

AN ECONOMIC ANALYSIS OF MEAT POULTRY BREEDING PROJECTS AND THEIR PROFIT EFFICIENCY IN IRAQ FOR THE YEAR 2020(WASIT AS A CASE STUDY)

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ABSTRACT

This research was aimed to study and analyze the costs, revenues, and profits of meat chicken breeding projects. The study also estimating the random frontier profit function, the profit inefficiency function and profit efficiency which based on cross-sectional data that included 59 projects for raising meat poultry in Waist governorate in 2020. The results of the analysis showed through the descriptive analysis of the cost structure that, the costs of chicks and fodder account for more than 70% of the costs, as well as achieving economic profits for projects. Through the random border profit function, the significance of both the total revenue and the costs of chicks, fodder, medicines, vaccines, and services (water, electricity and fuel) was shown. As for the inefficiency function parameters, they were significant for each proved the age of the breeder, his years of experience, the presence of the veterinarian and the agricultural engineer. As for the efficiency of profits, it was 76%. The researcher recommended the necessity of supporting breeding projects by providing incentives to feed factories and their processors or supporting feeds and private hatcheries to reduce costs and provide training for less experienced breeders and urge them to involve veterinarians and agricultural engineers in supervising broiler projects.

Keywords: poultry, stochastic frontier analysis, production economics.

الحجامي وآخرون

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تحليل اقتصادي لمشاريع تربية دجاج اللحم وكفاءة أرباحها في العراق لعام 2020 (محافظة واسط حالة دراسية).

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المستخلص

يهدف البحث الى دراسة وتحليل تكاليف وإيرادات وأرباح مشاريع تربية دجاج اللحم ، وكذلك تقدير دالة الربح الحدودية العشوائية ودالة عدم كفاءة الربح وكفاءة الأرباح بالاعتماد على بيانات مقطعية اشتملت على 59 مشروع لتربية دجاج اللحم في محافظة واسط لعام 2020، أظهرت النتائج التحليل من خلال التحليل الوصفي لهيكل التكاليف إن تكاليف الأفراخ والاعلاف تشكل أكثر من 70% من التكاليف كذلك تحقيق المشاريع أرباح اقتصادية ، ومن خلال دالة الربح الحدودية العشوائية تبين معنوية كل من الإيراد الكلي وتكاليف الأفراخ والأعلاف والأدوية واللقاحات والخدمات (الماء والكهرباء والوقود) أما معلمات دالة عدم الكفاءة فكانت معنوية لكل من عمر المربي وسنوات خبرته ووجود الطبيب البيطري والمهندس الزراعي وقدرت كفاءة الأرباح بنحو 76% وإن ابتعاد المشاريع عن الأرباح الكفوءة يعود سببها الى متغيرات دالة عدم الكفاءة. أوصى الباحث بضرورة دعم مشاريع التربية من خلال تقديم حوافز لمعامل الأعلاف أو تجهيزها أو دعم الأعلاف والمفاس الخاصة لتقليل التكاليف وتوفير التدريب للمربين الأقل خبرة وحثهم على إشراك الاطباء البيطرين والمهندسين الزراعيين في الإشراف على مشاريع اللحم .

كلمات مفتاحية: دواجن، التحليل الحدودي العشوائي، اقتصاديات الإنتاج

INTRODUCTION

The poultry industry is one of the main pillars in achieving food security policy, and it is a major source of protein and a good source of fats and vitamins with high nutritional value for humans (7), and it's one of the fastest ways to increase protein supply in the short term (22). Chicken has become one of the most important Sources of consumed meat in the world (20), the consumption of chicken meat is a source to meet the daily needs of protein (16). Poultry meat is characterized by its high nutritional value, its cheap price, and the high food conversion factor compared to red meat. As well as the speed of capital turnover, high return, and the lack of need for poultry projects for a large patch of land, as well as the low capital required for investment compared to other profitable projects. Poultry raising is one of the sub in the main factor in Iraqi agriculture high income, increased urbanization, and a deficit in local production have led marketers to supply chicken meat to Iraq due to the high demand, low price, and consumer-friendly packaging associated with imported chicken has given it more preference over local chicken meat (14) which has a higher cost. That negatively affected local production, , as many families prefer live and fresh chicken because it tastes good and safe, as well as the revival of religious occasions, wedding occasions and sorrows, in which food is provided free of charge to the people, which revitalized local production. In 2019, the Iraqi government decided to stop imports due to the abundance of local production and to reduce the losses of the breeder, but there are still quantities that enter through illegal methods. The increasing demand for poultry still represents an opportunity to increase production and export as well as increase farm income for breeders and provide job opportunities for the local workforce. While the total of meat chicken projects in Iraq are (1769) . there are 111 projects in Wasit Governorate, representing 6.2% of those projects, and with 5 breeding flocks in the current year, the total number of the sold chicken reached 54161 thousand chickens with a quantity of 109.5 thousand tons while in Wasit Governorate the sold chicken reached 3861 thousand chickens and its quantity is

