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Research Note

ECONOMICS OF JAPANESE QUAIL FARMING IN DHAKA METROPOLITAN CITY

S. A. Siddique
M. A. S. Mandal.

ABSTRACT

A large number of small-scale commercial quail farms or 'QUAILARY have been established in Bangladesh in the recent years. The present study is based on primary data collected from 76 quail farms in Dhaka metropolitan city. The findings of the study clearly indicate that the large layer quail farms are more profit earners than the small layer farms. The results also show that chicks or pullet production is highly profitable, compared to egg production. Cobb-Douglas production function analysis suggests that most of the selected variables had significant impact on the quail farmers' return. The study identified a number of problems of raising quail such as high prices of feed, inadequate institutional credit, lack of veterinary services and medicine, lack of training on quail husbandry and inadequate product marketing facilities. Based on the research of the study, a tentative plan for setting up of a quail layer farm is also developed.

1. INTRODUCTION

Japanese quail *(Coturnix coturnix japonica) is* a recent addition to the poultry farming in Bangladesh. Quail farming for egg and meat is quite popular in Japan, Hongkong, Korea, China, Singapore, India, Thailand, Malaysia, Indonesia, France, Italy, Germany, Britain and Russia. In Bangladesh it was introduced for the first time in 1990. There are about 131 species of wild quail found all over the world (Goetz, 1987). Only Bobwhite quail *(Colinus virginianus)* and Japanese quail have been domesticated for commercial purposes. Japanese quail has several breeds and varieties of which Pharaoh (wild type), British Range, English White, Manchurian Golden, Tuxedo are most popular (Singh, *et al.*, 1982; Panda, *et al.*, 1987; Panda, 1990). Among these, Pharaoh is widely raised all over the world. It has two popular colour strains, wild colour and brown colour (Rahman, 1995). In Bangladesh only these two are commercially available. Besides, scientists developed many quail lines e.g. white egg shell line, meat line etc. In recent years, a large number of small scale commercial quail farms or 'QUAILARY' have been established in Bangladesh to raise quails mainly for hotels, shops and household consumption.

The first author is a Research Associate of the Research Project, "Irrigation Water Markets in Bengal" conducted by the Bureau of Socioeconomic Research and Training, Bangladesh Agricultural University, Mymensingh. The second author is a Professor of Agricultural Economics at the Bangladesh Agricultural University, Mymensingh and the Research Supervisor of the said Master's thesis.
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The protein consumption from animal origin in Bangladesh is significantly lower than in other countries of the world. The annual average deficit of meat is 3.81 million metric ton and the annual average deficit of chicken egg is 6939 million numbers. With the rapid increase in total population and urbanization the demand for poultry products has been increasing. To meet up the growing demand for poultry products without importing them, the development of poultry industry is very important. Quail does not only supply animal protein in the form of meat and eggs, but also provides a source of income. The quail farming as a supplement to chicken and duck farming has the unique advantage of tapping the growing market demand for poultry products.

A large number of educated people will also have to look for self-employment, given the limited scope for employment in the public sector. The time has now come for creating alternative employment opportunities for the educated people. The self-employment scheme is one probable answer and quail farming seems to be a promising enterprise in this direction.

The climate and natural condition of Bangladesh is also very suitable for quail rearing. Quail can be reared in this country throughout the year and shows a good performance in meat and egg production. It has a shorter life cycle and its production requires less capital and land. Quail may be a source of income in addition to chicken and ducks for its immense potentiality for meat and egg production (Paul and Sarker, 1992).

The quail farming witnessed rapid expansion in urban areas. These farms are producing meat, eggs and quail-chicks/pullets. However, quail farming has not yet been popularized in rural areas. It is very important to know the potential of and constraints to commercial quail farming in the socioeconomic context of Bangladesh. It implies that empirical studies should be conducted on the profitability of commercial quail farming and the socioeconomic problems faced by the quail farmers. In fact, there have been very little economic research in this subject in Bangladesh, which precludes any policy making with respect to development of poultry farming.

