

## Economics of Broiler Production in Amman City, Jordan

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**Abstract:** The paper examined the profitability of broiler production in Amman city. The study was based on primary data collected from 149 broiler farmers during 2012. The secondary data were obtained from relevant sources including Ministry of Agriculture (MOA), Department of Statistics (DOS). Farm budgeting model was constructed to determine the profitability of broiler production. The results of the study revealed that the total costs in the broiler enterprise in the area of the study were 10.235JD per bird per annum. The total revenues were estimated to be 13.55JD, the gross margin was 3.52JD. These findings indicated that the broiler production enterprise was profitable in Amman area considering the conditions of broiler production in the area of the study. Factors affecting the production of Broiler Enterprise in the area include number of birds, quantity of consumed feed, mortality rate, costs of veterinary service and medicine. Marginal analysis of input showed that the farmers were inefficient in their production practices as indicated by the ratio of marginal value product (MVP) and marginal factor cost (MFC). The ratio revealed the overutilization of factors. The study concluded by indicating the significance of increasing poultry production in the study area in particular.

**Key Words:** marginal value product and marginal factor cost, Enterprise, Regression

### اقتصاديات إنتاج دجاج اللحم في مدينة عمان، الأردن

**ملخص:** تم إجراء دراسة حول ربحية نشاط إنتاج دجاج اللحم في محافظة عمان، عمان هي عاصمة المملكة الأردنية الهاشمية ويبلغ عدد سكانها أكثر من مليون شخص. وقد أجريت هذه الدراسة استناداً إلى البيانات الأولية (قطاعية) تم جمعها من مربيين دجاج اللحم (149 مربي) خلال 2012. تم الحصول على البيانات الثانوية من مصادرها ذات الصلة؛ كوزارة الزراعة و دائرة الإحصاءات العامة... الخ. تم تصميم موازنة نشاط لتحديد ربحية إنتاج دواجن اللحم، وكشفت نتائج الدراسة إلى أن التكاليف الإجمالية في نشاط دجاج اللحم في منطقة الدراسة وكانت 10,235 دينار لكل طائر سنوياً. وبلغ هامش الربح بـ 3,52 دينار وبلغت العائدات للنشاط 13,55 دينار. وبينت نتائج الدراسة إلى أن العوامل المؤثرة في إنتاج الدجاج اللحم هي: عدد من الطيور، وكمية

من الأعلاف المستهلكة، ومعدل الوفيات، تكاليف الخدمات البيطرية والأدوية. كما تم تبين ان مدخلات الإنتاج كانت غير كفؤة، وخلصت الدراسة إلى أهمية زيادة إنتاج الدواجن في منطقة الدراسة على وجه الخصوص

## **INTRODUCTION**

Broiler production is one of the most important agricultural enterprises among livestock in Jordan. broiler meat provides protein in terms of quality and quantity that narrow down the animal protein supply gap in minimum possible time as compared to other sources of animal protein (Motasem et al., 2010). Generally speaking, the importance of the poultry industry is that it concentrates in providing employment not only to those engaged in production directly, but also for the hatchery operations, feed dealers, manufactures of incubators, building materials, processors of egg and poultry products and all dealers engaged in the marketing of egg and poultry from the time they leave the producer until they are in hands of consumers (Morly,1982).

Depending on the farm size broiler farming can be the main source of family income or it can provide subsidiary income and gainful employment to farmers throughout the year. It is a short-term enterprise, therefore, a number of batches can be raised within a year. A number of strains exist in various regions of the country for broiler production, which have a genetic potential to achieve 2.0 kg live weight at the age of 42 days (M. J. Bhende,2006).

In Jordan there are nearly 2297 working broiler farms (DOS, 2010). The cost of production and net profit per broiler in these farms are the most important factors in determining the fate of broiler productivity. Both factors are influenced by other numerous factors like marketing age, mortality rate, flock size and hygienic conditions of the farm. Higher marketing age and smaller flock size would narrow the margin between total gross income and net profit per broiler (Farooq *et al*,2001). Park and Joeng (1990) and Holsheimer and Veerkamp (1992) reported better overall performance of broilers marketed at the age of 6 weeks than at the age of 5th and 7th through 9th week. The mortality rate plays an important role in determining the overall profitability of broiler flock. An increase in mortality rate from 2.5 to 10% will end in reducing the net profit per broiler(Kitsopanidis and Manos, 1991).

In Jordan the estimated productivity of the livestock sector is about 771 million JD, from which poultry sector contributes about 396 million JD which means that the poultry sector accounts for about 51% of the livestock sector of

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Jordan. The annual average per capita consumption of poultry meat is 30 kg (MOA,2011).

