Attempt to establish analytical accounting in the agricultural sector - Case study: Boujemaa and Brothers chicken breeding company in Blida –

محاولة ارساء محاسبة تحليلية في القطاع الفلاحي -دراسة حالة مدجنة بوجمعة واخوانه بالبليدة-

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Abstract:

This study aims to apply one of the analytical accounting theories, which is the theory of measuring costs according to the size of the activity, by studying the total potential costs, and we used a case study approach to apply this theory on the Boujemaa and Brothers chicken breeding company in Blida.

This study concluded by reaching the possibility of separating the costs into fixed and variable for the meat chicken product, but in some seasons the breeder is forced not to exploit the full capacity of the raw meat and thus the unit fixed cost increases.

Keywords: analytical accounting, animal production, poultry, agriculture.

Jel Classification Codes : M0 ،M40،N50 ،N57.

ملخص:

تهدف هذه الدراسة لتطبيق نظرية من نظريات المحاسبة التحليلية، تمثلت في قياس التكاليف حسب حجم النشاط، وذلك بدراسة مجمل التكاليف المحتملة، سواء كانت تكاليف ثابتة أو متغيرة، واستعملنا منهج دراسة الحالة في اسقاط هذه النظرية على مؤسسة بوجمعة وإخوانه لتربية الدجاج الكائن مقرها بولاية البليدة.

وقد خلصت هذه الدراسة بالتوصل الى إمكانية فصل التكاليف الى ثابتة ومتغيرة لمنتج دجاج اللحم، غير أن في بعض المواسم يضطر المربي لعدم استغلال كامل طاقة الخم وبالتالي ترتفع التكلفة الثابتة الوحدوية.

كلمات مفتاحية: محاسبة تحليلية، منتج دجاج اللحم، إنتاج حيواني، فلاحة.

تصنيف JEL : M0، M40،N50، N57.

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1.INTRODUCTION :

Chicken is the best-selling consumer product in the meat category, but the price of selling it is one of the most volatile prices in the market compared to alternative meat products, and sometimes, the standard deviation reaches more than 60%, and this percentage is considered very high statistically, It does not make sense to have more than 60% change in the price above the average annual selling price, and as the high selling price of chicken has a positive impact on the profitability of the farmer, the decrease in prices also has negative effects which sometimes leads to bankruptcy, So it is very important to control and anticipate costs in order to control the chicken market and the ability to seize the opportunities of high prices and to avoid the large losses leading to bankruptcy, So this study came with the aim of focusing on agricultural analytical accounting in agricultural enterprises, especially those that raise chickens prepared for consumption in the form of meat. The methods of measuring these costs vary according to several accounting theories, and given that the production of chicken meat is done through the breeding in batches according to the capacity of the absorption of the sheep for a certain number of chicks, The costs are affected by the size of The activity (number of chicks) to be raise, So we tried to apply the measurement theory related to the size of the activity, and therefore we asked the following question:

How can we apply the cost-measurement theory by volume of activity in chicken breeding companies under the constraint of production by batches?

Under this fundamental question, we asked the following sub-questions:

-What are the peculiarities of producing chicken meat product from others?

- Is agricultural analytical accounting possible to be applied in chicken breeding companies?

-How can we apply the cost-measurement theory by production volume at Boujemaa Chicken Breeding Company?

Based on our fundamental question and the sub-questions, we formulated the two following assumptions:

-**The first hypothesis**: Chicken product is the only product that follows the production in batches system.

-**The second hypothesis**: agricultural analytical accounting can be applied in all chicken breeding companies، especially the Boujemaa Chicken Breeding Company in Blida.

Study objectives:

Our study aims to achieve a set of objectives:

-Understanding the specifics of the chicken meat product in terms of production costs.

-Showing the basics of agricultural analytical accounting.

-Trying to apply the cost theory by volume of activity to the chicken meat product.