In this paper, an attempt was made to assess the relative profitability of quail farms and compare profitability between layer and breeding quail farms. This paper also attempts to determine the contribution of key variables to the quail production and to identify the major socioeconomic and technical problems faced by the quail farmers in Dhaka metropolitan areas of Bangladesh. The paper also presents a tentative plan developed for setting up commercial quail farms in Bangladesh on the basis of the findings of the study.

2. RESEARCH DESIGN

Selection of the Study Area

The quail farms are mainly established in urban areas, especially in metropolitan cities of Bangladesh and have not yet spread in rural areas. The present study was conducted at different locations of Dhaka metropolitan area, namely, Sher Sahsuri Road, Salimullah Road,

Humayuan Road, Sekher Tek, Tajmahal Road and Iqbal Road of Mohammadpur; Chhata Masjid Lane, Sultanganj and Sher-e-Bangla Road of Raer Bazar; Badda and Shahjadpur of Gulshan; Rokeya Sharani and Section-10 of Mirpur; Lalmatia and Manipuripara.

Collection of Data

The survey covered all of the 76 quail farms in the study areas. The owners of these quail farms were interviewed for collecting necessary information using structured questionnaire. The sample included 32 small layer farms, 30 large layer farms and 14 quail breeding farms. Farms were classified on the basis of total number of quails and product criteria. Farms producing eggs and having upto 500 birds were considered as small layer farms, those having 501 or more birds were considered as large layer farms, while farms producing mainly chicks/pullets were identified as breeding farms. The present study covered one year period from July, 1994 to June, 1995. Data were collected during the months of July to August, 1995 through personal visits and direct interviews with the quail farmers.

Analysis of the Data

Tabular, statistical and project appraisal technique were used for analysing the collected data. In this study, costs and returns analyses were done on both cash cost and full cost basis and Student's t-test was applied to test the observed difference between means. It should be noted that costs and returns were calculated on the basis of 100 quails for all types of farms in order to give the same weight.

The following. π (profit) equation was developed to assess the profitability of the quail farms :

$$\pi = P_e.E_s + P_e.E_c + P_e.E_g + P_q.\ Q_s + P_q.\ Q_c + P_q.\ Q_g - \sum_{i=1}^{n} (P_{xi}.X_i) \pm I_c - TFC$$

Where, π = Profit per quail farm per year (Tk.)

P_e = Per unit price of egg (Tk.)

P_q = per unit price of quail/chick/pullet (Tk.)

E_s = Total number of eggs sold in a year

E_c = Total number of eggs consumed in a year by the farm family

E_g = Total number of eggs gifted in a year

Q_s = Total number of quails/chicks/pullets sold in a year

Q_c = Total number of quails/pullets consumed in a year by farm family

Q_g = Total number of quails/chicks/pullets gifted in a year

P_{xi} = Per unit price of ith (variable) inputs

I_c = Value of change in inventory. (Change in inventory was measured by the difference between closing and opening stocks of quails)

Xi = Number/quantity of ith inputs (i=1, 2, 3, ... n)

TFC = Total fixed costs.

To determine the contributions of some selected factors to the production of quail farms, linear as well as Cobb-Douglas productions were tried, but the Cobb-Douglas production function was chosen for estimation because of the best-fit of the function with the sample data. The generalized specification of the function was;

$$Y = ax_1b^1x_2b^2x_3b^3x_4b^4x_5b^5x_6b^6 + Ui$$

The functional form of the Cobb-Douglas function was as follows:

$$LogY = loga + b_1logX_1 + b_2logX_2 + b_3logX_3 + b_4logX_4 + b_5logX_5 + b_6logX_6$$

Where,

Y = Return from egg and quails/chicks/pullets (Tk./100 quails/year)
a = constant or intercept.
X_1 = Cost of human labour (Tk./100 quails/year)
X_2 = Cost of feed (Tk./100 quails/year)
X_3 = Cost of veterinary services and medicine (Tk./100 quails/year)
X_4 = Cost of electricity and water (Tk./100 quails/year)
X_5 = Cost of marketing (Tk./100 quails/year)
X_6 = Number of quails (per sq. ft. floor space).

