# Analysis of Socio-Economic Determinants of Broiler Production in Egypt: A case Study of Sharkia Province

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**Abstract:** The socio-economic features of broiler farmers were studied, the factors influencing productivity were analyzed and constraints to broiler industry were identified in the study area. The data was collected during the months of October to December 2016 from a total of 130 broiler farmers by direct interviewing using pre-tested questionnaire. Descriptive statistics and multiple regression analysis were applied to analyse the data collected for the study. Findings indicated that most of the respondents were aged between 31-45 years and have secondary level of education along with long years of experience in broiler production. The result also showed a male dominance (86.92%) and only 32.31% of the farmers had broiler farming as their main business. Regression estimates indicated that age ($\beta$ = 0.427), level of education ($\beta$ = 0.716), experience ($\beta$ = 0.992), main occupation ($\beta$ = 0.367), farm size ($\beta$ = 1.158) and access to extension services ($\beta$ = -0.212) significantly affect the broiler productivity, while gender, marital status, family size and source of capital were not. Major production constraints identified, in order of severity, were outbreak of disease (ranked 1st), high feed price (ranked 2nd), price instability of chicks and live broiler (ranked 3rd), and extreme weather (ranked 4th). Other constraints reported by the farmers included management problems, low quality feed, poor access to extension service, lack of government support, lack of sufficient capital and lack of technical knowledge.

**Keywords:** Broiler Production, Socio-economic Features, Production Constraints, Egypt

## INTRODUCTION

The broiler industry is one of the main agricultural industries in Egypt, where investment in this sector is about LE8 billion. FAO [1] estimated the status of broiler production in the country to be 140 million chickens with an average meat production of 1,035,193 tons. Chicken meat utilization constitutes a vital source of animal protein needed to meet daily requirement. The contribution of poultry to the total daily per capita consumption of animal protein was about 20 percent, which is about 5.04 g/capita/day. The industry also provides hard-cash income and creates jobs for rural farmers and destitute women and could be produced within a short time at reasonable cost [2].

Broiler production differs from other livestock production activities in several ways. The most important is higher return on investment and rapid monetary turnover [3]. Additionally, broiler enjoys a relative advantage of ease of management, short production cycle, fast growth rate and high feed conversion efficiency [4]. Formal studies have identified four key factors affecting efficiency of broiler sector. These were production cost, processing, domestic demand and social factors [5]. Among socio–economic factors affecting poultry production are age, educational level, community status, level of living, finance, labour, farm size, land ownership, and

government policy [6, 7]. It was found that educational level, finance and inputs had positive and significant relationship with average production, while age, labour and market had negative and non-significant relationship with the average production of the respondents. Furthermore, government policy and infrastructure facilities had positive but non-significant relationship with average production [7]. The importance of such socio-economic factors and relationships on broiler productivity under Egyptian condition has not been fully discussed. Therefore, this study aimed at determining the impact of socioeconomic variables on broiler output in Sharkia province, Egypt.

## METHODOLOGY

### Study Area

This study was conducted in Sharkia province area, Egypt. The province is the 3rd most populous of the governorates of Egypt. It is divided into 2 districts, 15 cities, and 498 minor villages. The area is situated in the northern part of the country and lies between latitude 30.7°N and longitude 31.63°E. According to population estimates, the majority of residents in the province live in rural areas, with an urbanization rate of 23.1%. Out of an estimated 6,485,412 people living in the province, 4,987,707 people live in rural areas as opposed to only 1,497,705 in urban areas. Agriculture is

the basic business of the people. The rainfall pattern and temperature of the region vary seasonally. In the summer season, the mean temperature is as high as 37°C and in the winter periods it can go as low as 14°C. Rainfall reaches an average of 20 mm per annum.