7514 thousand tons in a year In 2018. the total number of poultry projects in Iraq was estimated at 5172, including 1769 chicken fattening projects, and the average Iraqi production of (live & fresh) chicken meat was 47,340 thousand tons, with an average amount of 91.32 thousand tons (10). There are many unlicensed broiler breeding projects that are added to the approved projects, and the breeding patterns have varied, including ground and cages, recently the breeding has spread in the plastic houses, which have been modified to accommodate the raising of chickens. The field capacity also exceeded, including the small one 3000-5000 and the large more than 15000 birds. The average number of halls for a single project was two halls. The average number of broiler flocks in Iraq was three breeding flocks per year, while the number of flocks for the study sample was five breeding flocks per year. The main constraints on production are the high cost of breeding, which is represented in the costs (chicks, fodder, medicines, vaccines, labor wages, energy prices, and infrastructure) and the high rates of mortality, project management and environmental conditions control of heat, ventilation, humidity and composition of feed mixes, distribution of vaccines, treatment of diseases, and reduction of deaths .As well as problems in cash flow are important influences on the profit of projects and thus affect the ability to continue breeding and competitiveness, most breeders sell live birds because they do not have the facilities necessary to supply the markets that require slaughtered and processed chickens. The live chicken market is also cyclical and unpredictable as some of the breeding flocks are sold. Within a couple of days, but some other flocks, the sale may take longer . This causes preparations for the next batch to be delayed as a result of the erratic nature of the market and which has many negative effects on uncertain cash flow which makes it difficult for breeders to prepayments for the inputs and the inability to recover the money had spent. This means that these breeders can only obtain the inputs by purchasing on credit, thus increasing costs, decreasing profits or losses. The success of raising local meat chickens requires strengthening the viability of breeding

projects to reap maximum returns, and thus producers have an incentive to increase the supply of meat poultry, and this will match with the priority of the Iraqi government to increase the supply. The case study of the research is represented in the low profits of poultry meat producers. The research aims to analyze the costs, revenues and profits of meat poultry breeding projects, as well as estimate the random frontier profit function, profit inefficiency function and profit efficiency. The results of this study will provide some basic information for policy makers and specialists in the economics of meat chicken breeding and agricultural extension workers and enabling them to formulate policies related to an effective breeding plan as well as information for researchers interested in conducting future studies. Several studies and researches have been guided by the use of the stochastic profit function and the inefficiency function to estimate the efficiency that provides indicators which contribute to determine the facts, methods and standards used and the results that can be accessed to be an extension of previous studies and research, including (1, 2, 3, 4, 6, 17, 18).

MATERIALS AND METHODS

Descriptive statistics were used to estimate the variable, fixed and total costs items, revenue and profit that depend on production, production prices, production costs, and dependence on the profit equation, as shown below(14): $\pi = P_1 Q_1 + P_2 Q_2 - (P_{xi} X_i) - TFC$ 1. where, π = profit, P_b = unit price of live broiler, Q_1 = quantity of live broilers (Iraqi Dinar), P_1 = unit price of used and additional litter, Q_2 = amount of waste, P_{xi} = unit price of the inputs (variants) used in a broiler farm; X_i = quantity of inputs (variables) used in kg, TFC = Total fixed cost involved in broiler farm. using of the Cobb–Douglas production function to estimate the marginal profit index, the inefficiency function, and the profit efficiency: The use of the random border approach based on the least squares method which is a method takes into account the random error that requires a prior deviation of the used model (8) The total error term (e_i) is divided into two parts, the first: which is the random error limit (v_i), which reflects measurement errors that may be

