

Research Article



Profitability Analysis of Different Farm Size of Broiler Poultry in District Dir (Lower)

Murad Khan^{1*} and Muhammad Afzal²

¹Assistant Director (Research & Analysis), Khyber Pakhtunkhwa Police; ²Institute of Development Studies, The University of Agriculture, Peshawar, Pakistan.

Abstract | Aim of the research was to analyze the profitability of different farm sizes of broiler poultry in district Dir Lower. Four *tehsils*, namely *Adinzai*, *Balambat*, *Timergara* and *Sumerbagh* were purposively selected during the year 2015. From these *tehsils*, 92 poultry farms were selected proportionately from total 460 poultry farms and data were collected on structured questionnaire. The sample farms were categorized into three groups i.e. small, medium and large. For analysing the data, profit function and multiple regression model, analysis of variance (ANOVA) and independent t test were used. The average profit of large size farm was Rs. 85228 followed by medium and small farm that were Rs. 58049 and Rs. 36090 respectively. The results of independent sample t-test indicated that there is no significant difference between the profit of the sole proprietors and partnerships. Further results of analysis of variance (ANOVA) revealed that at 5% significance level, there was statistically significant difference among different sizes of poultry farms as whole. The highest net benefits were reported from the large scale poultry farms followed by medium and small firms. The results of the multiple regression model for profit shows that profit of a poultry farm is positively affected by education, experience, age of the respondent and farm size while negatively affected by mortality of chicks. All the variables were significant except age of the respondents. Proper vaccination and medication is required to decrease the high mortality rate so that the losses due to mortality can be minimized.

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***Correspondence** | Murad Khan, Assistant Director (Research & Analysis), Khyber Pakhtunkhwa Police, Pakistan; **Email:** dr.khanzai@yahoo.com

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Introduction

In Pakistan poultry farming is concentrated with broilers and layers which are grown for poultry meat and eggs respectively. Besides that breeds of buff rock, leghorn, light Sussex etc are also hatched successfully but it failed to capture the market due to taste of the Pakistani consumer which has been developed over the year. Still the poultry industry meet more than 23% meat requirement of the country and has employed 1.5 million labour forces. It contributes 4.8% of the Agricultural GDP and 1.1% in the na-

tional GDP (GOP, 2009).

In early sixty, there was no commercial poultry farming in Pakistan. The demand of egg and meat was fulfilled by the rural poultry. In 1965 first commercial hatchery was started in Karachi by mutual collaboration of Pakistan International Airline and a Canadian firm SHAVER (Maqbool et al., 2005). After that government of Pakistan established poultry research institute at Karachi and Rawalpindi. Loans were provided to the poultry farmers without interest by ADBP and UNDP. The establishment of poultry

board and directorates of poultry production in Karachi and Punjab for extension service were the major steps of government. Now in Pakistan, the poultry industry is the second largest industry after textile. Egg and chicken meat is used in most food items and it gives quick service dining menus. It has shown very rapid growth and has impact on the national economy as an increase in GDP (Ahsan and Masood, 2004). According to livestock wing of Ministry of Food, Agriculture and Livestock almost every fifth family in rural areas involve in poultry production activities directly or indirectly.

The share of poultry in agriculture and livestock is 6.4% and 11.5% respectively. The current investment in poultry sector is 200.00 billion. The poultry sector has shown a growth rate of 8 to 10% annually (GOP, 2011). During 2011-2012 the layer, broiler, breeding stock and rural production was 244.86, 497.11, 11.83 and 37.23 million respectively, the share of KPK was 30% of the national poultry industry (GOP, 2010).