## Data collection

The survey was conducted during the months of October to December 2016 with 130 randomly selected broiler farmers from ten different cities of Sharkia province. For the data collection, direct interview method was followed using pre-tested structured questionnaire. The data collected include the socio-economic characteristics of broiler farmers (such as age, gender, marital status, education level, family size, years of experience in broiler production, main occupation, training exposure, labour type, access to extension services and capital source), problems affecting the economic production of broiler in the study area as well as average output/kg/100birds of the previous three flocks.

## Data Analysis Techniques

The data was sorted and analysed using SPSS V.16 software (SPSS, IL, USA). Both descriptive statistics and multiple regression model were used to achieve the declared objectives. Out of the three functional forms tested (linear, logarithmic and quadratic) the logarithmic functional form provided the best fit for the relationship between the socio-economic variables and broiler output. The functional form selected was based on value of the coefficient of determination ($R^2$), F-value, and t- values of the estimates.

The regression model is implicitly stated as follows:

$Log Y = \alpha + \beta_1 Log X_1 + \beta_2 Log X_2 + \beta_3 Log X_3 + \beta_4 Log X_4 + \beta_5 Log X_5 + \beta_6 Log X_6 + \beta_7 Log X_7 + \beta_8 Log X_8 + \beta_9 Log X_9 + \beta_{10} Log X_{10} + ei$

Where,
Y= Broiler output/kg/100 birds
$X_1$= Age (years)
$X_2$= Gender (Dummy 1= male; 0 = female)
$X_3$= Marital status (Dummy 1= married; 0 = single)
$X_4$= Education level (years)
$X_5$= Farming experience (years)
$X_6$= Family size (number of persons in the household)

$X_7$= Main occupation (Dummy 1= broiler farmers; 0= otherwise)
$X_8$= Farm size (Number of birds)
$X_9$= Access to extension services (Dummy 1= have access to extension; 0= otherwise)
$X_{10}$= Source of capital (Dummy 1= private; 0 = loan)
α = Constant term
$\beta_1 - \beta_{10}$ = Regression coefficients
ei = error term.

## Ranking the constrains to broiler farming

The participant broiler farmers were asked to give weight on 10 selected problems depending on their intensity (None problem =0, light problem =1, medium problem =2 and severe problem =3). Final rank order of the selected problems was done based on total weighted score of each problem. Total score was estimated according to Mozumdar *et al.* [8] using the following formula,

$$Total\ score = n_3 \times 3 + n_2 \times 2 + n_1 \times 1 + n_0 \times 0$$

Where, $n_3$, $n_2$, $n_1$ and $n_0$ = Number of respondents giving severe (3), medium (2), light (1) and none problem (0), respectively.

## RESULTS AND DISCUSSION
## Socio-economic features of broiler farmers

The result revealed that majority of the farmers (58.46%) fall within the age group of 31-45 years (Table 1). This age range is considered as an active productive age in the production process [9], and so the farmers are more likely to adopt innovations faster than those in the other age groups. The results further showed a male dominance (86.92%) and about 82.31% of respondents were married. This finding support the result of Adegboye *et al.* [10] who reported that married youth more involved in agricultural activities than unmarried ones. It could be deduced from the study that majority of the farmers were educated with 40% having secondary education and 33.08% had tertiary education. This result is a reflection of the high education level attainment in the study area which probably due to free education policy that the government embarked upon. Education level attained by the farmers not only improves their productivity, but also contributes significantly to decision making of farmers and boosts their ability to understand and evaluate new production techniques [11].