positive or negative. The second: the limit of efficiency deficiency (u_i), which is a one-sided error, and deviations from the maximum profits (5) are returned and come from the negative deviation from the borderline efficiency curve. There are many social, economic, demographic, institutional, environmental and non-material factors that affect efficiency (21). These factors include gender, age, educational level, family size, parenting experience, etc. (20). Stochastic border analysis is an auxiliary method in comparing projects that have similar profit activities (15), the production decision can be meant into less profit or return for the product (12). Profit efficiency is the ability of an enterprise to achieve the highest possible profit at prices and levels of production inputs.

Specification of the profit function

In $\Pi = b_0 + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + b_6 \ln X_6 + b_7 \ln X_7 + (V_i - U_i)$ 2. Where, Y = profit for the i th farm (Iraqi Dinar.); b_0 = intercept value; X_1 = Gross return (Iraqi Dinar.); X_2 = Cost of day-old chicks for i th farm (Iraqi Dinar.); X_3 = Cost of feed; X_4 = Cost of hired labour for i th farm (Iraqi Dinar.); X_5 = Veterinary expenses for i th farm (Iraqi Dinar.); X_6 = the cost of services (water and electricity) (Iraqi Dinar). X_7 = fixed cost (Iraqi Dinar). b_1 b_7 = Regression co-efficient of respective variables. U = Error term; $i = 1- 59$. v_i : the random error, which represents the variables that cannot be controlled and beyond the control of the breeder, errors in measurement and random errors (independent and identical distribution iid), which mean its equal to zero and a constant variance, so that is $N(0, \sigma^2_{v_i})$ where it takes positive or negative values v_i ($-\infty < v_i < \infty$). u_i : is a one-sided non-negative random variable ($u_i > 0$) that embodies profit efficiency projects i . Which represents the inefficiency in profit and assumes that it is distributed in an exponentially identical independent or semi-normal distribution with a greater mean equal to $N(0, \sigma^2_{u_i})$ or a discrete normal distribution with mean u_i and the variance of $\sigma^2_{u_i}$ (11). If its value is equal to zero, then this means that the unit Profitability is located on the borderline curve and achieved 100% efficiency, either if it is greater than zero, this means that the profit unit is not

located on the border curve and is not efficient. This model applied on cross-sectional data to independently obtain efficiency for each project. Clarifies the difference in efficiency for the project. u_i It represents profit inefficiency: is vector variables excerpt in inefficiency. I : the vector of the features to be estimated for the random variables. Profit efficiency TE_i : is defined as the ratio between actual profit and optimum profit, which takes values between zero and one (17), as in Equation 4.

$$PE_i = \frac{f(x_i; \beta_i) + \exp(v_i - u_i)}{f(x_i; \beta_i) + \exp(v_i)} \dots \dots \dots 3.$$

$PE_i = \exp(-u_i) \dots \dots \dots 4.$ affecting inefficiency, so the inefficiency function can be described as follows: $u_i = \sigma_0 + \sigma_1 S_1 + \sigma_2 S_2 + \dots +$

$\sigma_5 S_5 \dots \dots \dots 5.$ Whereas $\sigma_1, \sigma_2 \dots \dots \dots \sigma_5$ unknown parameters to be assessed (($S_1 \dots \dots S_5$) represent the breeder's qualifications, which are (the breeder's age, the breeder's experience and his ability to manage by increasing the number of breeding fields) and the presence of (agricultural engineer and veterinarian). Using of Frontier 4.1 software for the purpose of obtaining the parameter values of the stochastic frontier profit function as well as estimating the profit efficiency and the parameters of the inefficiency variables.

Study samples

This study relied on a field survey for meat poultry breeding projects approved by the Wasit Agriculture directorate in Wasit, as

there are 111 projects. The study sample consists of a sample of meat chicken breeding projects with a total of (59) projects.

