PROFITABILITY ANALYSIS OF BROILER PRODUCTION IN RAWALPINDI DISTRICT

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The present study was conducted in Rawalpindi District to evaluate the profitability of different Broiler farm sizes. Poultry farms were categorized into large, medium and small farms, Different efficiency measure such as net present worth, whole farm budget, marginal rate of return were applied. It was found that cost of production was high in small farm category. Small farmer buy feeds on credit basis and therefore, lose 8 percent concession on cash payment. The cost of medium farmer was lower as compared to small farmer. Benefit cost ratio of medium and large farmer was greater then one which indicate that they were earning profit on their investment. More economic incentive was found in increasing the farm size from small to medium as compared to medium to large as marginal rate of return were greater in former case. Efficient extension services were lacking in the study area. Extension activities can play a vital role in improving the poultry farming practices particularly for small farmers.
Keywords: Poultry farming, broiler production, profitability, marginal rate of return, net present worth

INTRODUCTION

Poultry is the domesticated species of bird reared for production of eggs and meat. Even though, term poultry is used for chickens, duck, guinea fowl and geese. Poultry is an important sub sector of live stock and its important can be judged from the fact that poultry share in GDP is 2.0 percent (Government of Pakistan 2008). It emerged as check and balance force for stability of the prices of beef and mutton. Poultry production has emerged as a good substitute of beef and mutton. The importance of it can be judged from the fact that almost every family in rural area and every fifth family in urban area is associated with production activities in one way or the other (Government of Pakistan 2003). Poultry farming on commercial scale was initiated in Pakistan in 1963, with introduction of new hybrid strains of birds for meat and eggs production. Commercialization of poultry production started in 1965, when the first modern hatchery was established at Karachi by Pakistan International Airlines in collaboration with a Canadian firm “shaver”. Since then a rapid expansion occurred in commercial poultry production resulting in the establishment of more and more broiler and layer farms, hatchery units and feed mills in the private sector. The total investment in the poultry, hatcheries and feed mills was Re.1.2 billion which, increased to Rs.5 billion in 1986 and Re. 20 billion in 1992 showing a tremendous rate of increase. Government of Pakistan has invested Rs.57 billion in poultry sector up to year 2001 (Chaudhry, 2001). The investment in the private poultry farming sector in Punjab during the year 1997-98 was Re. 23.005 million and it increased to Re.25.01 million in the year 2001 (Government of Punjab 2001). Poultry farming is playing an important role in improving the income of rural and sub-urban population of Pakistan (Government of Pakistan, 2003). The poultry industry is providing job opportunities to more and more people. Eggs and chicken meat production is playing effective role in decreasing the gap of the animal protein availability and its requirement. Poultry meat is one of the universally accepted superior sources of protein with high biological value containing relatively higher amount of essential amino acids in 3 well balanced forms. In addition to, it also contains other essential nutrients including minerals and vitamins. Poultry farming provides a great opportunity for the increased production of high quality birds in the shortest possible time. Credit goes to poultry breeders who have developed the modern commercial broiler, which attains marketable weight within a short span of 6 to 7 weeks.

A number of different commercial broiler farms are found in Pakistan and these can be divided into two production groups i.e., private poultry farms and government poultry farm. The production of broiler during the last eight years has shown a remarkable increase as given in the Table 1.

Table 1. Production of broilers in Pakistan 1999 to 2008

Year	Production in millions
1999-2000	184.7
2000-2001	253.3
2001-2002	264.4
2002-2003	227.2
2003-2004	280.1
2004-2005	292.1
2005-2006	337.0
2006-2007	370.70
2007-2008	407.77

Source: Economic Survey of Pakistan 1999-2008*
*2007-2008 are the estimated figures taken from the Economic Survey of Pakistan 2007-2008

The numbers of private broiler farms in Punjab are 12,970 with a rearing capacity of 24,409 million birds per annum. While there are 1,839 (15.64 %) private broiler farms in Rawalpindi Division with a rearing capacity of 5,886 million birds per annum and there are 821 (6.91%) private broiler farms in Rawalpindi District with a rearing capacity of 3,467 million birds per annum (Government of the Punjab, 2001).

