etc. In the case of subsidiary occupation, family poultry farming was being chosen by 100% respondents that mean all farmers were involved in family poultry farming (Table 02).

Table 02. Occupational status of the family poultry farmers

Occupation	Main		Subsidiary	
	Number	Percentage	Number	Percentage
Business	12	20		
Agriculture	26	43		
Family poultry	0	0	60	100
Service	6	10		
Others	16	27		
Total	60	100	60	100

Source: Field survey, 2013.

Income generation

Income generation is the primary goal of family poultry keeping. Eggs can provide a regular income while the sale of live birds provides a more flexible source of cash as required. For example, in the Dominican Republic, family poultry contributes 13% of the income from animal production (Rauen et al., 1990, cited in Sonaiya et al., 1999). Though the number of chicken varies year round, during the study period average number of chicken per family was found 9. The costs and returns were calculated

to analyze income generation from family poultry farming. Family poultry farming includes different types of cost and return described in this section under the following heads.

Fixed cost

Housing cost: In the present study, poultry shed were found both inside and outside of living house. At living house poultry sheds were observed as, straw or plastic paper on floor without any cage, straw or plastic paper on floor with cage on large piece of wood, on cage or basket made by bamboo, without any shed at store room. The outside poultry shed were observed box shaped and made of materials such as old tins, iron sheets, woods, bamboos and plastic bags. The cost of housing was calculated by taking into account of the depreciation cost and repairing cost. The average cost of providing housing facilities was 7.92% of the total cost (Table 03).

Tools and equipment's cost: Tools and equipment's like cooking pot, water jar, egg cage, plastic bowl, clay pots and tin can were used for feeding and drinking. Tools and equipments cost (Tk. 144.30) was determined by applying straight line depreciation method for one year.

Table 03. Annual average cost and return of family poultry farming

Cost/Return	Particulars	Taka	Percentage of total
Variable cost	Bird cost	370	8.97
	Feed cost	913	22.13
	Labor cost	1620	39.26
	Medicare cost	268	6.49
	Transportation & marketing cost	300	7.27
	Interest on operating capital	184.25	4.46
	Sub total	3655.25	88.58
Fixed cost	Depreciation on housing	327	7.92
	Depreciation on tools & equipments	144.30	3.50
	Sub total	471.30	11.42
Total cost		4126.55	100
Return	Bird and egg sold	3145	40.15
	Bird and egg consumed	2327.50	29.72
	Total	5472.50	69.87
	Value of present stock	2360	30.13
	Gross return	7832.50	
Gross margin		4177.25	
Net return		3705.95	
BCR		1.90	

Source: Field survey, 2013.

Variable cost

Bird purchasing cost: Bird purchasing cost is the primary cost for the family poultry farmer which varies from one family to another according to the size and numbers of bird. Average price of parent stocks was Tk. 320 to Tk. 370 hen⁻¹ and Tk. 350 to Tk. 400 duck⁻¹ found in the study area. The annual average purchasing cost of birds was 8.97% of total cost (Table 03).

Feed cost: Family poultry usually has to find food for them. The opportunity to scavenge is a way of allowing the poultry to collect some supplementary feed which maintain their nutritional deficiency. Feeding is mainly limited to insects and kitchen wastes. Bran (mainly rice) and grains are sometimes given to family poultry as well. In this study, the annual average feed cost per family poultry farm was 22.13% of total cost (Table 03).

Human labor cost: It was observed that most of the labor was given by female person. The cost of hired labor was absent for the family poultry. Usually women work one or two hours per day besides their household chores. Human labor cost was 39.26% of total cost found in the study area (Table 03).

Medicare cost: Medicare cost is another important cost item of family poultry production. It includes cost of vaccine, medicine and fees of vet. It was reported that medicare cost (Tk. 220 to Tk. 280 per year) is negligible. The annual average medicare cost was 6.49% of total cost (Table 03).

Transportation & marketing cost: In the present study, transportation and marketing cost included expenses on transportation for purchasing chicks, parent stock, feed, etc., and for selling bird and egg. Transportation and marketing cost per family per year was calculated at 7.27% of total cost (Table 03).