Discounted measures of project worth for financial analysis were also used for analysing data since undiscounted measures of project worth is unable to take into consideration the timing of benefits and costs throughout the project life. The discounted measures used in this study were Benefit-Cost Ratio (BCR), Net Present Worth (NPW) and Internal Rate of Return (IRR).

3. ANALYSIS OF THE RESULTS

The yearwise establishment of quail farms in Dhaka Metropolitan areas are shown in Figure 1. It can be seen that in 1990, only 1 farm started raising quails, the number of farms increased to 10 in 1991, 15 in 1992, 23 in 1993. In 1994, 27 quail farms started operating. The table shows an encouraging trend of expansion of each category of quail farms. It is estimated that the compound annual growth rate of small layer farms, large layer farms, all layer farms, breeding farms and all quail farms in the study areas were 29 per cent, 62 per cent, 43 per cent, 26 per cent and 40 per cent, respectively. It was found that a higher initial investment cost for the establishment of quail breeding farms was responsible for its slow growth.

In calculating costs and returns of raising quails cost items included feeds, included labour, veterinary services and medicines, electricity-water, marketing, tools and equipment, housing and interest on operating capital. It is noted that the interest on cost of birds was included in the cost of capital and the anual average inventory change of birds was added to the gross return. The total cost per farm per year were classified into cash and non-cash costs. Cash costs were those costs which the owners of the quail farms had to pay out of their pocket to

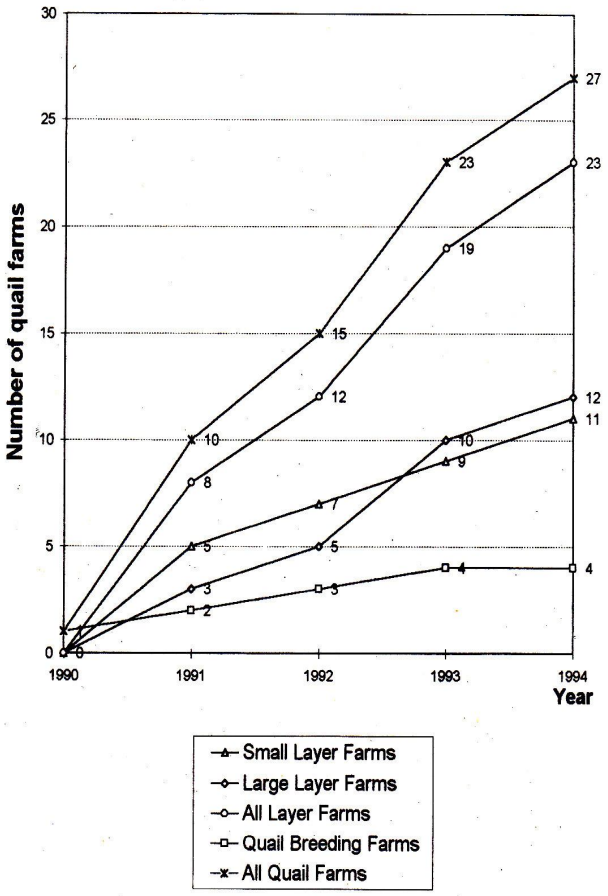

Fig. 1. Yearwise Establishment of Quail Farms in Dhaka Metropolitan City

acquire the inputs. On the other hand, non-cash costs were estimated for family labour, housing, tools and equipment, interest on operating capital, etc. on the return side, gross returns, net returns, returns above cash costs and returns above full costs per taka invested were determined and analysed in this study. It is noted that to determine costs per farm per year only parent stock was considered in case of quail breeding farms, and the chicks and pullets were considered as farm product.