The importance of the study:

The process of measuring costs is one of the most important operations during the exploitation cycle, in light of the determination of costs, the company analyzes these results to build its decisions, and by applying this analysis in the agricultural sector of The Boujemaa Poultry Breeding Corporation highlights the importance of determining the cost per kilogram of chicken meat based on applying the cost theory by production volume, by calculating the fixed costs that can be generated by a breeding batch in addition to the total variable costs that vary by separation such as the volume of heating gas consumption and sawdust, and the cost of medicines in the event of the onset of the disease or not.

Study limits:

Our study focused on the spatial boundaries of the Boujemaa Chicken Breeding Company, which based in the municipality of Beni Tamu, Blida province, and the limits of our study of time were limited from July 12, 2019 to 31/08/2019 together for 52 days, which represents the production period of a batch of chicken meat.

Approach:

In order to achieve the objectives of the study and answer the problem, the inductive approach based on the descriptive analytical method was chosen by describing and analyzing both poultry farming and the costs incurred and agricultural analytical accounting according to the theory of the volume of activity, and we used the method of case study in applying this theory to the Boujemaa Chicken Breeding company.

Previous studies:

- A Study conducted by **L.ozsvarilo, R.Tisoczkilo, A.Bartha and K.Horvath**, 2017, which came under the title cost-benefit analysis with vitamins and supplies in the production of chicken meat. One of the most important findings of the study is that applying a combination of feed additives containing a range of vitamins increase the profitability of chicken meat by positively affecting the final weight. Moreover, the fattening period is only 38 after the use of vitamins and supplements after the period of fattening was 49 days.
- A study by **Ghassan Hashem**, 2006, titled The economic efficiency of the feed used to produce chicken meat in the poultry farmes in Erbil province, where the researcher concluded that producers can increase their profits from the production of chicken meat by increasing the amount of chicks and medical care, as for the amount of feed used is too intense, so producers can increase their profits by reducing the cost of overfeeding.
- A study by **Mekdad Jassim Abdul and Raed Hassan Ali**, 2017, titled The cost function to determine the optimal size of production - study poultry breeding projects in Muthanna province - where we find among the most important results that the contribution ratio of fixed costs is higher than the contribution of variable costs in the total Costs, due to the high cost of renting the field, and the costs of chicks make up a large proportion of the variable costs by 41%, followed by wages at 10% and 01.82% are the costs of vaccines and medicines.

Our study is an added value to the field of studying the costs of chicken meat production, as it differs from previous studies in that it is concerned with measuring the bulk of the potential costs that can be borne by a single batch of production, unlike previous studies, our study gives an estimate of the fixed costs in poultry breeding companies that do not pay attention to these costs in calculating their total costs.

In order to reach the objectives of our study, we divided the study into the following topics:

-An overview of the chicken breeding industry.
-Analytical accounting in the agricultural sector.
-Applying the cost theory according to the volume of activity on the Boujemaa and Brothers chicken breeding company.

2. An overview of the chicken breeding industry:

To know this point, we will present the following points.

2.1. The basics of modern chicken breeding:

In the modern poultry industry, producers usually do not have primary breeding stock (the main lines that provide their operations), so, they buy chicks from breeders who specialize in providing this raw materials, and there are some companies and specialized institutes that get chicks to develop them in many ways to enhance specific characteristics such as resistance to diseases and reduce growing time for early marketing. (FAO, 2010, p. 19)

2.2. Various purposes of chicken breeding:

Poultry production can was divided: (247-246 الصفحات ،2013 ،جمعة)

2.2.1. Chicken meat production projects:

The purpose is to buy or hatch chicks to raise them until they reach a certain stage of growth and sell them alive or slaughtered according to the possibility of the project, in which case the revenue of breeding is the main revenue, while the resulting eggs are consider an occasional and additional supply of the main activity.