### **PROBLEM STATEMENT**

Broilers production plays an important role in providing food and cash income for villagers. The cash income in turn helps to contribute to poverty alleviation, therefore, the Major problems facing broiler producers were low market prices, high cost of feed, veterinary services, transportation, lack of access to credit and extension services.

### **OBJECTIVES**

The main objectives of this study are the following:

- 1- To examine the profitability broilers production in Amman city .
- 2- To determine the factors affecting Broiler production in the study area.
- 3- To determine economic efficiency of resource utilization in broiler production.

### **LITERATURE REVIEW**

Motasem *et al* (2010) studied marketing margins in broiler production in Jordan industry, He found that marketing system of poultry in Jordan is traditional in nature. Chohan (1992) studied the marketing of poultry in district Jhang in Pakistan (A country with similar broiler production conditions to Jordan). He found that broiler producers got considerably less price than that of market price. This is true for broiler producers in Jordan. Motasem (2010) studied the Factors Affecting Profits of Broiler Industry in Jordan, he found that the most important factors affecting profit in this study were the price of feed and the Feed Conversion Rate.

### **MATERIALS AND METHODS**

**Data collection:** The data were collected from primary sources (cross sectional data) through personal interview method using questionnaire specially designed to achieve the objectives of the study.

The population of the study was the whole broiler farms in Amman Governorate (244 farms).

**Sample size:** (149) producers were interviewed throughout the population (244), the sample size was determined according to the following equation:

$$n = \{ ( p \times q \times z^2 ) / e^2 \} / \{ ( N \times e^2 ) + ( z^2 \times p \times q ) / ( N \times e^2 ) \}$$

Where:

n = Sample Size.

P = The proportion that the sample will occur = (0.5).

q = The proportion that the sample will not occur = (1- p) = (0.5).

$z$  = The standardized score = (1.96).

$e$  = Error term = (0.05).

$N$  = Population = (244).

**Data analysis:** Data were analyzed using descriptive statistics such as means and percentages, stepwise regression analysis was used to estimate parameters and the model is stated below:

$$Y = f ( X1, X2, X3, X4)$$

Where:

$Y$ : Quantity produced of broiler meat (ton/ year)

$X1$ : Number of birds (1000)

$X2$ : Quantity of consumed feed (ton)

$X3$ : Costs of veterinary service and medicine (1000 JDs)

$X4$ : Mortality rate (1000)

**Profitability:** Farm budgeting model was constructed to determine the profitability of broiler production. This is the difference between the Gross Revenue and Total Cost of Production. Total Cost of production is the total expenses incurred during the production period. It includes Variable and Fixed costs. It is expressed as (Amos, 2008):

$$NP = GR - TC$$

Where

$NP$  = Net Profit,

$GR$  = Gross Revenue,

$TC$  = Total Cost of Production (Fixed Cost + Variable Cost).

## **RESULTS AND DISCUSSION**

All the farms had an average of five (5) production cycles with a period of 42 days for each cycle. The costs, returns, and profitability estimates of the broiler production enterprise is presented in Table 1.

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**Table 1: Costs and Return Analysis in Broiler Production Per bird per annum**

Item	Value (JD)	Percentage
<b>A. Variable Cost</b>		
Chick cost	1.25	12%
Veterinary cost	0.75	7%
Feed Cost	7.125	70%
Labor Cost	0.30	3%
Electricity charges	0.30	3%
Litter	0.25	2%
Miscellaneous variable cost	0.05	0.5%
<b>Total Variable Cost</b>	<b>10.025</b>	<b>98%</b>
<b>B. Fixed Cost</b>		
Farm rent	0.20	2%
Interest on capital	0.01	0.1%
<b>Total Fixed Cost</b>	<b>0.21</b>	<b>2%</b>
<b>Total Production Cost</b>	<b>10.235</b>	<b>100%</b>
<b>C. Revenues</b>		
Sale of meat	13.53	
Manure	0.025	
<b>Total revenues</b>	<b>13.55</b>	
D. Gross Margin	3.52	
E. Profit	3.30	
F. Net Profit	<u>6.71</u>	
G. Production cost per bird	2.04	
H. Production cost per 1 kg/ bird	1.13	
I. Producer's sale price	1.50	
<b>Source: Field Survey 2012</b>		

Table 1 show that the enterprise incurred a total variable cost of 10.025 JD Per bird per annum, out of which feeding alone accounted for 70% of the total cost. The table, also, reveals that the sourcing of the chicks cost represented 12% of the total cost. Relatively veterinary cost rate of 7% was also recorded

within the study period. Other major cost components in this enterprise are the fixed cost on production. These was 0.21 JD of the total cost per annum. The total revenues within the period were found to be 13.55 JD Per bird per annum, generated from the sales of broiler birds and manure. The results of the farm budgeting model revealed that the gross margin was found to be 3.52 JD per bird per annum. This means that broiler production is a profitable in the area of the study under the previously discussed conditions.