Ali et al. (2014) studied the profitability and cost efficiency of open shed broiler farmers in Punjab, Pakistan. Profitability analysis revealed that net profit in study area was 30830.49 rupees per flock. Net profit margin was 3.99 percent, Rate of return on investment was 4.16 percent and Cost benefit ratio was 1.04. Bano et al. (2011) revealed the profitability index of open house broiler farms. The study also showed that broiler production is profitable with a profitability index of 0.24. Imtiaz (2012) conducted a study to analyse the profitability of poultry farming. Results showed that average net benefit was 133163 rupees, benefit cost ratio was 1.06. The largest net benefits were reported by the large scale farmers which is obvious due to the large size of flock. The regression analysis shows that farmer's education and experience were positively affecting farmer's profitability, whereas mortality of birds was negatively affecting the profitability of farmers. Islam (1998) conclude that medium farms have low ration (1:1.17) and large, small farm possess large cost benefit ratio (1:1.22). Mian (1994) stated that yearly profit on investment of broiler farming is approximately 23 percent and the profit on broiler operation are largely different. Mohsin et al. (2008) conducted a study to evaluate the profitability of different broiler farm sizes. . BCR of large and medium farmer was greater than one which shows that they are earning profit on their investment. Oladeebo and Ambe-lamidi (2007) determined the profitability of

poultry production was profitable among youth poultry farmers. Sheikh and Zala (2011) studied the Production Performance and Economics Appraisal of Broiler Farms and found that as the size increases, the net margin over the rupee invested on broilers also increases. The break- even analysis showed that the producer have to maintain a minimum of 1531, 2611 and 10437 broilers, respectively on small, medium and large farms to meet the cost incurred in production of broiler. Singh et al. (2010) carried a study and found that net present value was positive in all farm sizes and the value of BCR for small, medium and large broiler farms were 1.04, 1.08 and 1.12 respectively. There was direct relationship between BCR and farm size.

Tufail et al. (2012) suggested that to increase the productivity of the backyard poultry farming the government should encourage the private sector for availability of balance feed in the study area. Mussawar and Durrani (2002) said that by keeping proper size of the operation, effective use of resources, good housing, sustaining highly productive stock, keeping standard hygienic practices, proper planning and minimizing production cost can increase and make commercial egg production more profitable. Gonzatez (1994) study reveal that profit can be enhanced up to 0.75 percent per broiler in comparison to fixed diet level proposed by nutritionist, if protein and energy level are keeping corresponding to the variation in output and input prices. Fawwaz et al. (2013) indicated that these inputs were underutilized during the production process and an increase in the rate of these inputs would lead to increase in output and profit.

The present study attempts to calculate the cost, revenue, profit of broiler poultry farms and to compare the profit of different size of poultry farms as well as the profit of sole proprietors and partnerships by using descriptive statistics, profit function, analysis of variance and t test.

Materials and Methods

The study was conducted in district lower Dir. The Area was purposively selected because there is high concentration of poultry farm business in District Dir Lower. Addition to this, it was suitable for the research to carry out survey and collect information from the farmers because Dir Lower is one of the area that have large numbers of broiler farms in Khy-

ber Pakhtunkhwa. There are seven *tehsils* in district Lower Dir. For the present study four *tehsils* namely Adenzai, Timergara, Balambat and Samarbagh *tehsils* were selected as a sample area. There were more than 550 poultry farms of different sizes in the study area. The number of poultry farms in the sample area i.e. Adenzai, Timergara, Balambat and Samar Bagh *tehsils* were about 460 (GoKP, 2014). The sample size of 92 is obtained by selecting 20% of the overall population proportionately (Sikaran, 2006). Further the distribution among different *tehsils* were made through proportional allocation technique.

$$n_i = \frac{N_i}{N} \times n$$

To get sample size proportional allocation technique is applied.

Where:

n_i = Number of sampled poultry farms in each location

n = Total sample size

N = Total number of poultry farms in the study area

N_i = Total number of poultry farms in i th *tehsil* of the study area

The present research study was based on primary data. However secondary data was also documented from Livestock Directorate Timergara, Lower Dir. Primary data was collected through a comprehensive questionnaire. In order to achieve the specific objectives of the study data was analysed with the help of softwares i.e. Statistical Package for Social Sciences (SPSS) and MS Excel. The following techniques were used to analyse the data:

Budgetary technique is a very popular method applied for analysing the cost and return. It was used to determine the profitability of broiler poultry farming in the study area.

$$\text{Profit } (\pi) = TR - TC$$

$$\text{Total Revenue (TR)} = \text{Total Farm Output} \times \text{Price} + \text{Broiler Manure}$$

$$\text{Total Cost (TC)} = \text{Total Fixed Cost (TFC)} + \text{Total Variable Cost (TVC)}$$