RESULTS AND DISCUSSION

The cost of raising meat chickens, the total costs of each project consisting of one breeding field or several fields were taken into consideration. The variable costs included the cost of the variable inputs costs of chicks, feed costs, expenditures on vaccines, medicines and sterilizers, the wages of hired labor, the cost of electricity, water and fuel. On the other hand, the fixed cost included the cost of the family business, the rent of the fields and the interest on invested capital. The items of variable and fixed costs were estimated and the relative importance of them, as it was found that the value of feed occupies the first place, reaching about 2005.59 dinars / per bird, and the second ranked costs of purchasing one chick were about 668.6 dinars, while disbursements of medicines, vaccines and sterilizers ranked third with a value of 440.69 Dinars / per bird, and the water, electricity and fuel expenditures ranked fourth, about 241.69 dinars / per bird, one dinar / per bird, and the labor wages ranked fifth with a value of about .164.4 dinars / per bird. The invested money was 253.77. As for the relative importance of these items in relation to the total costs, they were 53.13, 17.71, 11.66, 6.4, 4.53 and 6.72 respectively, and as shown in the Table 1.

Table 1. Average of the variables used in the research.

Series	Cost Items	Quantity	average Price	Cost One Bird	Ratio of variable costs	Ratio of Total Costs
unit of Measurement						
1	variable costs					
a	chicks	Number	14540	668.6	668.6	18.99
b	Feed	kg	3.02	663.5	2005.589	56.95
	Brushes and sterilizers	dinars	-	-	90.46	2.569
c						
d	Medicines and vaccines	dinars	-	-	350.34	9.95
g	Leased work	Number	-	-	164.4	6.86
f	Fuel, electricity and water,	dinars	-	-	241.69	4.67
	Total variable costs (dinars / Bird)				3521.055	100
	Fixed costs (dinars / Bird)				253.773	6.72
	Total costs (dinars / Bird)				3774.8	100

Source: Prepared by the researcher based on the questionnaire data. Revenue of raising broiler chickens: The total yield was determined through the sale of meat chicken and field residues from the litter. Table 2 shows that the average price per kilogram of live meat chickens that the breeders received was 2196.6 dinars, and the average weight of one hen was 2068 g, and a percentage of the total revenue amounted to 99.43% .In addition

to the sale of waste from one field, 25.57 dinars. In comparison with the selling price of one kilogram in 2019, which was 1900 dinars, this means the increase in prices was 300 dinars, and knowing that many fields had costs that exceeded those prices, and therefore it was subjected to large losses in most of the breeding flocks, as the import was low in price. The market flooded, in addition to epidemic infections, including bird virus.

Table 2. Total revenue by raising broiler chickens of each project.

detailst	unit of Measurement	price dinars/ kg	Average weight	revenue	The percentage of total revenue
Live bird	kg	2196.6	2.068	4543.18	99.43
Field residues	Per bird (dinars)	-	-	25.75	0.56
total revenue	dinars	-	-	4568.94	100

Source: Prepared by the researcher based on the questionnaire data.

Profit from raising meat poultry: After determining the total, fixed and variable costs as well as total return, the gross margin, net return, and the return of each dinar invested were estimated in relation to the variable and total cost. It is clear from Table 3 that the total margins for each project per flock were 1,447.88 dinars. The net return on the total cost, which was achieved by deducting all costs from the total revenue, was 770,912 dinars. The return was calculated for each dinar invested based on the return to cost ratio

and it was found that the projects of raising chicken meat achieved 29 percent profit based on variable cost and 21 percent profit on the basis of the total cost. The costs of one dinar produced amounted to 0.826, which means that achieving a return In the amount of one thousand dinars, it needs costs of 826 dinars, and this is a positive indicator, means that there is an economic profit surplus of 17.6%. Thus, it turns out that the projects of raising meat poultry are profitable considering the data of the study sample.

Table 3. Cost-benefit ratio and benefit ratio to cost.

Series	details	Series	details
1	Total return	4568.93	6 Profit = (1-4)
2	Total variable costs	3521.055	7 Return per dinar invested on the basis of variable cost = (1/2)
3	Total fixed costs	253.773	8 Return for each dinar invested, based on the total cost
4	Total costs (2+3)	3774.82	9 Unit costs produced (1/4)
			770.912
			1.29
			1.21
			0.826

Source: Prepared by the researcher based on the questionnaire data.