The summary results of costs and returns considering cash costs and full costs of rearing quails are presented in Table 1. The average annual costs and returns of quail farms are also illustrated in Figure 2. It can be seen from Table 1 that the major cost items were identified as feed, labour, veterinary services and medicines, electricity-water, marketing, tools and equipment, housing and interest on operating capital. There were wide range of variations in the costs and returns of the quail farms categories. The total costs per 100 quails per year were

Table 1. Annual Costs and Returns of Quail Farms in the Dhaka Metropolitan Area, 1995.

Particulars	Small Layer Quail Farms	Large Layer Quail Farms	Absolute mean difference	All Layer Quail Farms	Quail Breeding Farms	Absolute mean differe-nce
	1	2	3=(1-2)	4	5	6=(4-5)
	Taka per 100 quails	Taka per 100 quails		Taka per 100 quails	Taka per 100 quails	
A. Cash cost						
(a + b + e + d + e)	13625	14420	795*	14010	46811	32801*
a. Feed cost	10471	9511	960*	10007	29972	19965*
b. Hired labour	2010	3547	1537*	2754	12063	9309*
c. Veterinary and medicine	230	342	111*	284	1402	1118*
d. Marketing	737	851	114*	793	2604	1811*
e. Electricity-water	177	168	9	173	770	597*
B. Non cash cost						
(f + g + h + i)	2721	3735	1014*	3212	12868	9656*
f. Family labour	1041	1865	824*	1440	3650	2210*
g. Housing (opportunity cost)	600	826	226*	709	3600	2891*
h. Depreciation	65	108		86	1338	
i. Interest on operating capital	1015	936		977	4281	
Total / Full cost = A + B	16346	18155	1808*	17222	59679	42457*
Gross returns	19714	25266	5552*	22401	144826	122425*
Net return over cash cost	6089	10846	4757*	8391	98016	89625*
Net return over full cost	3368	7111	3743*	5179	85147	79968*
Return per Taka invested (cash cost basis)	1.4	1.8		1.6	3.1	
Return per Taka invested (full cost basis)	1.2	1.4		1.3	2.4	

Note: * Differences were significant at 1% level.

Source : Calculated from field survey data, 1995

estimated at Tk.16346 for small layer farms, Tk.18155 for large layer farms, Tk.17222 for all layer farms and Tk. 59679 for quail breeding farms. It was found that the cash expenses