The poultry industry has experienced unprecedented production and marketing efficiencies since 1960, in larger part due to vertical integration which is facilitated by production contracts between growers and integrators. The lack of realistic and publicly available data makes it nearly impossible for poultry growers to determine the overall financial situation. It is extremely difficult to forecast profitability of broiler operations for three primary reasons. First, because of the grower pay system, it is nearly impossible to effectively determine revenue for poultry growers. Payment amount may not actually reflect the grower's performance, since performance is compared to the other growers who sell in the same weekly pool. Secondly, estimating income may be difficult because of varying poultry house size, while most new poultry houses are built on standard size. Variable dimensions of older houses can lead to difficulty in estimating profitability. Finally, many potential poultry farmers are not keen in supplying all of their past records to be evaluated before the sale of their farm. This situation leaves buyers with little actual data upon which to judge the profitability of their impending purchase, and potential growers are faced with the complex task of approximating the farm's past performance. In order to check the productive performance and optimal farm sizes in relation to the resource availability in the local environment and management conditions of Rawalpindi District, the present study was conducted having the following objectives:

- To find the basic characteristics of farm households;
- To find the economic viability of different sizes of broiler poultry farms;
- To have a comparative analysis between different broiler farm sizes;
- To suggest recommendations for broiler production.

MATERIALS AND METHOD

Methodological techniques of data collection and analyses of observations play a significant role in the social research. The sample of the study constituted about 60 broiler farmers, who were interviewed in the year 2003 before the onslaught of avian influenza (bird flu). The primary data containing information about economics of broiler farms was collected through multistage random sampling. Multistage random sampling technique was carried out only from the population of broiler farmers in the Rawalpindi District. List of the broiler fanners who were working in the District Rawalpindi was obtained from Poultry Research Institute, Rawalpindi. The sample data collected of broiler farmers were selected randomly from four Tehsils of Rawalpindi District through interviewing schedule at their respective sites. An informal survey was conducted prior to the actual data collection. The pro-designed interviewing schedule was modified after the informal survey. Information was collected like the family structure, education level, age and access to the institutional credit of the respondents. Further information was also collected about the costs and revenues of the poultry farms. The farm budget was calculated by adding the farm receipts and costs. The farm costs are of two types i.e., fixed costs and the variable costs.

Table 2. Whole broiler farm budget

Farm category	Benefits (Rs.)	Costs (Rs.)	Benefit cost ratio
Small	151334	159884	0.95
Medium	216979	198641	1.10
Large	553634	413107	1.34

Fixed costs included the cost of land and equipment whereas, the variable costs included, the cost of day old chicks, cost of feed, vaccination, labour charges and other miscellaneous charges such as electricity and gas etc. Economics of broiler production was calculated by using the net present worth of the farm investment. The net present worth is the most straight forward discounted cash flow measure. It is computed by finding the difference between the present worth of benefits stream less the present worth of cost stream. The net present worth was calculated by using the following formula;

$$\sum_{t=1}^{n} \frac{B_t - C_t}{(1+i)^t}$$ (Chaudhry *et al.,* 1995)

Where,

C_t is the cost incurred in time t

B_t is the value of benefits earned in time t

i is the discount rate

n is the life of the farm investment

Benefit and cost ratio was calculated to check the profitability of the poultry farming business. This ratio expresses the relationship between the net benefits and capital cost over the life of the investment. It is in fact a form of input-output analysis that is useful for on

farm appraisal. Cash and noncash costs and benefits were included in deriving appropriate ratios. To calculate the benefit cost ratio, the benefits and costs of broiler farms were calculated. The ratio of benefits to cost was calculated by using the following formula:

$$\text{Benefit cost ratio} = \sum_{t=1}^{n} \frac{B_t}{(1+d)^t} \Big/ \sum_{t=1}^{n} \frac{C_t}{(1+d)^t}$$ (Chaudhry *et al.*, 1995)

Where,

D is the discount rate

C_t is the cost incurred in t time period

B_t is the value of benefits earned in t time period

N is the life of the farm investment

The benefit cost ratio also called the profitability index. The profitability index shows the relative profitability of any investment or the present value of benefits per rupee of cost. The percentage analysis was done to find that how the profit increases with an increase in the farm size. The percentage analysis was done by using the following formula;

P = (f / n)* 100

Where,

P is the percentage

F is the absolute frequency

N is the total no of observation

Broiler farm gross margin was calculated by gross income minus the variable expenses attributable to that farm. In order to calculate gross margin, budgets were prepared at farm level for different farm sizes in the District Rawalpindi. Revenues from output and cost of different variable inputs used were calculated. Gross margin was calculated at an average sample size level by taking a difference in the activity per unit revenue and per unit cost variable. The gross margin is the difference between the farm's activity per unit revenue and variable input cost per unit. It is computed as:

$g_j = r_j - c_j$ (Chaudhry *et al.,* 1995)

Where,

g_j is the gross margin

r_j is the activity's per unit revenue

c_j is the activity's per unit cost

The marginal analysis was also done to reveal just how the net benefits from an investment as the amount invested increases. An easier way of expressing the relationship is by calculating the marginal rate of return. The formula used for calculating the marginal rate of return (MMR) is:

MMR = (Incremental Net Benefits/
Incremental Total Cost) * 100
(Chaudhry *et al.,* 1995)

By using marginal analysis technique, it was checked that how profit varies with the increase in investment.