**The Multiple Regression Model:**

Reliability of Model Estimates: The reliability of the regression estimates may be undermined by a violation of the assumptions when using regression analysis.

The existence of any violation (abnormally distributed independent variable, autocorrelation, heteroscedasticity and multicollinearity) of the assumptions made in the least square estimation were tested by looking at the histogram of the dependent variable (Figure 1), the Durbin-Watson Test (column 5 of Table 2), and the standardised residual plot (Figure 2), and the multicollinearity test(Collinearity Statistics, column 4 of Table 1),and no serious violation of the assumptions was encountered.

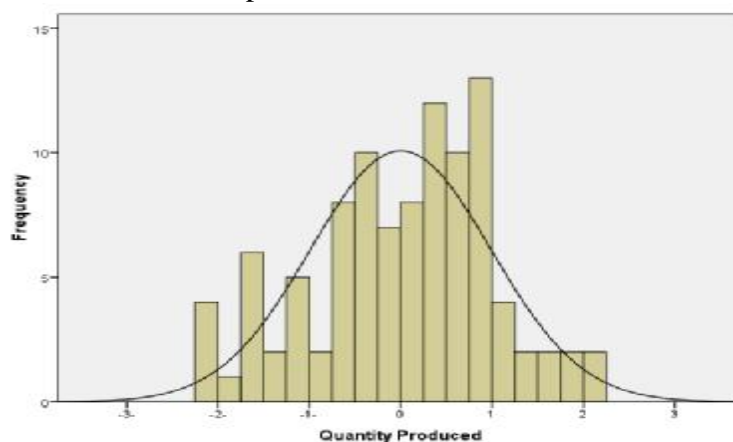
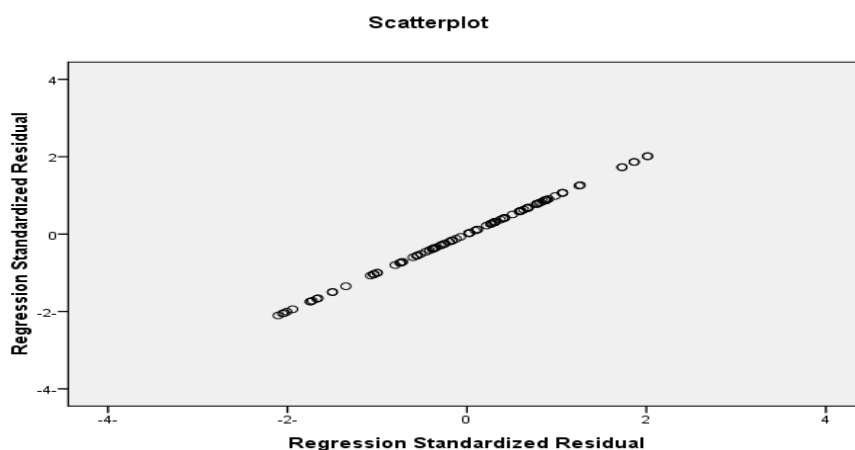


Figure 1. The distribution pattern of quantity produced of broiler meat .

Figure 2. The relationships of broiler meat) and standardized residuals between the dependent variable (quantity produced

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The estimated multiple regression model was as follows:

$$Y = 10.682 + 0.400 X1 + 0.531 X2 - 0.679 X3 - 3.204X4$$

Table 2 shows the corresponding results of the multiple regression model.

**Table 2: The estimated regression model:**

Variables D.W	β Value	T value	Sig.t	Collinearity Statistics	
				Tolerance	VIF
Column	1	2	3	4	5
Constant	10.682	4.019	0.000		
1.751					
X1	0.400	5.378	0.000	0.261	3.827
X2	0.531	6.995	0.000	0.337	2.965
X3	- 0.679	- 23.157	0.000	0.638	1.567
X4	- 3.204	- 2.341	0.021	0.938	1.066
<b>R<sup>2</sup></b>	<b>F value</b>		<b>Sig.f</b>		
0.823	340.838		0.000		

\*The dependent variable is the quantity produced of broiler meat (ton/ year)  
Source: Field Survey 2012

From Table 2 : Number of birds (X1), quantity of consumed feed (X2), Costs of veterinary service and medicine (X3), Mortality rate (X4) was the major determinants of quantity produced of broiler meat (Y). With a significant F-value, it implies that all variables considered influenced the quantity produced from boiler production, The R<sup>2</sup> for the estimated regression was 0.910 this implies that about 91% of the variation in the revenue from quantity produce of broiler is explained by all the explanatory variables.