Return

The return items include the value of chicken and duck sell, egg, chicks and gift, etc. The value of adult poultry was calculated on the basis of weight (kg) of live birds sold, multiplied by the average price of that birds prevailing at the market. The value of per adult chicken was Tk. 320 to Tk. 370 and per duck was Tk. 350 to Tk. 400 in the study area. The price of egg varied from Tk. 26 to Tk. 42 per *hali*. Table 03 reveals that annual average gross return was Tk. 7832.50, net return was Tk. 3705.95. Thus the family poultry farming is profitable and financially efficient (BCR=1.90). Karim (2010) showed that by rearing smallholder family poultry (16 chickens) a woman can add about Tk. 5085 to her family income of TK 74003 in a year, or 6.87 percent.

Functional analysis

To investigate the factors affecting production of family poultry Cobb-Douglas production function was employed (Table 04).

Table 04. Estimated values of coefficient and related statistics of production function

Variable	Estimated coefficient	t-statistic
Bird cost (X_1)	0.38**	3.45
Feed cost (X_2)	0.45**	7.12
Labor cost (X_3)	0.29*	2.41
Medicare cost (X_4)	0.23	1.26
Transportation and marketing cost (X_5)	0.19	1.23
Intercept	2.25	4.87
R^2	0.88	
Adjusted R^2	0.79	
F-value	218.57	
Returns to scale	1.54	

** Significant at 1 percent probability level and * Significant at 5 percent probability level.

Source: Field survey and author's estimation, 2013.

The estimated coefficients reveal that the regression coefficients of bird and feed cost for family poultry were positive and significant at 1 percent probability level. Labor cost for family poultry was positive and significant at 5 percent probability level. Also, the result of the analysis indicated that 1 percent increase in bird and feed cost keeping other factors constant would result in increase in the gross returns by 0.38 percent and 0.45 percent for family poultry farm, respectively. The transportation and marketing cost have positive effect on production, but in the study area farmers usually have little transportation and marketing cost. Normally, they used to go to the village market by walk. Therefore this important variable is insignificant. In the study area, if any disease occurred, they brought medicine from local dispensary at low cost for their birds. The cost of medicine was very low in the study area. Therefore this important variable cost is insignificant.

The F-value of the equation is significant at 1 percent level of significance implying that the variation in poultry farms depends on the key explanatory variables included in the model. The overall performance of the Cobb-Douglas model for family poultry farming was satisfactory as indicated by the estimated $R^2=0.88$ and $F\text{-values}=218.57$. This indicates that the model was good fitted by the independent variables. The sum of estimated coefficient (1.54) implies that the production function exhibited increasing returns to scale.

Employment generation

Women of small farm families generally involve in family poultry production and rearing. It provides employment to the farm family during both the on and off season of crop farming especially women. It was reported that they spend about 70 minutes per day in feeding and nurturing family poultry. They remained idle after completing household chores before involvement of family poultry farming. Table 05 depicts that after involvement in family poultry farming, on average 53.23 man days in a year employment opportunity was generated.

Table 05. Average change in employment

Time period	Average working man days a year	Change in working man days	Change in percent
Before involvement in family poultry	-	53.23	100
After involvement in family poultry	53.23		

Source: Field survey, 2013.

Impact Analysis for Family Poultry Farming

The impact of family poultry farming on livelihood improvement after family poultry rearing in terms of the changes in different types of livelihood assets, food intake, health, sanitation, etc., shown in this section.

A livelihood is the set of capabilities, assets and activities that furnish the means for people to meet their basic needs and support their well-being. The building of livelihoods reflects and seeks to fulfill both material and experimental needs. The members of a family combine their capabilities, skills and knowledge with the different resources at their disposal to create activities that will enable them to achieve the best possible livelihood for themselves and their family as a whole (Messer and Townsley, 2003). Table 06 shows that family poultry farming can bring a significant change in livelihood pattern as they have an opportunity to avail education, savings, daily protein intake, health and sanitation, upgrade social status, recreation facility, etc. Poultry keeping is traditionally the role of women in many developing countries. Female-headed households represent 20% to 30% of all rural households in Bangladesh (Saleque, 1999, cited in Sonaiya and Swan, 2004). Women look after the birds and earnings from sale of egg and chicken are often a significant source of their cash income (Sonaiya et al., 1999). They met up their daily necessities such as paying school fee for their children, buying food and medicine, purchasing household equipments, joins in *Somiti*, etc., with the help of family poultry farming. Development of family poultry production will not only enhance the cash income of women but can lead to their greater empowerment when they participate as poultry advisers, extension workers and vaccinators.