RESULTS AND DISCUSSION

The information related to farm household were collected in order to know the social setup of the respondent poultry farmers. Table 3 highlights those features.

It is evident from the Table 3 that the average family size in the study area was generally high. The main reason for large family size was joint family system. It is also clear from the table that the large number of the people i.e. 60 percent lies in the age bracket of 41 years and above. The average age of the respondent broiler farmer in the study area was 50 years. The study revealed that mainly people with the age of 41 years and above were involved in broiler production. The reason was that most of the retired people were involved in the broiler production because they receive money on their retirement and find it easy to invest it in the poultry business as it gives returns in shorter span of time. Second reason was that generally people think that poultry farming needs no technical education therefore according to the survey most of the aged people joined the poultry business. As our research finding revealed that most of the broiler farmers were not educated and were doing poultry business without having any formal or technical education of poultry rearing. Majority of the sample respondent (75 %) were under matric (O level). The highest formal education level among sample respondents was intermediate (10 %). Only 15 percent of the respondents were matric (Olevel). Lack of educational institutions, poor economic conditions and social taboos were the major causes of low literacy rate in the area under study.

For the purpose of farm profitability and comparison, broiler farms were divided into three categories i.e. small, medium and large depending upon the farm size. Area of the farm and flock size were found directly related because of the standard requirement of per chicken at farm. The average farm, flock and other farm information are given in Table 4.

Broiler farmers suffer the most through mortality in flocks. The average rate of mortality (in %) at different farm sizes during the survey is given in Table 4. The highest rate of mortality was found at medium farm size because these farms were mostly located in hot areas like Gugar Khan whereas; small farms has less mortality percentage because these farm were located at cool areas like Murree and Kotlisattian. Large farms have lowest mortality rate as such farms were well organized and well informed about diseases and their cure.

Table 3. Social setup of the respondent farmers

Family size			Age Distribution			Educational level			
5-7	8 & above		<26	26-40	41-60	Primary	Middle	Matric	Inter
Number	29	31	3	21	36	13	32	9	6
Percentage	49	51	5	35	60	22	53	15	10

Table 4. Average farm size, flock size and mortality rate of birds in the study area

Farm category	Average farm size (sq. ft)	Average flock size	No. of birds /sq. ft	Mortality (in %)
Small	2035	2024	0.99	6.52
Medium	3156	3310	1.05	9.30
Large	6946	6851	0.99	3.35

For the purpose of cost comparison, the cost of production of broiler chickens at different farm categories was computed. Costs were divided into two groups i.e. fixed cost and variable cost of production. Fixed costs are that part of the total cost which does not vary with the change in output per period of time (Government of Pakistan 2003). These costs include the rent of building, interest on capital invested at farm and salaries of the permanently employed staff. The average fixed cost at different farm categories is given in Table 5. The cost is lowest at large broiler farms, because in this category farmers use high quality equipments which, lasts more and therefore, they pay less depreciation on equipments per flock. Variable costs are the costs which vary with the output level. Variable costs include the cost of day old chicks, feed, vaccination, marketing charges and the miscellaneous costs such as electricity, gas, water and telephone charges. The average variable cost per bird was Rs.51.11 irrespective of the farm size. The average variable cost, per flock at different farm categories is given in Table 5.

The average variable cost per bird at large broiler farms was highest, the reason being that large broiler farmers were more organised and they give more attention towards complete diet, containing all essential nutrients, vaccination of birds and high quality disinfectants and used to disinfect the farm after selling of one flock. The variable cost/ bird was higher at small broiler farms than the medium sized broiler farms. The reason was that most of the small broiler farms were located in hilly areas and they have to bear high brooding expenses, where as they by feed on credit and do not get discount on feed purchase. Furthermore transportation cost effects the purchasing price of vaccines, miscellaneous items such as bulbs, gumboots, buckets and sprays etc.

The whole farm budget was prepared to judge the farm profitability. For this purpose the whole farm budget was prepared by adding the benefits and costs of broiler production. In the whole farm economic analysis, the farm is considered as a complete entity. This was done to show the anticipated consequences in term of selected measures of performance. The whole farm budget is shown in Table 6.