**Table 1: Socio-economic characteristics of broiler farmers in the study area.**

| Variables | Frequency | Percentage |
|---|---|---|
| **Age (years)** | | |
| 18-30 | 30 | 23.08 |
| 31-45 | 76 | 58.46 |
| 46 and above | 24 | 18.46 |
| **Gender** | | |
| Male | 113 | 86.92 |
| Female | 17 | 13.08 |
| **Marital status** | | |
| Married | 107 | 82.31 |
| Single | 23 | 17.69 |
| **Education level** | | |
| Illiterate | 12 | 9.23 |
| Primary education | 23 | 17.69 |
| Secondary education | 52 | 40.00 |
| Tertiary education | 43 | 33.08 |
| **Main occupation** | | |
| Broiler farmers | 42 | 32.31 |
| Other occupation | 88 | 67.69 |
| **Family size** | | |
| Small ($\leq$ 5 members) | 84 | 64.62 |
| Large (>5 members) | 46 | 35.38 |
| **Years of experience** | | |
| 1-5 | 16 | 12.31 |
| 6-10 | 64 | 49.23 |
| 11-15 | 40 | 30.77 |
| 16 and above | 10 | 7.69 |
| **Training exposure** | | |
| None | 102 | 78.46 |
| Rare | 17 | 13.08 |
| Occasional | 9 | 6.92 |
| Frequent | 2 | 1.54 |
| **Labour type** | | |
| Strictly familiar | 21 | 16.15 |
| Hired, familiar | 18 | 13.85 |
| Strictly hired | 91 | 70.00 |
| **Access to extension services** | | |
| Access | 16 | 12.31 |
| No access | 114 | 87.69 |
| **Farm size (No. of birds)** | | |
| Small (<5000 bird) | 61 | 46.92 |
| Medium (5000-10000 bird) | 56 | 43.08 |
| Large (>10000 bird) | 13 | 10.00 |
| **Source of capital** | | |
| Private | 111 | 85.38 |
| Loan | 19 | 14.62 |

Source: field survey (2016)

With regard to main occupation, only few of poultry owners (32.31%) took broiler production as their major occupation, while 67.69% had another occupation implying that broiler farming is a part time job in the study area. Consequently, the producers may not pay adequate attention to more careful and sensitive management practices involved in the production process. Further finding showed that, 64.62% of the respondents had a small household size (≤5 members). This is quite different from what is common among farmers since more household size mean more work forces, but may be due to the fact that most of the

farmers were educated. The finding back up the result of Igodan *et al.* [12] that more educated farmers tends to have small families.

About 49.23% of the respondents had 6-10 years of experience followed by 30.77 % had 11-15 years, this in turn, enhances the farmers' ability to maximize output and profit at the lowest possible cost. Consistent with the study of Oluwatayo *et al.* [13] that farmers with more experience would be more efficient, have a good knowledge about market position and climatic conditions and so, expected to run a more efficient and profitable enterprise. It was also observed that high proportion of the farmers (78.46% and 70%) had no training and employed purely hired labour, respectively.

Majority of farmers (87.69%) do not have any form of extension contact meaning that lack of innovative information, where extension services help to transfer innovations to farmers such as technical innovations and sources of improved inputs for enhancement of their productivity [14]. In addition, most of farmers (46.92%) reared less than 5000 birds followed by 43.08% kept between 5000-10000 birds, while only 10% kept more 10000 birds. The dominant small and medium scale of most respondents is attributed to the high cost required to operate large scale farms. The results also showed that 85.38% of the respondents source their finance through personal saving with only 14.62% depend upon financial institutions.

**Socio-economic determinants of broiler production**
The analysis yield an $R^{-2}$ value of 0.636 indicating a 63.6 percent variation observed in broiler productivity was accounted for the explanatory variables included in the regression equation (Table 2). The F- value of 12.01 was significant at 1% level indicating that independent variables included in the socio-economic model had an overall impact in explaining the variation in the broiler productivity in the study area. The regression analysis results showed that the age, education level, experience, main occupation, farm size and access to extension services were statistically significant on their influence on broiler productivity.

The coefficient of age was found to be positive and significant at 5% level ($\beta = 0.427$; $P = 0.031$), indicating that the age of farmers contributes positively to broiler productivity. The implication may be that older farmers more productive because they have more experience through learning by doing. This is in line with findings published by Echebiri *et al.* [15] and indirect contradiction to those reported by Ume *et al.* [16] who stated that age was negatively related to production, and argued that the mental and physical capacity required in farming decreases with older age.