Table 06. The extent of change in different development indicators

Indicators	Extent of change (%)		
	High	Medium	Low
Increased knowledge and skill	50	33	17
Improved food nutritional condition	50	40	10
Change in food habit	53	44	3
Improved family health and sanitation	40	44	16
Increased savings	23	50	27
Increased social status	27	53	20
Increased recreational facility	33	47	20
Women empowerment	48	34	18
All	41	43	16

Source: Field survey, 2013.

Problems in Family Poultry Farming

The scenario in the family poultry farming is obscure and full of risk and uncertainty. It is suffering from various problems and does not have a scope to compete with the commercial poultry farm. Lack of adequate and proper market information, no-reliable statistics on demand and supply situation etc., make the household farming back behind. Economic problem, marketing problem and environmental problems faced by the family poultry farmers described in the following section.

Economic problems

Lack of capital and credit institution: Cash capital and investment is an important input for enlargement of any farm. Formal credit from different institution is very difficult to get and it requires complicated procedure. Therefore, farmers borrowed money from land lord or *mahazon* or other person (relative and neighbor) against interest rate. For this reason farmers faced the problem of loan repayment later on.

Higher price of feed: Farmers do not offer extra food for feeding family poultry. For proper growth, poultry require balance feed. But the price of feed was higher. Because of high price of feed, only a few number of family poultry farmers could buy feed.

Price fluctuation of poultry: Family poultry farmers were not sure of their profit margin. Sometimes, price of poultry became low and while sometimes, it fluctuated regarding broiler price or other meat price. As the poultry producers are rural poor, they often did not get real and or expected price of their poultry and eggs.

Social and natural problems

Problem of thief: Risk of theft was found very common for family poultry. Greediness was the main cause of that delinquency. It was evident that mainly adult poultry birds were theft by human being during day time. It seems difficult to ensure security of scavenging poultry.

Predatory animals: Almost every family poultry farmer faced problems of predatory animals. During summer and the rainy season, predators hunt after family poultry chicks and minimize a huge number of chicks in the study area. It reduces a large scale of family poultry production in Bangladesh. Predators such as snake, rat, dog, cat, fox and bird of prey, were the main causes of bird losses, especially young birds. Fragile shelters constructed by using locally available materials make security status vulnerable.

Outbreak of disease: Healthy birds are very essential for meat and egg. Main consideration for come down of family poultry is mortality of chick in early stage. In the rainy season and wet weather, disease

infects rapidly and create haphazard situation for chick mortality. High mortality occurred due to Ranikhet disease. Farmers faced other diseases as Gumboro, Fowl Pox, Fowl Cholera, etc. Farmers had to bear a tremendous loss due to Newcastle, Ranikhet and Gumboro. Farmers were not able to give appropriate treatment to family poultry as there was scarcity of proper vaccine and higher cost of medicine.

Environmental pollution: Scavenging poultry roam around and pollutes surrounding areas. It generates stink which leads to a quarrel with neighbors.

Marketing problems

Lower price of poultry meat and egg: Lower price of poultry was the most important marketing problem. Due to spatial price difference and small number of buyers at local markets family poultry farmers had less bargaining power and received lower price compared to urban market.

Lack of competitive market: Family poultry farmer did not face any competitive market situation. They sold their poultry and eggs as they can. Sometimes, they sold at very low prices to the villagers. They did not have any fixed buyer who could buy regularly at a reasonable price.

Technical problems

Lower quality of chick: Indigenous or local breeds are generally raised in family poultry production system. These birds are exposed to natural selection from the environment for hardiness, running and flight skills, but not for egg production. Local varieties of poultry are very sensitive to diseases and have a high mortality rate. Most of the farmers were facing the same problem.

Lack of training facility: Training facility enrich and upscale existing knowledge and experience. Family poultry farmers are still practicing traditional system as they do not have adequate knowledge of advanced poultry farming. Due to lack of training facility from extension worker, production rate of family poultry is declining rapidly.