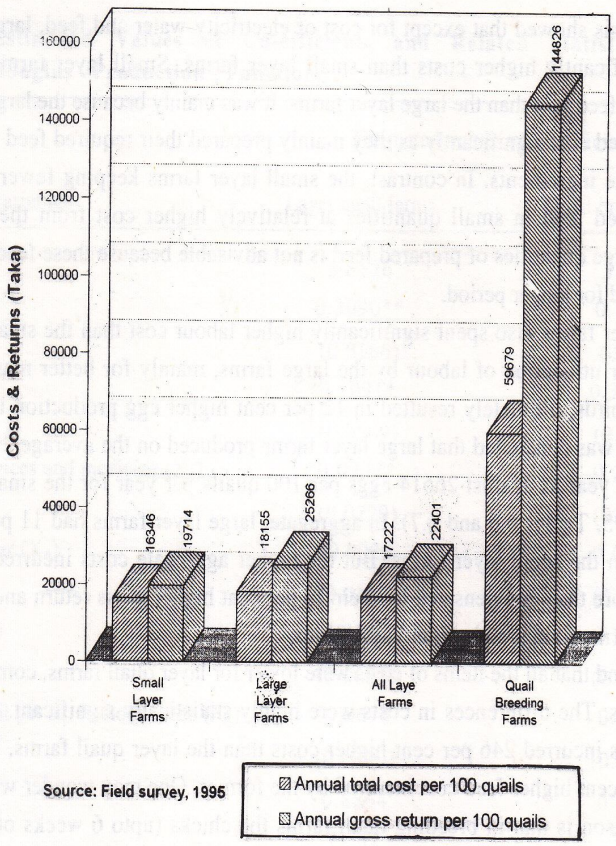

Fig. 2. Annual costs and returns of quail farms

accounted for the major part of the total costs. The cash expenses per 100 quails per year for small layer farms, large layer farms, all layer farms and quail breeding farms stood at Tk.13625, Tk.14420, Tk.14010 and Tk.46811, respectively, which accounted for 83.4, 79.3, 81.4 and 78.4 per cent of their respective total costs. The non-cash expenses per 100 quails per year were Tk. 2721 for small layer farms, Tk. 3735 for large layer farms, Tk. 3212 for all layer farms and Tk. 2868 for quail breeding farms.

The average gross returns per 100 quails per year stood at Tk.19714, Tk.25266, Tk.22401 and Tk.144826 for small layer farms, large layer farms, all layer quail farms and quail breeding farms, respectively. The net returns above cash and full costs per 100 quails were Tk.6089 and 3368 for small layer quail farms, Tk.10846 and Tk.7112 for large layer quail farms, Tk.8391 and 5179 for all layer quail farms and Tk.98016 and 85147 for quail breeding farms. The returns above cash cost and full costs per Taka invested were estimated at Tk.1.4 and Tk. 1.2, Tk.1.8 and Tk.1.4, Tk.1.6 and Tk.1.3, and Tk.3.1 and Tk.2.4, respectively.

The analysis showed that except for cost of electricity-water and feed, large layer farms incurred significantly higher costs than small layer farms. Small layer farms incurred 10 percent higher feed cost than the large layer farms. It was mainly because the large farms could reduce their feed cost significantly as they mainly prepared their required feed from the bulk purchase of the ingredients. In contrast, the small layer farms keeping fewer birds mainly bought prepared feed in small quantities at relatively higher cost from the market. The purchase of large quantities of prepared feed is not advisable because these feeds rapidly lose quality if stored for longer period.

Large layer farms also spent significantly higher labour cost than the small layer farms and this higher utilization of labour by the large farms, mainly for better management and caring of the birds, ultimately resulted in 12 per cent higher egg production than the small layer farms. It was concluded that large layer farms produced on the average 29885 eggs per 100 quails per year as against 26614 eggs per 100 quails per year for the small layer farms (Siddique, 1995, Tables 6.6 and 6.7). In aggregate, large layer farms had 11 per cent higher total costs than the small layer farms. But the higher aggregate costs incurred by the large farms were more than compensated by their 28 per cent higher gross return and 111 per cent higher,net returns, compared to small layer farms.

It was found that all the items of costs were lower for layer quail farms, compared to quail breeding farms. The differences in costs were highly statistically significant. Overall, quail breeding farms incurred 246 per cent higher costs than the layer quail farms, largely due to about 200 per cent higher feed cost incurred by the former. One may wonder why this should be so. The reason is that in breeding quail farms the chicks (upto 6 weeks of age) and the pullets (above 6 weeks) are the main products while, in layer quail farms, eggs are the byproducts. The reality is that the breeding quail farms have to bear the cost of feeding not only the parent stock but also the chicks which need increasingly higher amount of feed as they grow. Finally, the highly significant difference in net returns in favour of quail breeding farms (about 15 times higher returns than layer farms) confirm that chick/pullet producing is highly remunerative, compared to only egg production. The findings of the study clearly indicate that the large layer quail farms are more profit earners than the small layer farms. The results also show that chicks or pullet production is highly profitable, compared to egg production

The estimated values of the co-efficient and related statistics of the Cobb-Douglas production functions of layer quail farms and quail breeding farms are shown separately in Table 2. The results of the co-efficients for layer quail farms suggest that the variables labour cost, feed and veterinary services & medicine costs had significant impact on layer quail farms returns. The most of the selected variables, especially feed cost had significantly positive impact on breeding quail farms returns. Also, electricity-water cost had significant impact on quail breeding farms returns, implying that these type of farms are established only in locations

Table 2. Estimated Values of Co-efficients and Related Statistics of Cobb-Douglas Production Function.