2.2.2. Chicken egg production projects:

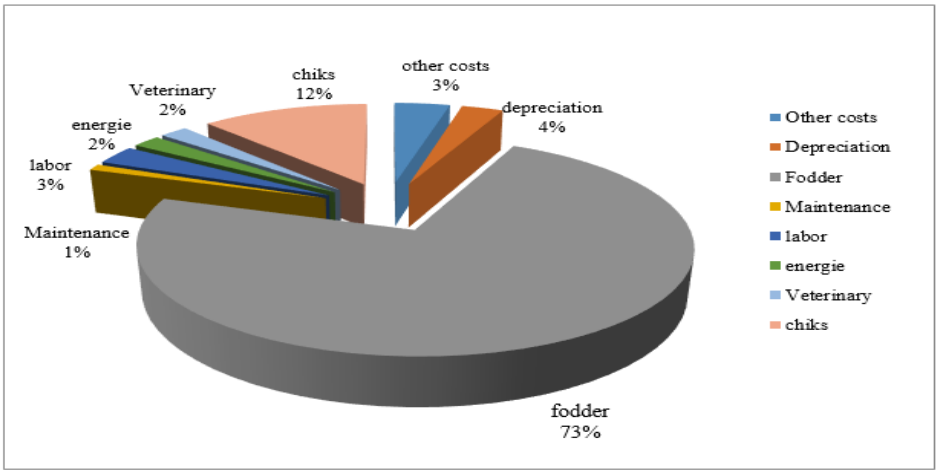
By raising chickens to obtain fresh eggs for sale mainly or using part of it to produce chicks (chicks) and the main income of the activity is the price of the eggs sold, while the income from the sale of chicks was consider additional.

2.3. various usual costs of raising chickens:

Feed costs are predominant in chicken meat farming, as they give nearly three quarters of the total production costs. (ozsvari, tisoczki, bartha, & horvath, 2017, p. 46)

The remaining costs are distribut according to the following figure:

Fig.1: Potential costs of raising chicken meat.



Source: L.ozsvari and R.tisoczki and A.bartha and M.K.horvath, 2017,p46.

From the chart, we note that feed costs are predominant, followed by the costs of the chicks, while the rest of the costs are approximately in their amounts.

3. Analytical accounting in the agricultural sector:

Analytical accounting is one of the control mechanisms adopted in many industrial and even service institutions, and then extends to the agriculture sector.

3.1. the need for control in agricultural facilities:

Can be divide into: (فخر، الأمين، و علي، 2009، صفحة 112)

-The need for control in agricultural facilities and activities arises due to several considerations, including:

-The lack of clear criteria for distinguishing between involuntary losses resulting from natural factors and those resulting from negligence, manipulation and misappropriation of agricultural assets.

- Difficulties in the inventory of many agricultural assets and the possibility of easy manipulation and misappropriation of these assets.

3.2. Definition of agricultural analytical accounting:

The Agricultural analytical accounting is "a branch of the accounting information system that tracks the elements of expenditure (costs) for all agricultural activities, animal husbandry... Etc., from the occurrence of maintenance or commitment to determining its relationship with cost centers after analysis and tabulation in order to issue reports that assist management in making decisions." (مولاي، 2018، صفحة 114)

There are many theories used in analytical accounting, and in our study, we will address one of these theories.

3.3. Cost theory by relationship to activity size:

This classification is an important one for cost elements as it is relat to the study of the behavior of cost elements and their relationship to the volume of activity (production), and is classif into fixed and variable costs.

3.3.1. the modus operandi of this theory:

The main objective of analytical accounting is to reach the result through stages, these stages vary from theory to theory, and in our theory they are as follow: (بوخاري، عرابة، و مايو، 2016، صفحة 07)

-Margin on variable cost =net sales -variable costs

Therefore, the analytical result = margin on variable cost - fixed costs

We explain it through the following table:

Table .1: Analytical result Calculation Table.

Number	Statement	Amounts	Percentage%
01	Net sales		100
	Variable costs		A
02	Margin on variable cost		100-A
	Fixed costs		B
03	Analytical result		100-A-B

Source: Prepared by the researcher based on the above.

The numbers shown on the right of the table represent the various stages, starting with the business number, which represents 100%, then the margin on the variable cost in second place, and finally after subtracting the fixed costs, the analytical result is determined.