Where,

TVC = Total Variable Cost = cost of feed + cost of day old chicks + cost of medicine + cost of electricity + heat-

ing charges + cost of other factors

Model for determinants of profits of broiler farmers

In order to analyse the factors determinants of profit of broiler farmers the following econometric model was used. This model was also used by Imtiaz (2012) and Ali et al. (2014) but in present study some additional variables were included in the model as follows:

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + e_i$$

Where,

β_i = coefficient of associated variable

β_0 = constant

Y_i = Profit of the respondents

X_1 = Year of education of the respondents

X_2 = Experience of the respondents

X_3 = Mortality of chicks

X_4 = Age of the respondents.

X_5 = Farm size

e_i = random error term

For further analysis, analyses of variance (ANOVA) with post hoc test for multiple comparison and independent sample t-test were used to observe the profitability of different size of broiler poultry farms and to know whether there is significant difference in the profit of sole proprietors and partnerships or not.

Diagnostic tests

To know whether econometric issues exist in the data or not. Diagnostics tests were applied i.e. Heteroscedasticity test, VIF (variance inflation factor) test for multicollinearity and D.W (Durbin Watson) test for autocorrelation. The normality of the data was checked with the Jarque-Bera test. The homogeneity of variance was also checked with the help of Levene's test for homogeneity of variance for ANOVA.

Results and Discussion

Poultry farms are categorized in three different size of farm. The farm which consist birds/chicks up to 2000 are categorized in small size poultry farms. The farms which consist birds/chicks ranged from 2001 to 4000 are categorized in medium size poultry farms while the 4001 and above are categorized in large size farms. The respondents with small farms were 43(46.74%), 40(43.48%) of the respondents have medium size farms and 9(9.78%) of the respondents possessed large farms (Table 1). Most of the respond-

ents were carrying the poultry business in the small and medium size because for the small and medium size require less money, cost, risk and it is also easy to handle. The poultry farms were also categorized into three different groups that are small, medium and large by Imtiaz (2012).

Table 1: Categorization of Poultry Farms

Stratum	Farm Size Interval	No. of Respondents	Percentage
Small Farm	Upto2000	43	46.74
Medium Farm	2001-4000	40	43.48
Large Farm	4001 and Above	9	9.78
Total		92	100

Source: Field Survey, 2015

In comparison of the profit of various size of broiler poultry farms it was observed that the average profit per flock of small poultry farm is 36089.51 rupees while average profit per flock of medium and large poultry farms are 58049 and 85228 rupees respectively. The result indicate that profit was high in the case of large poultry farms in the study area (Table 2). Similar research conducted by some other researcher also shows that performance of large units was better than that of medium and low capacity broiler farms (Chhikara, 1989).

Table 2: Profit per flock of different size of poultry farms (in PKRs.)

Poultry Farm	Average Total Revenue/flock	Average Total Cost/flock	Average Total Profit/flock	Standard Deviation
Small	342692	306603	36089	28788
Medium	536562	478513	58049	46697
Large	810628	725400	85228	33518

Source: Field Survey, 2015

Estimation of Multiple Regression Model

The results of multiple regression model for estimation of profit is stated in Table 3.

The empirical results of the multiple regression model for profit shows that profit of a poultry farm is positively affected by education of the respondent, experience of the respondent, age of the respondent and farm size while negatively affected by mortal-

ity of chicks. A 1 unit increase in the education of the respondent will increase the profit of the poultry farm by 2902.173 rupees. A 1 unit increase in experience of the respondent, age of the respondent and farm size will increase the profit of the poultry farm by 3237.528, 104.507 and 11.221 rupees respectively while a one unit increase in mortality will decrease the profit of the poultry farm by 361.731 (Table 3).

As evident from t-ratios that at 5% probability level, education of the respondent, experience of the respondent, mortality of chicks and farm size have significant effect on profit of the poultry farm as these variables turned out to be significant. While at the same probability level, Age of the respondent has insignificant effect on profit of the poultry farm as this variable turned out to be insignificant (Table 3).