Explanatory variables	Estimated values of co-efficient	
	Layer quail farms	Quail breeding farms
Intercept	5.8126	3.3550
Labour (X_1)	0.3090**	0.1527*
	(0.0166)	(0.053)
Feed (X_2)	0.1091*	0.3625**
	(0.0509)	(0.1002)
Veterinary services and medicine (X_3)	0.0997*	0.2050*
	(0.0220)	(0.0706)
Electricity-water (X_4)	-0.0029	0.0738*
	(0.0130)	(0.0359)
Marketing (X_5)	0.2117	0.1995*
	(0.0625)	(0.0912)
Number of quail per sq. ft. floor space (X_6)	-0.0678	0.0546
	(0.0300)	(0.0222)
R^2	0.8864	0.9212
F- ratio	71.52	28.9
Returns to scale	0.6588	1.0481

Note: ** Significant at 1 per cent level; * Significant at 5 per cent level
Figures in the brackets indicate the standard error
Source : Estimated from field survey data, 1995

where there are provisions of electricity supplies. As regards returns to scale, layer quail farms operated with decreasing returns to scale, while the breeding farms operated with moderately increasing returns to scale.

An attempt was made to identify the major problems and constraints of raising quail as reported by farmers. The results are presented in Table 3. It can be seen from Table 3 that high prices of feed were identified by 81 per cent quail farmers as an important constraint to the expansion of quail farming. Inadequate institutional credit was also crucial problem for the development of commercial quail farms. Most of the quail farmers alleged that credit institutions were reluctant to provide credit for quail farming as it is not considered as a big enterprise. Japanese quails are very resistant to diseases and therefore there is no need of

vaccination for them. But they need some essential vitamins and medicines for proper health care and physical growth. It was also reported that these vitamins and medicines were not supplied by the government department. On the other hand, only a few pharmaceutical industries were manufacturing a limited number of medicines which were not always available either.

Table 3 Distribution of Quail Farmers According to the Problems Faced.

Nature of the problems	Number of farmers reporting the problems				
	Layer quail farms			Breeding quail farms	All quail farms
	Smal	Large	All		
1. High price of feed	28 (87.5)	22 (73.3)	50 (80.6)	12 (85.7)	62 (81.6)
2. Disease	8 (25.0)	4 (13.3)	12 (19.4)	4 (28.6)	16 (21.1)
3. Lack of credit	6 (18.8)	24 (80.0)	30 (48.4)	12 (85.7)	42 (55.3)
4. Lack of veterinary service facilities and inadequate essential medicine	7 (22.0)	10 (33.3)	17 (27.4)	9 (64.2)	26 (34.2)
5. Lack of training on quail husbandry	30 (94)	20 (66.7)	50 (80.6)	7 (50.0)	57 (75.0)
6. Product Marketing problems	---	---	---	14 (100)	---
Total	32 (100)	30 (100)	62 (100)	14 (100)	76 (100)

Note: Figures in brackets indicate the percentage; Source : Field survey data, 1995

About 75 per cent quail raisers felt that their knowledge on quail husbandry were not sufficient and therefore they considered the lack of proper training facilities as one of the constraints to the development of their quail enterprise. Another problem hindering quail production was marketing of quail as meat. In breeding farms the 50 per cent of chicks were male but market demand was only for female birds because of the purpose of layer stock.

4. CONCLUSIONS AND POLICY RECOMMENDATIONS

It has been revealed in the study that large layer quail farms are more profit earners than the small layer farms. The results also show that chicks or pullet production is highly

profitable, compared to egg production. It has also been revealed that quail raising can be more profitable business if the problems related to it can be minimized. Quail farming can greatly supplement income and protein requirements in the country.