**Table 2: Multiple regression estimates of socio-economic factors affecting broiler productivity in the study area**

| Variables | Coefficient | T-statistics | P-value |
|---|---|---|---|
| Constant | 2.054 | 2.823 | 0.008 |
| Age | 0.427 | 6.251 | 0.031 |
| Gender | 0.103 | 0.521 | 0.651 |
| Marital status | 0.067 | 0.962 | 0.142 |
| Education level | 0.716 | 5.731 | 0.001 |
| Farming experience | 0.992 | 1.335 | 0.001 |
| Family size | 0.003 | 0.369 | 0.475 |
| Main occupation | 0.367 | 2.489 | 0.029 |
| Farm size | 1.158 | 1.986 | 0.009 |
| Access to extension services | -0.212 | -6.252 | 0.041 |
| Source of capital | -0.016 | -0.021 | 0.383 |
| $R^2$ | 0.641 | | |
| $R^{-2}$ | 0.636 | | |
| F-value | 12.01 | | |

Source: field survey (2016)

As expected, the coefficients of education level and experience were positive and significant at 1% ($\beta = 0.716, 0.992$; $P = 0.001$ respectively). This suggests that a unit increase in the level of education or experience of the respondent will lead to increase broiler productivity by 0.71 and 0.99%, respectively. The study have shown that, farmers with higher numbers of years in broiler production couples with advancement in education level seem to be more willing to manage the farm better and make more informed decisions. This finding is consistent with those of Ugwumba and Lamidi [17], Bukunmi and Yusuf [18] and Ume *et al.* [16]. However, Ike and Ugwumba [19] reported that level of education was not significant on its effect on output.

The coefficient of main occupation was positive and significant at 5% level (β = 0.367; *P* = 0.029). This implies that broiler farming as main job contributes positively to broiler productivity in the study area. This is in line with a priori expectation as fulltime poultry farmer is expected to specialized and get more experience than part time one. Furthermore, the analysis found the coefficient of farm size to be positive and significant at 1% level (β = 1.158; *P* = 0.009), indicating that the larger farm size, the more broiler productivity.

The coefficient of extension services against a priori expectation was negative and significant at 5% level (β = -0.212; *P* = 0.041). The negative coefficient obtained in our analysis is an indication that broiler farmers in the study area have got limited access to extension services, and hence insufficient transfer of information and technologies required for improving production levels. Ume *et al.* [16] made similar findings, while Bukunmi and Yusuf [18] did not concur. They found negative but non-significant relationship between extension services and farmers level of production. The rest of factors viz, gender, marital status and household size had positive and non-significant relationship, while source of capital had negative and non-significant relationship with broiler productivity.

**Analysis of broiler farmers' constraints**

The production constraints faced by broiler farmers in Sharkia province were identified and their ranking was computed as shown in Table 3. Outbreak of disease was found to be the main problem faced by respondents, which is in agreement with Roy [20] who also reported that outbreak of disease is an important problem in poultry sector especially in chicken farming. This is due to the fact that the disease infestation causes severe economic losses resulting from high mortality rate, high treatment costs, and poor feed conversion and growth rate in recovering birds; this in turn, reduces farm income and investment. Furthermore, high price of feed was complained by respondents, and ranked the second among the constraints. All the farmers opined that high price of feed greatly affect profit margin, since feed cost may account for 70% of the total production costs [21]. For this reason, poultry companies make a great effort to maximize food efficiency in order to improve farm income. The third main problem faced by interviewed farms was price instability of both chicks and finishing broilers. This constraint makes many farmers unaware of frequent changes in price of inputs and uncertain of profit where sometimes the price of broilers is less than production cost. Similarly, Kawsar *et al.* [22] reported that price instability of both chicks and live broilers was a problem for broiler farmers, and ranked second among the constraints.