3.3.2. Fixed cost concept:

Fixed costs are the sum of expenses and fixed expenses, which are not related to the activity of the institution, for example: expenses of rent, insurance, and distractions, but in fact these costs do not remain constant due to the level of activity of the institution, if the institution decides to increase the level of its activity will expand its structure The year increases the installations and thus

increases the other fixed expenses of distractions and insurances. (davasse, parruitte, & sadou, 2011, p. 319)

3.3.3. The concept of variable costs:

These are the costs that change as a whole with the change in the volume of activity by increase or decrease, they increase at the same rate of increase, and decrease at the same rate as the decrease in the volume of production, and it was also found by studying the behaviour of these elements that the share of the productive unit remains constant no matter how the volume of production changes and the variable costs Direct items usually include direct wages and direct expenses. (التكريتي، 2006، صفحة 38)

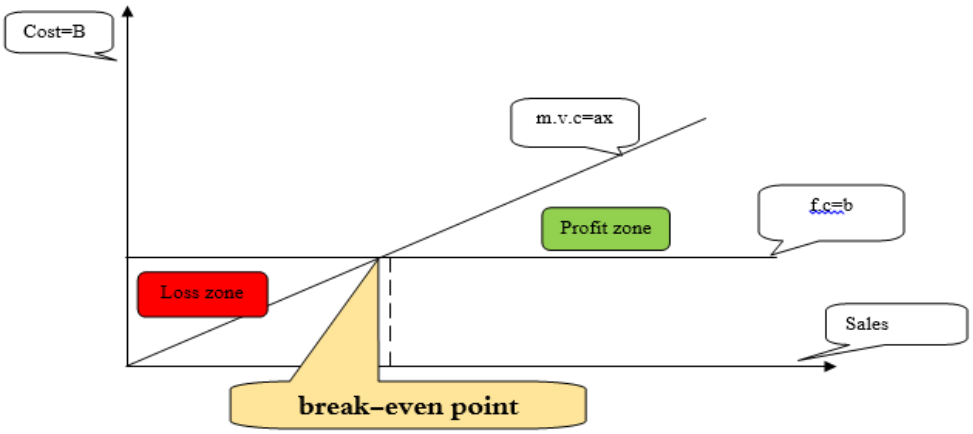
3.3.4. Accounting break-even point:

The accounting break-even point is determine by the amount or value of sales that achieve a level of profit equal to zero, and can be expressed mathematically as follows: (لومايزية و خياري، 2018، صفحة 51)

Tie point business number =fixed costs (f.c)/margin ratio on variable costs (m.v.c).

It is graphically by equation: Margin on variable cost =fixed costs

Fig . 2: Graphical representation of break-even point.



Source : Henri davasse et Michel parruitte et Ahmed sadou, 2011, p331.

From the chart, we note that there are two different regions, the first is in which the organization makes a profit and the second achieves a loss and the separation between them is the break-even point

4. Applying the cost theory according to the volume of activity on the Boujemaa and Brothers chicken breeding company in Blida.

In this study, we will look for the development of an analytical accounting system in poultry farming activity at the level of The Boujemaa Poultry Breeding Company, we will be assigned to calculate the cost per kilogram of chicken destined to slaughter and consumption for a batch estimated at 4,700 breeding chicks for slaughter and consumption in a period Between 12/07/2019 to 31/08/2019, equivalent to 52 days of chicken growth and market weight of an average of 2.5kg to 3.5 kg/ chicken.

This batch will bear the estimated fixed costs of the building's allocation premiums and the equipment used in nutrition, drinking, cooling and heating, and variable costs that change according to several factors, the prices of chicks change according to the availability of the species and types, the drugs change according to the emergence of diseases or not, the consumption of gas for heating in winter consumes more than the rest of the seasons, cooling also does not consume electricity in winter unlike summer, sawdust used in the tiffing for heating as well as also consume in winter more than the rest of the seasons, so these costs are variable costs in calculating the cost of production.