Bangladesh has nearly achieved self-sufficiency in staple food. But still the country suffers from animal protein deficiency. Quail raising has strong potentiality for reducing protein deficiency as well as unemployment problem. It has an unique advantage of tapping the vast market potential for chicken and duck products, especially in the urban areas. The policy makers should, therefore, take necessary measures which would encourage development of quail farming. The following recommendations are advanced as broad guidelines for successful operation of quail farming in the country.

A. Suggested Measures :

i. Measures should be taken to ensure adequate supply of feed and feed ingredients at reasonable price for raising quail.
ii. Government should give appropriate incentive to the private pharmaceutical industries to produce and supply necessary medicines and vitamins for quail raising at reasonable prices.
iii. Adequate provisions should be made for short term loan for quail farming on easy terms and conditions.
iv. Since none of the quail farmers had formal training on quail rearing, short-term training programmes on farm management, quail husbandry, quail diseases and its control should be arranged by the relevant government agencies and NGOs.
v. Marketing facility is an important factor for quail farming. Marketing opportunities should be expanded through the provision of extension services such as publicity through Radio, TV, newspapers, leaflets, folder etc. Steps should be taken to propagate information on profitability of quail farming as well as nutritive value of quail meat and egg so that their demand is increased.
vi. Since commercial quail husbandry has been established as a viable proposition, the strategy for a concrete breeding and improvement programme seems inevitable. In due course it may be necessary to improve a sustainable purelines breeding stocks for environmental condition of Bangladesh. Private breeders and government sector research organizations should be involved in quail improvement activities and they should work in close~ association to concentrate on evolving suitable breeding programmes which capitalise on the potentials of the quailary business.

B. Suggested Plan for Setting up of a Layer Quail Farm

A tentative plan for starting up a commercial layer quail farm is developed on the basis of the findings of the study. To adopt quail farming on a commercial scale, the technical and

economic feasibility study is a pre-requisite. Accordingly, the latest information based on 1995 prices have been used to prepare projects for the benefit of the prospective quail farmers. However, these schemes require regular updating due to the changing scenarios of feed and product prices.

The plan is based on the following assumptions :

i. It is assumed that the quail farmer has provisions for construction of quail sheds and other facilities;
ii. On the basis of housing construction project life is assumed to be 10 years;
iii. The prices of inputs and output used in the analysis are the whole year average;
iv. The life of equipment is assumed to be 5 years;
v. Interest rate was assumed to be 12 per cent per annum.

Project : Plan for setting up of a 1000 layer quail farm

Production Strategy and Management

The plan is drawn in such a way that income can be earned from the beginning of the farm. A strategy has been fixed to keep 1000 layer parent stock and replace 88 quails every month in order to maintain a sustainable production in the farm. The operational expenses of the farm will be met from the sale proceeds of eggs from the first week of investment.

Budget

The initial investment of the project will be Tk. 105,000. Prior to the income earned from the project the heads of capital expenditure will be 46% for housing, 20% for equipment, 30% for purchase of layer stock and 4% for others . It is expected that net profit of Tk. 98,780 per year will be earned from the project (Table 4).

Project Appraisal

The financial analysis of the proposed project showed a BCR of 1.79 and NPW of Tk.5,62,349 (Table 5). The results indicate that the project is highly profitable. However, the problems of layer quail farms as identified in the study will have to be considered before accepting the plan.

Benefit-Cost Ratio (BCR) at 12% D.F. $= \frac{\text{Tk. } 1325255}{\text{Tk. } 762906} = 1.74$

Net Present Worth (NPW) at 12% D.F. = Tk. 562349

Net Present Worth (NPW) at 50% D.F. = Tk. 160611

Note : At 50% discount rate the NPW is still positive implying that the Internal Rate of Return (IRR) is infinity.

Table 4. Estimated Budget for Setting up of a 1000-Layer Quail Farm.