Quantifying the profit function, the inefficiency function and efficiency: The Stochastic Frontier Analysis was estimated by using the Frontier 4.1 program and choosing the best functional form using probability ratio testing, estimating the inefficiency function and finding efficiency for the study sample projects, as shown below:

A. Estimating the stochastic frontier profit function:

$$\ln Y_i = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + \beta_6 \ln X_6 + \beta_7 \ln X_7 + v_i - u_i, \dots, 1.$$

$$Y_i = \text{Profit} / \text{dinars. } X_1 = \text{total revenue} / \text{dinar. } X_2 = \text{cost of purchasing the chickens. } X_3 = \text{The cost of feed. } X_4 = \text{the cost of medicines and vaccines. } X_5 = \text{the cost of the rented work} / \text{dinars. } X_6 = \text{the cost of services (water and electricity} / \text{dinars. } X_7 = \text{fixed cost.)}$$

B. Estimating the inefficiency function: To estimate the effect of the variables on efficiency, as they are considered as a source influencing inefficiency and a model has been described as follows:

S_1, \dots, S_5 . = Represents the variable affecting efficiency (the breeder's age (number of years) the breeder's experience (number of years), the presence of a veterinarian and agricultural engineer ((qualitative variable) (1 and 0)) and the number of breeding fields for the breeder (number) respectively. While $\sigma_1, \dots, \sigma_5$ are unknown parameters to be estimated. For the purpose of obtaining the values of the parameters of the random marginal profit function as well as estimating the profit efficiency and the parameters of the inefficiency variables according to the logarithmic profit function to obtain the maximum probability estimates for the parameters of the random frontier profit function.

1. The sigma squared value 12.39 is significant at a significance level 0.01 and indicates the quality and validity of the assumed distribution of the compound error.

2. The gamma value 90.9 is significant at a significance level 0.01 and indicates that the largest part of the divergence of values from marginal profits (variance of values) is due to inefficiency of profit and not the result of random error as it indicates that (0.90) of deviations Profit to profit inefficiency due to the variables mentioned in the study, and it was only 0.10 due to factors beyond control.

3. The value of the logarithmic probability error test from one side LR 60.9 which is significant at a significance level 0.01 as it was greater than the chi square 20.9 and thus confirms the alternative hypothesis, i.e. There is a significant relationship between the study variables and the inefficiency meat chicken's farmer in marginal profit (11) and rejects the null hypothesis, which states that there is no significant relationship between the aforementioned study variables and the inefficiency of meat chicken farms in marginal profit, indicating that the study variables play an important role in explaining the variation in raising chickens the meat.

4. Analysis of the factors affecting the profit function: The effects of some important inputs

on the total profit in the meat chicken breeding projects have been analyzed, as the value of the profit function parameters by (ML) method which is relied upon in explaining the relationship between the independent variables in the function and the dependent variable (profit) can be seen at Table 4. That the total revenue parameter was significant and positive, and this means that an increase in revenue by 1% leads to an increase in profit by 3.54%, while the parameters of the cost of feed, the cost of chicks, medicines, vaccines and rented work were significant and negative indicating that the increase of 1% in their cost It will lead to a decrease in profits by 1.19, 0.57, 0.24 and 0.34%, respectively, while the parameters of service costs (fuel, water and electricity) and fixed costs were negative and insignificant.

5. Estimating the inefficiency function and sources of profit inefficiency: based on the results of profit efficiency as a dependent variable and on the explanatory variables included (the breeder's experience (number of years), the age of the breeder (number of years), the presence of the veterinarian, the presence of the agricultural engineer, and the number of breeding fields of the breeder (number), the function was estimated inefficiency and parameters were:

A. (The age of the breeder (S1) is positive and moral, and this means the increase in the years of the life of the breeder has led to an increase in inefficiency and thus led to a decrease in profitability as the person is more vital and active in the age of young people compared to the elderly.

B. The breeder's experience (S2) is negative and moral, and this means that the increase in the number of years of experience of the breeder led to a decrease in inefficiency and thus led to an increase in the profitability of the project. This is due to the ability of more experienced farmers to adopt best breeding practices through the continuous learning process to produce more profitable using a mixture Less costly than the available productive inputs and more return, and consistent with what was reached (15).