4.1. Estimate the fixed costs of the 4.700 chicks production batch:

All of the following elements are consistent at the level of all production batches, and we will summarize the bulk of the estimated fixed costs according to the following table:

Table . 2: Table of fixed costs for chicken meat production (4.700 chiks).

Unit : 01 Algerian dinars

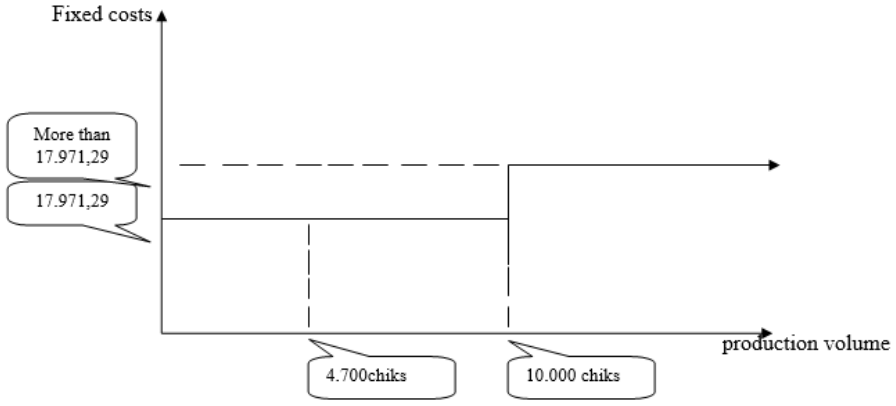
Statement	Original value	The duration of the benefit (per year)	Annuity	The amount of dépréciation	Percentage %

Building depreciation	4.500.000	50	90.000	13.000	%72,34
Equipement depreciation	62.000	03	20.666,66	2.985,19	%16,61
Air fans depreciation	78.000	08	9.750	1.408,33	%07,84
Gas bottles depreciation	40.000	10	4.000	577,77	%03,21
Total fixed costs				17.971.29	%100
kilograms produced				10.360	
Fixed cost per kilogram				**01,73**	

Source: Prepared by the two researcher based on the data provided by the company.

From the table we notice that the total fixed costs are equal to 17.971,29 dz for a production batch of 4.700 chiks with a production of 10.360 kg, and these costs remain fixed to a maximum production of 10.000 chiks, which is the production capacity of the yeast, if the enterprise wants to produce more than this limit, its costs will increase. The total constant expansion of its installations, which generates new distractions, while the value of 01,73 dz is the fixed cost of the unit will decrease by increasing production above 4.700 chiks up to a maximum of 10.000 chiks, and to clarify more we display the following figure:

Fig . 3: The relationship of fixed costs to the level of production at the level of The Boujemaa Chicken Breeding Company



Source: Prepared by the researcher based on previous data**.**

We notice from the previous figure that the total fixed costs remain constant until the level of production of 10.000 chiks, which is the production capacity of henhouse, but it rises to a higher level if you decide to raise production by increasing investments that generate fixed costs.

4.2. The variable costs of the 4.700 chicks production batch.

The following expenses are variable costs because they change by changing the number of chicks, summarized in the following table:

Table . 3: Variable costs of the chicken meat production (4.700 chiks).

Unit : 01 Algerian dinars

Statement	Amounts	Percentage%
Price to buy chicks	329.000,00	%17,73
Labour	140.400,00	%07,57
Electricity charges	19.601,50	%01,05
Gas charges	840,00	%0,04
Vaccine and medicines	119.398,5	%06,44
Fodder	1.222.000,00	%65,90
Sawdust	3.000,00	%0,16
Transport	20.600,00	%01,11
Total variable costs	1.854.840,00	%100
kilograms produced	10.360	
Variable cost per kilogram	**179,04**	

Source: Prepared by the two researcher based on the data provided by the company.