Particulars of Capital Expenditure	Taka
I. Total initial capital expenditure: (1 + 2 + 3 + 4)	**1,05,000**
1. Buildings: A quail shed consisting of quail layer house and a office cum store 80 m^2 @ Tk. 600/- per square meter	48,000
2. Equipment: (a + b + c + d)	**20,800**
a. Four rearing cum laying batteries (5 tier) @ Tk. 5000/- each	20,000
b. One feed mixture machine (country made) @ Tk. 200/- each	200
c. Cost of 20 chick feeders @ Tk. 20/- each	400
d. Cost of 20 chick waterers @ Tk. 10/- each	200
3. Laying stock: Cost of 1050 female pullets of 7 weeks of age @ Tk. 30/- each (5% extra to compensate mortality)	**31,500**
4. Contingency reserves	**4,700**
II Profit and Loss Statement (Each Year of Whole Project Life)	**Taka**
A. Operational / Recurring Expenditure (a + b + c + d)	**1,15,300**
a. Cost of layer stock for replacing 1050 old layer by new stock (88 layers × 12 month) i.e., 1050 × 30 =	31,500
b. Cost of feeding 1050 layers for 1 year 8 kg feed per bird per year and feed cost @ Tk. 900/- per quintal (the average number of quails for the full period would be 1000).	72,000
c. Cost of electricity, water, medicine, etc. @ Tk. 1.00 per bird.	1,000
d. Labour charge : 1 labour @ Tk. 900/- per month (for 12 month)	10,800
B. Gross income: (a + b + c +d)	**2,34,600**
a. Sale of 2,60,000 eggs @ Tk. 0.85 per egg (egg production 260 eggs/bird/year	2,21,000
b. Sale of 100 used gunny bags @ Tk. 8/-	800
c. Sale of 1000 calling parent stock @ Tk. 12/- each	12,000
d. Sale of manure (faeces)	800
C. Gross profit = (B – A)	**119,300**
D. Net profit = C – (e + f + g)	**98,780**
e. Depreciation on buildings @ 10%	4,800
f. Depreciation on equipment @ 15%	3,120
g. Interest on capital expenditure @ 12%	12,600
Net profit from 1000 quail layer per year	**98,780**
Net profit from 1000 quail layer per month	**8,231**

Table 5. Financial Analysis of the Proposed Layer Quail Farm Project (1000 Layer Stock).

Year	Costs					Gross benefits	Present worth of	Present worth of	Present worth of	Present worth of
	Initial Investment	Replacement of equipment	Maintenance	Production costs	Gross cost		gross costs at 12% D.F.	gross benefit at 12% D.F.	gross costs at 50% D.F.	gross benefit at 50% D.F.
1	105000	0	0	115300	220300	234600	196728	209498	146867	156400
2	0	600	1000	115300	116900	234600	93169	186976	51956	104267
3	0	600	1000	115300	116900	234600	83233	167035	34637	69511
4	0	600	1000	115300	116900	234600	74348	149206	23091	46340
5	0	600	1000	115300	116900	234600	66282	133018	15394	30894
6	0	20800	1000	115300	137100	234600	69236	118473	12036	20596
7	0	600	1000	115300	116900	234600	52839	106039	6842	13731
8	0	600	1000	115300	116900	234600	47228	94778	4561	9154
9	0	600	1000	115300	116900	234600	42201	84691	3041	6102
10	0	600	1000	115300	116900	234600	37642	75541	2027	4068
Total							762906	1325255	300452	461063

Benefit-Cost Ratio (BCR) at 12% D.F. $= \frac{\text{Tk. } 1325255}{\text{Tk. } 762906} = 1.74$

Net Present Worth (NPW) at 12% D.F. = Tk. 562349

Net Present Worth (NPW) at 50% D.F. = Tk. 160611

Note : At 50% discount rate the NPW is still positive implying that the Internal Rate of Return (IRR) is infinity.

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