The benefit cost ratio (BCR) of different categories was also calculated. BCR is a profitability indicator which expresses the relationship between the sum of net benefits and the capital costs. BCR is given in Table 6. The BCR for small farm is less than one. It shows that small farmers were in loss and they were not earning profit at present farming level. The value of BCR for medium sized farm was 1.10. It shows that the present worth of benefits at discount rate of 14% is greater then those of the costs and on the investment of Rs.1, the poultry farmers were earning Re. 1.1. The value of BCR for larger broiler farms was 1.4 and these broiler farms were recovering the highest return as compared to medium and small farms. Small farms were suffering from losses due to improper marketing facilities, poor

Table 5. Average fixed, variable and total cost of production (in Rs.)

Farm category	Average fixed cost/flock	Average fixed cost/bird	Average variable cost/flock	Average variable cost/bird	Total cost/bird
Small	15055	7.44	106640	5269	60.13
Medium	31335	9.47	156029	47.14	56.61
Large	46536	6.79	366571	53.50	60.29

marketing knowledge and less awareness of market conditions.

Table 6. Whole broiler farm budget

Farm category	Benefits (Rs.)	Cost (Rs.)	Benefit cost ratio
Small	151334	159884	0.95
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Large	553634	413107	1.34

In order to increase the scope of the study the net present worth (NPW) of different farm categories was also calculated. For the purpose of NPW, the official interest rate and discount rate were used (discount rate used by the Zarai Taraqyati Bank Limited was utilized for the purpose). The NPW is the most straightforward discount cash flow measure. It is computed by finding the difference between the present worth of the benefit stream less the present worth of cost stream. The NPW of different farm categories is given in Table 7.

Table 7. Net present worth of different farm categories

Farm category	NPW of costs @ 14 %	NPW of benefits @ 14 %	NPW of incremental benefits @14%
Small	126932	92214	-34718
Medium	115988	125320	9332
Large	239424	317518	78094

The NPW at discount rate of 14% for small broiler farms is negative which shows that small farmers were not recovering their investment. As indicated in Table 6 and 7 small broiler farmer were in loss because their BCR was less than one and NPW is negative. In order to know how small farmers were still in business the gross marginal analysis was done. Gross marginal may be defined as returns over and above the variable costs. It is very useful measure of efficiency for both single farm business activities and a multiple activities plan of a business (Chaudhry *al.,* 1995). The gross marginal analysis shows (Table 8) that small farmers were successfully recovering the variable costs per flock. As gross margins of small farmers categories were positive and show that the variable costs are recovered therefore, small broiler farmers were still in the business. The gross margin increases as the farm size increases because the medium and large broiler farmers have BCR greater than one and they are earning profit.

Table 8. Gross margins of different farm categories

Farm category	Average variable costs	Average benefits	Gross margins/flock
Small	106640	155664	49024
Medium	156029	216979	60950
Large	366571	553634	187063

In order to know, how the net benefits from an investment increase as the amount invested increases the marginal analysis was done. Marginal analysis is simply the marginal rate of return. It is simply the marginal net benefits divided by the marginal cost expressed as the percentage. Marginal rate of return of small and medium and medium and large is shown in Table 9.

When we increase the broiler farm size from small to medium, the poultry farmer expect to recover Re. one along with additional Re. 1.69. Similarly when we shift farm size from medium to large the broilers farmers expect to recover Re. one along with additional Re. 1.56. These findings indicate the incentive in increasing the farm size in order to fully exploit the benefits of poultry business but also to change the pattern of broiler production.

Table 9. Marginal rate of return of different farm categories

	MRR for small to medium farms			MRR	MRR for medium to large farms			MRR%
	Small	Medium	Difference		Medium	Large	Difference	
Benefits	156644	216979	60335	169.20%	216979	553634	33665.	156.97
Costs	159844	198641	38797		214466	413107	214466	

CONCLUSION

Study indicates that most of the boiler farmers do not have formal education about poultry rearing therefore; the cost of production is very high. Majority of the respondents i.e. 63 percent had no access to agri-extension services. In order to improve the technical knowledge of the poultry farmers there is a need to improve the extension services. This requires an enlightened and imaginative extension team. Extension staff should be able to motivate farmers to bring about desired changes in the poultry farming pattern and to adopt recommended farming practices. The study also indicates that there was an incentive to increase the

small farm to medium farm and from medium farm to large farm. BCR of the small farmers was less then one and NPW was negative. But small farmers were still in the business because there gross margin was positive which shows that they were recovering at least variable cost.

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