C. (The presence of the veterinarian (S3) is negative and moral, and this means the presence of the veterinarian led to a decrease

in inefficiency and thus led to an increase in the profitability of the project, as the presence of the veterinarian is important in distributing vaccines, detecting and treating sick injuries, and thus reducing losses.

D. (The presence of the agricultural engineer (S4) is negative and moral, and this means that the parameter (the presence of the agricultural engineer) led to a decrease in inefficiency and thus led to an increase in the profitability of the project as the presence of the agricultural engineer is important in controlling the conditions surrounding the birds in the production hall of humidity, ventilation and temperature, as well as the type of feeding diet and its compatibility with the age of the bird.

E. (The number of breeding fields (S5) is positive and not significant, and this means that the increase in the number of breeding fields leads to an increase in inefficiency and thus led to a decrease in the profitability efficiency of the project.

Table 4. Results of estimating the Stochastic frontier profit function.

The parameters	coefficient t	standard -error	t-ratio
B0	-6.6	0.62	-10.70***
B1	3.54	0.36	9.95***
B2	-1.19	0.16	-7.54***
B3	-0.57	0.18	-3.22***
B4	-0.24	0.05	-4.47***
B5	-0.34	0.04	-8.52***
B6	-0.02	0.04	-0.64
B7	-0.14	0.08	-1.62
S0	-5.35	1.5	-3.57***
S1	0.07	0.02	3.49***
S2	-0.04	0.02	-2.05**
S3	-0.55	0.28	-1.93*
S4	-5.27	1.54	-3.41***
S5	0.11	0.15	0.72
Sigma squared	1.24	0.31	3.98***
Gamma	0.999	1.70E-05	56000***
Log likelihood	1.2		
LR test	60.9		

Note: *, ** and *** represent the significance of variables at 10%, 5% and 1% level respectively.

Profit efficiency results and analysis for meat chicken projects:

By reviewing the profit efficiency results for meat chicken breeding projects, we found that the profit efficiency rate was (0.75), and this means that the meat chicken breeding projects

in order to be efficient must increase their profits by 25% with stay on actual revenue levels as well as actual costs. As for the distribution of the number of projects according to the efficiency percentage. The projects that achieved profit efficiency less than 50% There were 9 projects that made up 15.25%, and one project had an efficiency about (52)%, while 6 projects that had achieved efficiency between (60-69) made up 10%, and 7 projects achieved profit efficiency (0.70-0.75), made up 11.8%. As for the remaining projects 35 projects, they achieved higher efficiency than the sample average, and one project achieved complete efficiency.

Conclusions and recommendations

The costs of chicks and fodder accounted for more than 70%. The projects achieved a net return of 771 dinars per bird, and the return of each invested dinar was 21%. The function of inefficiency is the experience and age of the breeder, the presence of the veterinarian, and the presence of the agricultural engineer. The results showed that raising meat chickens was profitable in the study area, so there is a wider scope for developing meat poultry breeding projects and meat poultry trade. Nevertheless, breeders face some problems, including the low selling price, so an appropriate policy is needed to close the import file as well as smuggling, monitor the market and encourage projects, to overcome the difficulties they face and to make them more profitable. The study recommended the necessity of supporting fodder and chicks, controlling their high prices or providing incentives to factories special fodder and hatcheries, as this can be beneficial to reduce the high prices of fodder and chicks. Training must be provided to less experienced breeders to enable them to adopt best breeding and urge breeders to involve veterinarians and agricultural engineers in supervising breeding projects, as well as urging research centers to develop an improved Iraqi breed.

REFERENCES

1. AL-Hachami I.S. and, O. K. AL Ukeili 2014. Study of technical and economic efficiency of certified wheat cultivars in the irrigated areas of Iraq during the season 2012-2013. The Iraqi Journal of Agricultural Sciences -.46(4):569-583.