From the table we notice that the cost of chicken feed represents more than half of the total variable costs and this is due to the high prices of this substance being imported, and in the second place the cost of chicks is also related to the type of species purchased and available in the Algerian market, and therefore the chick costs 179,04dz as variable costs, and these costs rise as the level of production increases linearly

4.3. Calculating the analytical result and formulating various mathematical equations.

Mathematical équations vary according to the type of costs

4.3.1. Presenting the analytical result.

A. Calculating the analytical result:

We will present the result achieved by the company from this batch in the following table:

Table . 4: Calculating the analytical result of the chicken meat production batch (4.700 chiks).

Unit: 01 Algerian dinars

Statement	Amounts	pourcentage%
Net sales	2.438.800,00	100
Variable costs	1.854.840,00	76,05
Margin on variable cost	583.960,00	23,95
Fixed costs	17.971,29	0,74
Analytical result	565.988,71	23,21

Source: Prepared by the researcher based on previous results**.**

The company made a profit of 565,988.71 dz for this batch of chicks, unlike the previous one, where the owner of the company stated that it made a loss, and the result represents 23.21% of the turnover achieved.

B. Formulating the equation of the analytical result:

We will formulate the equation of the result in the figure y=ax-b, where we find:
y: The variable of the equation is an expression of the analytical result.

a: The margin rate on the variable cost achieved and according to table N°04. Equals 23.95% or 0,2395.
x: The independent variable of the equation is a reflection of the number of work achieved ,
b: Represents total fixed costs equal to 17.971,29.
The result equation can therefore be view as follows:

29,2395x-17.971,Y=0

From this equation, the result can be calculate based on the number of the work achieved.

4.3.2. Formulating the total cost equation:

We will formulate the total cost equation in the form y=ax+b, where:
y: The variable of the equation reflects the total cost of the education payment of less or equal to 10.000 chiks, because the production capacity does not exceed 10.000 chiks.
-A: Represents the variable cost of the chik's، equal to 1.854.840,00dz/4.700 chiks=394,646dz
x: The independent variable of the equation is expressed in the number of chicks raised.
b: Represents total fixed costs equal to 17.971,29.
Therefore, we will present the total cost equation as follows:

29,646x+17.971,Y=394

From this equation, the production costs of poultry breeding batches, which are lower or equal to 10.000 chicks, can be estimat.
For example, if we want to calculate the total costs of poultry breeding batches of 7.500 chicks and 10.000 chicks, we replace these values in the independent variable of equation X, giving us the following results according to the following table of actual number:

Table . 5: Calculating the total costs of poultry breeding batches of different amounts.

Unit : 01 Algerian dinars

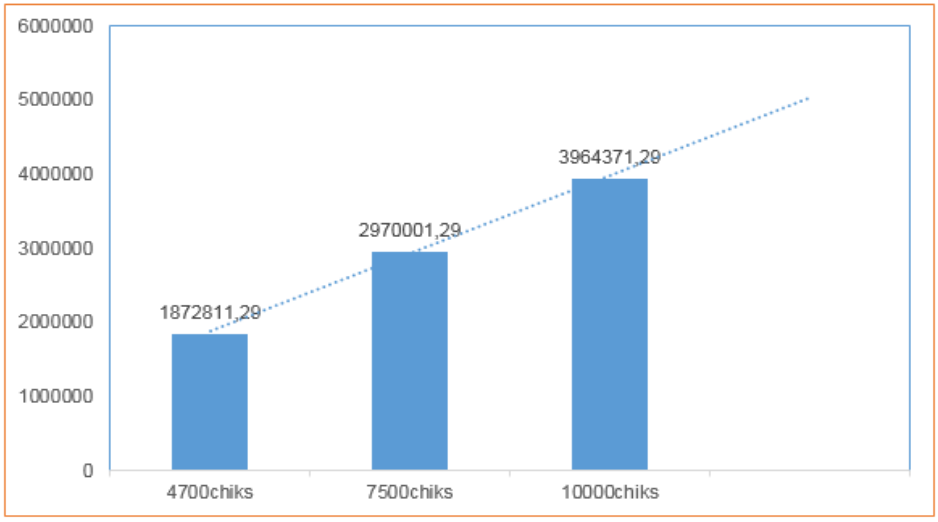
Number of chicks (x)	4.700	7.500	10.000

Total costs (y)	1.872.811,29	2.977.771,29	3.964.371,29

Source: Prepared by the researcher based on the equation of the total costs reached.