Table 3: Regression model for estimation of profit

Independent Variables	Beta Value	St. Error	t Value	Sig.
Constant	-7354.932	20268.908	-0.363	.718
Education of the Respondent	2902.173	1051.763	2.759	.007
Experience of the Respondent	3237.528	1291.999	2.506	.014
Mortality of chicks	-361.731	129.079	-2.802	.006
Age of the respondent (Years)	104.507	419.880	0.249	.804
Farm size (Sq. feet)	11.221	3.649	3.075	.003

R Square= 0.35, Adj. R Square= 0.313, F= 9.288 (P value=0.000)

Source: Field Survey 2014

The value of R Square indicates that 35% of the variation in the profit of the poultry farms due to education of the respondent, experience of the respondent, mortality of chicks, age of the respondent and farm size. The F value shows over all significance of the model that is highly significant (Table 3).

Independent sample t-test

The independent t test was used to test that there is no significant differences in per flock profit of the sole proprietors and partnerships in the poultry farming business. The results showed that the t value at 5% significance level was -0.739, suggesting that there were no significant differences between the per flock profit of sole proprietors and partnerships (Table 4).

Table 4: Difference in per flock profit between sole proprietor and partnership

Particular	Mean	Standard Deviation	Mean difference	S.E difference	t value	Sig.
Sole proprietor	48525.375	41154.100	-9221.041	12483.683	-0.739	0.462
Partnership	57746.416	33786.967				

Source: Field Survey, 2015

Table 5: Differences in the per flock profit of different sizes of farms

	Sum of Square	D.F	Mean Square	F ratio	Significance
Between Groups	22460446435.277	2	11230223217.638	8.010	0.001
Within Groups	124783085231.783	89	1402057137.436		
Total	147243531667.060	91			

Source: Field Survey 2014

Table 6: Multiple comparison table of the per flock profit of different size of farms

i group of the farm	j group of the farm	Mean Difference (i-j)	Standard Error	Sig.	95% Conf. Interval	
					Lower Bound	Upper Bound
Small	Medium	-21959.664*	8268.793	.025	-41668.748	-2250.580
	Large	-49138.266*	13647.843	.002	-81668.587	-16607.946
Medium	Small	21959.664*	8268.793	.025	2250.580	41668.748
	Large	-27178.602	13916.808	.130	-60350.015	5992.810
Large	Small	49138.266*	13647.843	.002	16607.946	81668.587
	Medium	27178.602	13916.808	.130	-5992.810	60350.015

*The mean difference is significant at the 0.05 level; Source: Field Survey 2014

Analysis of Variance (One Way ANOVA)

To check that whether profit is same in different size of poultry farms or not, one way ANOVA test was used. The results showed that at 5% significance level, There was statistically significant difference between different size of poultry farms as determined by one-way ANOVA ($F(2,89) = 8.010, p = .001$), hence the null hypothesis was rejected and the alternate hypothesis was accepted that profit is different in different size of poultry farms as whole in the study area (Table 5).

From the results so far, it is revealed that there are significant differences between the profits of different size of poultry farms as a whole in the study area. The Multiple Comparisons table 6, shows which size of poultry farm differed from each other. The Tukey post-hoc test is generally the preferred test for conducting post-hoc tests on a one-way ANOVA. A Tukey post-hoc test revealed that there is a significant difference between the profits of different size of poultry farms that took the small size and the medium size ($p = 0.025$), as well as between the small size and large size ($p = 0.002$). However, there were

no significant differences between the profits of the medium size and large size poultry farms ($p = 0.989$).

Conclusions and Recommendations

From the above results it is concluded that the average profit per flock of small poultry farm is 36089.51 rupees and that of medium and large poultry farms are 58049 and 85228 rupees respectively, showing that large poultry farms are more profitable than small and medium size of poultry farms. The results of independent t test indicated that there is no significant difference between the profit of the sole proprietors and partnerships. Further results of analysis of variance (ANOVA) revealed that at 5% significance level, there was statistically significant difference between different sizes of poultry farms as whole. A Tukey post-hoc test revealed that there is a significant difference between the profits of different size of poultry small size and the medium size, however, there were no significant differences between the profits of the medium size and large size poultry farms.