2. AL-Hachamiy I.S., O. K. AL Ukeili, and M. S. Gh. Jubouri, 2018 Measuring the impact of modern technological packages on the profitability efficiency of wheat farmers in Iraq by using the forward function of temporal profit. *The Iraqi Journal of Agricultural Sciences* -.1028:49(5):687-697.
3. AL-Hachamiy I.S. and M. E. Frhan. 2015. A comparative study of technical efficiency of certified wheat cultivars (ADNA 99 and IPA 99) in Iraq during the season 2014-2015. (Wasit governorate as a case). *The Iraqi Journal of Agricultural Sciences* –48(6): 1764-1750.
4. Ali, M., and J. C. Flinn, 1989. Profit efficiency among basmati rice producers in Pakistan Punjab. *American Journal of agricultural Economics*, 71: 303-310.
5. Ali. E.S and. J.M.H. Al-Eezi, 2015. Estimating farm technical efficiency by using stochastic frontier approach *The Iraqi Journal of Agricultural Sciences* –46(2): 262-268.
6. Ayieko, D. M., E. K. Bett, and Kabuage, L. W. 2014. Profitability of indigenous chicken: The case of producers in Makueni County, Kenya. *Journal of Economics and Sustainable Development*, 5(11), 15-23.
7. Bamiro, O. M., D. O. A., Philip, and S., Momoh, 2006. Vertical integration and technical efficiency in poultry (Egg) industry in Ogun and Oyo states, Nigeria. *International Journal of Poultry Science*, 5(12), 1164-1171.
8. Bao Thoa, H. T. 2016. *The Value Chain Management Of Garment Companies In Vietnam*. The University of the Thai. Chamber of Commerce. Thailand.
9. Bauer P. W., A. N. Beraer, G. D. Ferrier, and DB. Humphrey. 1998. Consistency conditions for regulatory analysis of financial institutions. a comparison of frontier Efficiency methods. *Journal of Economics and Business* .50(2). pp: 85-114.
10. Central Statistical Organization Iraq , *Agricultural Statistics,2019 Poultry Report* .
11. Coelli T.J.; S. P. Raod., C.J. O'Donell. and A.G.E. Battese. 2005-*An Introduction to Efficiency and Productivity Analysis*. 2nd ed. pp: 242-245.
12. Coelli, T., 1996. *Front Edition 4. IC: A Computer, Frontier And Random Production Program, Estimating The Cost Function*. Department, Econometrics, University Of New England.
13. Debertin, I, David. 2012. *Agricultural Production Economics*. University of Kentucky p41.
14. Egyir, I. S., K., Adu-Nyako, and, R., Okafor, 2012. The “Made in USA poultry label and consumer choice in Ghana (No. 1372-2016-109083).
15. Jabbar M.A., S.M.F. Islam and, M. A., Jabbar, 2005. Policy and scale factors influencing efficiency in dairy and poultry production in Bangladesh. ILRI (aka ILCA and ILRAD).
16. Kwadzo, G. T., F. Dadzie, Y. B., Osei-Asare and J. K. Kuwornu, 2013. Consumer preference for broiler meat in Ghana: a conjoint analysis approach. *International Journal of Marketing Studies*, 5(2), 66.
17. Oladimeji, Y. U., Z. Abdulsalam, A. M. Ajao, S. Abdulrahman, and R. O. Abdulazeez, 2017. Profit efficiency of broiler production among public servant household heads in Kwara state, Nigeria: a coping strategy. *Asian Journal of Economics, Business and Accounting* ,2(2): 1-8.
18. Olumayowa, O., and O. O. Abiodun, 2011. Profit efficiency and waste management in poultry farming: the case of Egba Division, Ogun State, Nigeria. *International journal of poultry science*, 10(2), 137-142.
19. Pilar, P. G., A. P. Marta, and A. Antonio, (2018). Profit efficiency and its determinants in small and medium-sized enterprises in Spain. *BRQ Business Research Quarterly*, 21(4), 238-250.
20. Rahji, M. A. Y., T. E Aiyelari, O. O., Ilemobayo, and M. O. Nasiru, 2011. An analysis of the agricultural entrepreneurship of broiler farmers in Oyo State, Nigeria. *Agrosearch*, 11(1), 83-98.
21. Rana, K. A. M., M. S.Rahman, and M. N. Sattar, 2012. Profitability of small-scale broiler production in some selected areas of Mymensingh. *Progressive Agriculture*, 23(1-2), 101-109.
22. Watt. 2010. *Watt Executive Guide to World Poultry Trend: Statistical Reference for Poultry Executives* (P. Best ed.). Rockford.