From the table we notice the development of total costs influenced by the increase of variable costs and the stability of fixed costs at the production level of 10.000 chiks, and according to the number of chicks raised according to the equation we have already formulated, we will explain this development through the following form:

Fig .4: The evolution of total costs by the number of chicks raised.



Source: Prepared by the researcher based on previous results.

From the chart, we see the evolution of total costs in a straight line, in line with the linear equation we have already set, peaking at 3.964.371, 29dz based on the maximum production capacity of the foundation .

4.3.3. Determination of the break-even point.

A. Mathematical calculation:

When speaking about the turnover, we must specify the turnover of the even point, which achieves a non-existent result, and is calculate according to the following formula:

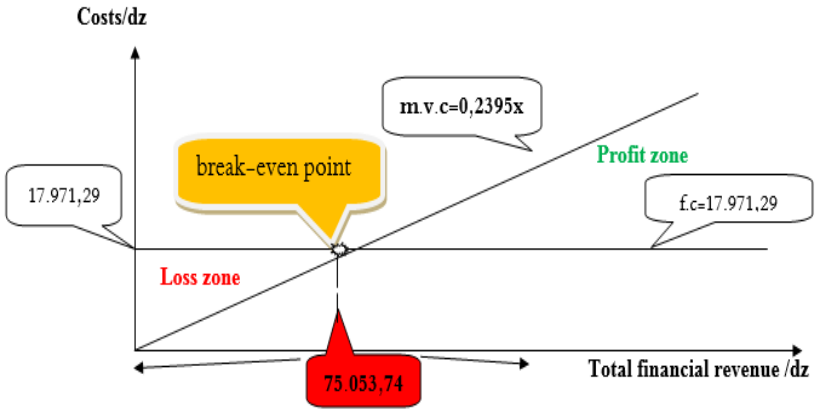
Break-even point = (Total **financial revenue * fixed costs)/ Margin on variable cost**

Break-even point = (2.438.8000, 00*17.971, 29) / 583.960,00
Break-even point = 75.053,74 dz.

B. The graph of the break-even point:

We will represent it according to an equation, the margin on the variable cost (m.v.c) = fixed cost (f.c), and depending on the calculation table of the analytical result the equation becomes as follows:
0,2395x =17.971,29 so that x= the number of Sales.

Fig .5: The graph of the break-even point.



Source : Prepared by the researcher based on previous data**.**

The chart above shows the loss and profit areas, the loss zone is achieved if the turnover is less than 75.053, 74dz, which is a critical area for the institution to avoid, while the profit area is achieved if the enterprise achieves a turnover of more than 75.053, 74dz, but if the result is achieved zero which is the break point Its turnover is equal to 75.053, 74dz.

6. Conclusion:

Through this study we tried to apply a theory of cost measurement theories of measuring costs by volume of activity, by separating production costs to constant and variable, and by applying this theory to Boujemaa and brothers poultry breeding company we chose a production batch of 4.700 chiks In the summer period, which helped the company to avoid the heating costs, which are mainly

gas, as for the fixed costs (distractions) are the costs that had to be tried to be estimated as impartial as possible, all of these costs are spent on the basis of a production batch of 4.700 chiks that decrease when selling due to several factors such as disease or predatory rodents as well as the possibility of theft, but production at the point of sale is measured in kilograms produced, and the most important findings are:

-The reduction in the number of chicks due to predatory rodents is an unusual deficiency and therefore can be avoided.

-Not counting fixed costs in measuring the total costs according to the Boujemaa and Brothers chicken breeding company.

-Being able to estimate the total fixed costs in the organization and link it to a production batch of 4.700 chicks.

-The production of 4.700 chiks in a henhouse with a production capacity of 10.000 chiks generates additional fixed costs per unit as a result of not being optimally exploited .