Housing problem: Proper housing facilities could help to attain better production. Most of the farmers did not know how to make proper poultry shed. For this reason, birds did not get enough room and ventilation. Family poultry mainly remain in their shed at night. Most of the time, they perambulated outside of their shed. But farmers did not maintain proper space and quality while framing their house. That's why they faced risk of predation and theft.

Inadequate parent stock: Genetic potential is the most important for parent stock. Local variety has not enough growth potentiality. Adequate parent stock of family poultry is not available in Bangladesh. Due to the lack of quality parent stock, the productivity of family poultry is reduced markedly. Family poultry rearers do not follow a planned breeding programme which results close inbreeding among indigenous flocks and the ages and numbers of young birds fluctuate markedly.

The identified problems are similar to the findings of [Saleque and Islam \(2002\)](#) as the family poultry production goes through lots of economic, social, marketing and environmental constraints. Constraints facing family poultry production systems are related to high mortality mainly due to Newcastle (Ranikhet) disease, housing, feeding, breeding, marketing, training or education and credit. Productivity of the local hens is low and losses due to incidence of diseases and predators, inefficient management systems, lack of supplementary feeding, predators and inappropriate breeds.

The computed problem confrontation index (PCI) of the 14 problems ranged from 164 to 269, have been arranged in rank order according to the response of family poultry farmers. Data contained in Table 07 indicates that small farmers confronted the problem most is outbreak of disease as indicated by its PCI of 269. The second and third problems confronted by them were 'predatory animal' and

'high price of feed', respectively. In this way, the problem confronted least by the small farmers is 'environmental pollution'.

Table 07. Problems confronting by the family poultry farmers

Problems	Extent of problems (percentage)				PCI	Rank order
	High	Medium	Low	Not at all		
Economic problem						
Lack of capital	49	37	6	8	227	5
High price of feed	61	30	5	4	248	3
Price fluctuation of poultry	15	75	5	5	200	8
Lack of credit institution	4	81	10	5	184	11
Social and natural problem						
Problem of theft	6	69	15	10	173	12
Outbreak of diseases	82	11	1	6	269	1
Environmental pollution	9	62	13	16	164	14
Predatory animals	64	28	2	6	250	2
Marketing problem						
Lower price of egg	38	43	7	12	207	7
Lack of competitive market	10	79	10	1	198	9
Technical problem						
Lower quality of chick	59	24	6	11	231	4
Lack of training facilities	9	59	22	10	167	13
Housing problem	27	58	11	4	208	6
Inadequate parents stock	7	81	10	2	193	10

Source: Field survey, 2013.

Measures suggested by family poultry farmers

The farmers put forward following suggestions to overcome these problems of family poultry farming and to make family poultry farming more profitable:

1. The government and NGO's should ensure training on disease control, housing, equipment, feeding, genetic improvement and marketing besides social awareness building.
2. To avail feed availability, credit facility and good parent stock the government and NGO's should launch livelihood improvement project.
3. Vet service center and flexible market access opportunity should be facilitated by the government and NGO's.

IV. Conclusion

Family poultry rearing have been practiced for a long time in Bangladesh. Family poultry plays a significant role in the nutritional enhancement, income generation, self-employment, poverty eradication, women empowerment and improving the livelihood of small farmers. The study found the benefit cost ratio of 1.90 from family poultry, which indicated that family poultry rearing is profitable venture and a yearly net return of Tk. 3705.95. The production function analysis indicates that 1 percent increase in bird and feed cost keeping other factors constant would result in increase in the gross returns by 0.38 percent and 0.45 percent for family poultry farm, respectively. It provides employment to the women at both the on and off season of crop farming. On average 53.23 man days employment was created by women per year. Overall it changed food habit, improved family health and sanitation, increased savings and enhanced women empowerment of the poultry farmers. Now-a-days family poultry faces several economic, social and natural, marketing and technical problems. To solve these problems ensuring training on disease control, housing, equipment, feeding, genetic improvement and marketing, availing feed availability, credit facility and good parent stock by the government and non-government organizations were the suggested measures by the farmers.

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