**Marginal Analysis of Input Utilization:**

The marginal analysis of input utilization was used to estimate the resource use efficiency in broiler production (V. B. Taru *et al* ,.2010). This is given thus:

- APP<sub>x</sub>= y / x.....1
- MPP<sub>x</sub>=dy / d x.....2
- EP = MP / AP ..... 3
- MVP = MPP<sub>x</sub> × P<sub>y</sub>.....4
- MFC = P<sub>x</sub> × X..... 5

Where:

- AP = Average Physical Product,
- MPP = Marginal Physical Product ,
- MFC = Marginal factor cost of each input,
- MVP = Marginal Value Product of The Variable Input,
- r = Efficiency ratio,
- P<sub>x</sub> = Price of inputs,
- P<sub>y</sub> = Price of product,
- EP = elasticity of production.

When the ratio is,  $r < 1$ , it shows over utilization of that resource and profit will be increased by decreasing the quantity used of that input.

When the ratio is,  $r > 1$ , it indicates underutilization of that resource and increasing the rate of use of that input will increase the level of profit. When the ratio is,  $r = 1$ , it shows that the resource is efficiently utilized in the production.

This is the best point to maximize profit.



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**Table 3: The estimated Ep, MPP ,MVP, MFC ,r:**

Factor input	APP	MPP	EP	MVP	MFC	r=MVP/MFC
<b>X1</b>	0.643	0.400	0.622	0.933	55	0.017
<b>X2</b>	0.715	0.531	0.742	1.113	875.76	0.001
<b>X3</b>	- 0.523	0.679	-1.298	1.947	43.5	0.045
<b>X4</b>	-1.067	3.204	-2.834	4.528	200	0.023

Source: Field Survey 2012

From Table 2 and 3:

**1. Number of birds (X1):** The parameter estimates for number of birds for the study were (0.400 ,  $p < 0.05$ , Table 2), The elasticity of production (Table 3) shows that Number of birds was inelastic (0.62), the implication is a 10% increase in number of birds will result in a less proportionate increase in quantity produced of broiler meat by 62%. The marginal analysis of input utilization (r) for Number of birds (0.017) This is an indication that chicks are over utilized in the study area.

**2. quantity of consumed feed (X2):** The parameter estimates for number of birds for the study were (0.531 ,  $p < 0.05$ , Table 2), The elasticity of production (Table 3) shows that quantity of consumed feed was inelastic (0.74), the implication is a 10% increase in quantity of consumed feed will result in a less proportionate increase in quantity produced of broiler meat by 74%. The marginal analysis of input utilization (r) for Number of birds (0.001) This is an indication that chicks are over utilized in the study area.

**3. Costs of veterinary service and medicine (X3):** The parameter estimates for Costs of veterinary service and medicine were ( -0.679 ,  $p < 0.05$ , Table 2), The elasticity of production (Table 3) shows that Costs of veterinary service and medicine was elastic (-1.29) implying that a 10% increase in Costs of veterinary service and medicine will reduce quantity produced of broiler meat by 129%. The above finding are conformity with Motasem (2010) which showed that Costs of veterinary service and medicine had a negative effect on the quantity. The marginal analysis of input utilization (r) for Number of birds (0.045) This is an indication that chicks are over utilized in the study area.

**4. Mortality rate (X3):** Mortality rate ( $b_4$ ) were (-3.204 ,  $p < 0.05$ , Table 2), The elasticity of production (Table 3) shows that Costs of veterinary service and medicine was elastic (-2.834) implying that a 10% increase in Mortality rate will reduce quantity produced of broiler meat by 283%. The above finding are

conformity with Motasem (2010) which showed that Mortality rate had a negative effect on the quantity. The marginal analysis of input utilization ( $r$ ) for Number of birds (0.023) This is an indication that chicks are over utilized in the study area.

## **CONCLUSION**

The study examined the profitability of Poultry production in Amman. A total of 149 Poultry farmers. The study revealed that backyard poultry production is a profitable venture in the study area. Factors affecting of the broiler production enterprise in the area included Number of birds ,quantity of consumed feed ,Mortality rate ,Costs of veterinary service and medicine, Therefore to reduce total cost of poultry production, fertilizer subsidy should be increased to boost feed production. Marginal analysis of input shows that the farmers were inefficient in their production practices as indicated by the ratio of marginal value product (MVP) and marginal factor cost (MFC). The ratio revealed the over utilization of factors, Incentives such as free import duties on drug components should be put in place to increase vaccine production. Young people should be encouraged to go into poultry production to stem the tide of rural-urban migration in Amman.

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