**Table 3: Score and classification of the constraints faced by broiler farmers**

| Identified constraints | Problem severity | | | | Total score | Rank |
|---|---|---|---|---|---|---|
| | SP | MP | LP | None | | |
| 1. Outbreak of disease | 98 | 32 | 00 | 00 | 358 | 1 |
| 2. High price of feed | 87 | 43 | 00 | 00 | 347 | 2 |
| 3. Price instability of chicks & finishing broilers | 27 | 39 | 64 | 00 | 223 | 3 |
| 4. Extreme weather | 32 | 45 | 33 | 20 | 219 | 4 |
| 5. Management problems | 17 | 27 | 56 | 30 | 161 | 5 |
| 6. Low quality feed | 26 | 22 | 19 | 63 | 141 | 6 |
| 7. Poor access to extension services | 18 | 15 | 50 | 47 | 134 | 7 |
| 8. Poor access to government support | 17 | 19 | 38 | 56 | 127 | 8 |
| 9. Lack of sufficient capital | 22 | 12 | 7 | 89 | 97 | 9 |
| 10. Lack of technical knowledge | 5 | 11 | 24 | 91 | 61 | 10 |

SP = Severe Problems; MP = Medium problems; LP = Light Problems

Extreme weather and management problems were also reported as substantial problems by the farmers, and ranked in fourth and fifth place, respectively. About 84.6% and 76.9% of respondents identified that extreme weather and management problems, respectively are very serious problems for their business. Climate change adversely affects broiler performance since it encourages outbreak of diseases and increases energy costs (fuel and electricity) for heating in winter and ventilation in the summer [23]. In addition, low quality feed, poor access to extension service, lack of government support, lack of sufficient capital and lack of technical knowledge were ranked as

6th, 7th, 8th, 9th, and 10th problems respectively out of 10 selected problems. Similarly, Alam *et al.* [24] and Mendes *et al.* [25] reported lack of sufficient capital, inadequate veterinary services, low quality feed, lack of technical service, improper use of technology were serious problems in broiler farming.

**CONCLUSION**

In conclusion, our data suggest that the major determinants to broiler production in the study area were age, level of education, experience, main occupation, farm size and access to extension services. In addition, the major constraints to broiler farming

were outbreak of disease, high price of feed, price instability of chicks and live broilers and extreme weather.