-The farmer Boudjemaa can double his profits by exploiting the actual capacity of the breeding henhouse.

-The changing costs of the production batch were mostly forage، and the costs of medicines as well as vaccines were borne by a disease that appeared during breeding.

-The company will not make a profit if it achieves sales of approximately 75.053,74dz , which represents the break-even point.

On reading the third result, we refute the first hypothesis that the fixed costs in chicken farming institutions cannot be assessed in an impartial manner, and we prove that the second hypothesis, which was formulated as a laboratory, can be applied at the level of chicken farms, particularly the Boujemaa Breeding Company, through the last three results .

From the outgoing results, it is clear to us that measuring fixed costs is the most difficult and important element in poultry farming companies because they do not pay attention to their overall costs, and consider the variable costs as the costs they have incurred only, and our estimate of these fixed costs with their consolidation. With variable costs, it can was argued that analytical accounting can was applied to the poultry farming companies by applying the cost-measurement theory by volume of activity, which is the answer to our fundamental question, which is as follows:

How can we apply the cost-measurement theory by volume of activity for a production batch at the Poultry Company of Boujemaa and Brothers?

Our study deals with an attempt to develop a method for measuring costs for an institution that is classified among the small enterprises active in raising chickens, where we applied the theory of costs according to the volume of production divided between fixed and variable, which is classified within the traditional methods compared to modern cost measurement methods, but through it we were able to find how to separate What is fixed in terms of costs and what is variable according to the timing of placing the batch of chicks, and we have also concluded that by optimizing the production capacity of the ore, the unitary fixed cost can be reduced to the end of the maximum production volume, and we can make the following recommendations:

-Applying financial accounting (treasury accounting) by small farmers helps build an information system for analytical accounting.

-Attempting to apply another method for measuring costs in order to compare it with the method that was applied.

-Utilization of the maximum production capacity of breeding places.

Bibliography:

Books:

Davasse, h., Parruitte, m., & Sadou, a. (2011). manuel de comptabilité. algerie: berti édition.

أحمد حلمي جمعة، (2013)، محاسبة الأصول البيولوجية (النبات والحيوان-الدواجن والبيض وتربية النحل)،الأردن: دار الصفاء للنشر والتوزيع.

اسماعيل يحي التكريتي، (2006)، محاسبة التكاليف بين النظرية والتطبيق، مصر: دار الحامد.

Journal article:

Ozsvari, l., Tisoczki, r., Bartha, a., & Horvath, ,. m. (2017). the cost-benifit analisis of application of vitamin and mineral supplements in broiler chiken production. hungarian agricultural engineering journal(31), 46.

بوخاري ,ع ، عرابة ,ا و مايو ,ع(2016) ، نحو تطبيق طريقة التكاليف المتغيرة في المستشفيات العامة- دراسة حالة مستشفى سليمان عميرات بتقرت، مجلة التنظيم والعمل،05(03)، 21-05.

حسين مولاي، (2018)، المحاسبة التحليلية الفلاحية وامكانية تطبيق نظام التكاليف على أساس الأنشطة في المستثمرات الفلاحية، مجلة الأبحاث الاقتصادية(18)، 131-110.

عفاف لومايزية و زهية خياري، (2018)، استخدام أسلوب تحليل التعادل في تحليل حساسية ربحية المشاريع الاستثمارية-دراسة حالة مشروع انتاج زيت الزيتون-، مجلة رؤى اقتصادية، 08(02)، 45-59.

نواف فخر، ماهر الأمين، و عفراء علي. (2009)، واقع نظام التكاليف في منشات تربية الدواجن في سوريا وامكانية تطويره، مجلة جامعة تشرين للبحوث والدراسات العلمية، 31(03)، 124-107.

Internet websites:

Food and Agriculture Organization. (2010). agribusiness handbook-poltry meat and eggs.

Detailed website: http://www.fao.org/3/al175e/al175e.pdf (consulted on 12/12/2019)