The results of empirical estimated function revealed

that profit of poultry farm has been positively affected by education of the respondent, experience of the respondent, age of the respondent and farm size while negatively affected by mortality of chicks. All the variables were significant except age of the respondents.

Author's Contribution

Murad Khan designed and carried out the study, paper write up with all the analysis of this research, explanations and discussions. Muhammad Afzal collected the whole data for the paper and also helped in literature review.

References

- Ali, S., S. Ali, R. Asif and M. Nawaz. 2014. Profitability and cost efficiency analysis of open shed broiler farmers in punjab, Pakistan. *Int. J. Econ. Comm. Manag.* Vol. 2(6): pp. 01-10.
- Ahsan and Masood. (2004) *Poultry Farming, Pakistan*. Chapter-01: 1-7.
- Bano, R., H. Shah, M. Sharif and W. Akhtar. 2011. Profitability index and capital turn over in open house broiler farming : a case study of district Rawalpindi. *J. Agric. Res.* 24:1-4.
- Chhikara, O.P., (1989). Cost and return from broiler rearing in Gurgaon district of Haryana. *Ind. J. Anim. Prod. Manag.* 5 (4): 177-180.
- Fawwaz, T.M. and A. Al-Sharafat. 2013. Estimation of resource use efficiency in broiler farms: a marginal analysis approach. *Globe J. Finan. Bank. Iss.* 7(7).
- Gonzales., (1994). Feeding broiler in summer. *Poult. Abstr.* 1(20):7
- Government of Khyber Pakhtunkhwa. 2014. *Livestock Directorate Timergara, District Dir Lower*.
- Government of Pakistan. 2009. *Economics Survey of Pakistan of 2009*.
- Government of Pakistan 2010. *Economics Survey of Pakistan of 2010*.
- Government of Pakistan 2011. "Economics Survey of Pakistan of 2011"
- Imtiaz, 2012. Profitability analysis of poultry farming in district Peshawar. Unpublished thesis of M.Phil, Institute of Development Studies, The University of the Agriculture Peshawar-Pakistan.
- Islam, F., (1998). An analytical evaluation of broiler farm unit in Malakand. M.Sc. Thesis, Department of Poultry Husbandry, S.A.U. Tand.
- Maqbool A., Bakhsh K., Hassan I., Chatta M.W.A. and Ahmad S.A. 2005. Marketing of commercial poultry in Faisalabd city, Pakistan. *J. Agri. Soc. Sci.* 327-331.
- Mian, A.M, (1994). *Poultry production and animal husbandry*, National Book Foundation, Islamabad. Pp. 328.
- Mohsin, A.Q., R. Riaz, S. Asad and A. Mushtaq. 2008. A profitability analysis of broiler production in Rawalpindi District. *Pak. J. Agri. Sci.* 45(4).
- Mussawar, A. and A. Durrani. 2002. A estimation of techincal efficiency of layer farms in Peshawer District, Sarhad. *J. Agri. Sci.* 25(5).
- Oladeebo, J.O. and A.I. Ambe-Lamidi. 2007. Profitability, input elasticities and economic efficiency of poultry production among youth farmer in Osun State, Nigeria. *Int. J. Poult. Sci.* 6(12): 994-998. <https://doi.org/10.3923/ijps.2007.994.998>
- Sekaran, U. (2006). *Research methods for business: A skill building approach*. John Wiley & Sons
- Shaikh, A.S. and Y.C. Zala. 2011. Production Performance and Economics Appraisal of Broiler Farms of Gujarat. 24: 317-323.
- Sing, V.P., V.K, Sharma, M.S. Sidhu, and H.S. Kingra. 2010. Poultry farming in Punjab: An economic evaluation and export competitiveness. *Agric. Econ. Res. Rev.* Vol. 23.
- Tufail, M., M.Z. Syed, M. Sohail and I. Ahmad. 2012. Economic of backyard poultry in tehail Matta District Swat. *Sarhad J. Agric.* 28(3).