## REFERENCES

1. Food and Agriculture Organization. FAO Statistical database for Egypt 2014, FAO internal data. www.FAOSTAT.FAO.ORG
2. Ahmed IAM. Economic and productive efficiency of poultry farms in relation to veterinary management. M.V.Sc. Thesis, Fac. Vet. Med, Menofia Univ, Egypt. 2007; 81.
3. Akhter S, Rashid MHA. Comparative efficiency analysis of broiler farming under Aftab Bahumukhi farm limited supervision and farmers' own management. Progress. Agric. 2008; 19(2):195-204.
4. Taru VB, Nkwi GE, Medugu AI, Reuben J. Economics of broiler production in Meme Division of Cameroon. J. Agri. Sci. 2010; 1(2):83-87.
5. Thornton G. Future competitiveness of the US poultry industry in the world broiler and turkey trading Arenas. In: Linden, J. Poultry International, WATT Poultry USA. 2004; 43(1):20-24.
6. Hassan AA. Economic analysis of egg production in three LGAs of Kaduna State. MSc. Thesis, Ahmadu Bello University, Zaria. 2002.
7. Adebayo OO, Adeola RG. Socio-economic factors affecting poultry producers in Ejigbo local government area of Osun State. J. Hum. Ecol. 2005; 18(1):39-41.
8. Mozumdar L, Farid KS, Ahmed JU, Rahman MW. Broiler farming: An approach to improve rural livelihood. J. Bangladesh Agril. Univ. 2009; 7: 395-402.
9. Jatto NA. Economics and social characteristics of registered poultry egg producers in Ilorin, Kwara State. Russian Journal of Agricultural and Socio-Economic Sciences. 2012; 11(11):18-23.
10. Adegboye MA, Eriolorunga PA. Participation of youths in self-help efforts in Jos South local government area of Plateau State. Proceeding of the 40th Annual Conference of Agricultural Society of Nigeria (ASN) held at National Root Crop Research Institute, Umudike Abia state, Nigeria. 2006 October 16-20; 275.
11. Alabi RA, Aruna MB. Technical efficiency of family poultry production in Niger Delta, Nigeria. Journal Central European Agriculture. 2006; 6 (4):531-538.
12. Igodan CO, Ohaji PE, Ekpere JA. Factors associated with the adoption of recommended practices for Maize production in Kainji Lake Basin of Nigeria. Agricultural Administration and Extension. 1988; 29:149-156.
13. Oluwatayo IB, Sekumade AB, Adesoji SA. Resource use efficiency of Maize farmers in rural Nigeria; Evidence from Ekiti State. World journal of agricultural science. 2008; 4(1):91-99.
14. Nwaru JC, Iheke RO, Nwaeke JU. Allocative efficiency in table egg production in Owerri agricultural zone of Imo State, Nigeria. Proceedings of the 44th Annual Conference of Agricultural Society of Nigeria held at Tadoke Akintola University of Technology Ogbomoso, Oyo State Nigeria. 2010; 29-34.
15. Echebiri RN, Igwe KC, Okwun AK. Analysis of technical efficiency of urban broiler production in Umuahia Metropolis of Abia State. Proceedings of the 40th Annual Conference of Agricultural Society of Nigeria, Umudike Umuahia. 2006; 203-206.
16. Ume SI, Ezeano CI, Elisha D, Edeh ON. Analysis of socio-economic determinants to broiler production by rural women in Imo State of Nigeria. International Journal of Environment, Agriculture and Biotechnology. 2016; 1(4):1046-1053.
17. Ugwumba F, Lamidi AI. Profitability and economic efficiency of poultry local government area of Anambra State. Journal of Poultry Science. 2011; 10:106-109.
18. Bukunmi FR, Yusuf HA. Analysis of socio-economic factors influencing poultry egg production among poultry farmers in Ondo State, Nigeria. British Journal of Applied Science & Technology. 2015; 10 (3):1-7.
19. Ike PC, Ugwumba COA. Profitability of small scale broiler production in Onitsha North local government area of Anambra State, Nigeria. International Journal of Poultry Science. 2011; 10 (2):106-109.
20. Roy BC. Identification of constraints of raising broiler of small flock size and determination of their Remadial measures. MS Thesis, Dept. of Poultry Sci., Bang. Agri. Univ., Mymensingh, Bangladesh. 2000; P. 34–50.
21. Hassan AA, Nwanta JA, Njoga EO, Maiangwa MG, Mohammed A. Economic analysis of feed source in broiler production. Nigerian Veterinary Journal. 2011; 32 (2):154-156.
22. Kawsar MH, Chowdhury SD, Raha SK, Hossain MM. An analysis of factors affecting the profitability of small-scale broiler farming in Bangladesh. World's Poultry Science Association. 2013; 69: 676.
23. Adesiji GB, Baba ST, Tyabo IS. Effects of climate change on poultry production in Ondo State, Nigeria. Russian Journal of Agricultural and Socio-Economic Sciences. 2013; 2(14):55-60.
24. Alam MB, Uddin ABMS, Bablu MAZH, Kamaly MHK, Rahaman MM. Socio-economic profile of duck farmers and duck management practices in Rajshahi Region. Bang. J. Anim. Sci. 2012; 41 (2):96-105.

25. Mendes AS, Gudoski DC, Cargnelutti AF, Silva EJ, Carvalho EH, Morello GM. Factors that impact the financial performance of broiler production in Southern States of Paraná, Brazil. Brazilian Journal of Poultry Science. 2014; 16 (1):113-120.