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Agricultural Sector and its Impact on Economic Growth in Algeria

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Abstract

This study came to shed light on the agricultural sector and how it can contribute, as a basic sector, to achieving economic growth rates and the extent of its response to the most important reforms and various forms of support provided to it, this study relied on a methodology based on combining quantitative and qualitative analysis in dealing with relevant data and statistics. In the agricultural sector, Algeria to achieve this methodology, the descriptive approach was adopted in this study, which concerned itself with describing the importance of the agricultural sector and its role in achieving economic growth, in addition to the most important measures taken towards it, while presenting a set of statistics, analyzing and interpreting them statistically, and searching for ways to develop this sector, and then carrying out With a standard study, it dealt with the search for the most important variables affecting agricultural production on the one hand and the impact of the elements of agricultural production on the elements of economic growth on the other hand. The study showed that the sector is still subject to climate change and the labor force's aversion to it, In addition, there is a lack of a clear administrative system in this sector, we recorded the large difference in the volume of food and agricultural imports and food and agricultural exports, For example, the coverage rate of food exports for food imports did not exceed 6.2% during the study period.

Keywords: agricultural sector, economic growth, exports agricultural, gross domestic product.

1- INTRODUCTION:

With the entry of the third millennium, developing countries -Algeria, for example followed a long-term economic strategy based on supporting economic growth through investment in renewable capital in order to confront the emergency decline in oil prices, by adopting a set of development investment programmes, the most important of which is investment In other sectors outside the fuel sector and the development and diversification of its exports, the agriculture sector was at the top of these sectors.

Since the end of 2015 and the accompanying continuous collapse in oil prices and their arrival to the lowest levels, especially in the year 2017, it has become clear that the oil sector is considered the main support in achieving economic growth and the stability of the financial system in Algeria at the expense of other basic sectors. The decline in oil prices was accompanied by a decrease in exchange reserves. It reached $159 billion in mid-2015 after it was $178 billion at the end of 2014, reaching $143 billion at the end of 2015. Thus, it became clear that financial stability in renter economies is unsustainable because it was achieved by factors outside its components.

In the context of confronting this crisis, other vital sectors were supported and stimulated, the most important of which is the agricultural sector, one of the most important productive sectors in the economies of the countries of the world, as it is the sector that affects other sectors in addition to its contribution to achieving economic growth and economic development goals by increasing the gross domestic product, which leads to increase the average per capita real income, provide jobs, especially unqualified ones, provide food, reduce the volume of imports, in addition to providing raw materials and contributing to diversifying the state's sources of wealth.

Objectives of the study:

The objectives of the study are summarized as follows:

- Continuously highlighting the natural and human potential of the agricultural sector and reminding of the necessity of optimal exploitation of these resources; - Working to find radical solutions in order to reduce the historical and continuing dependence on the oil sector despite the crises that this sector has experienced;
- Finding the best ways and methods to revitalize and stimulate the agricultural sector to bridge the food gap in Algeria on the one hand and support the state's income, especially foreign income, by paying attention to and encouraging products that have a comparative advantage in Algeria, especially dates.

Study Approach:

In this study, we relied on a methodology based on combining quantitative and qualitative analysis in dealing with data and statistics related to the agricultural sector in Algeria. To the reality of the agricultural sector in Algeria and the most important measures taken towards it, with the presentation of a set of statistics and the analysis and interpretation of them statistically and the search for ways to develop this sector, then we moved to the applied side through a standard study that dealt with the search for the most important changes affecting agricultural production on the one hand and the impact of agricultural production elements On the elements of economic growth .

2- Theoretical literature

Agricultural economics is an applied social science that deals with how producers, consumers, and societies use scarce and natural resources in the production, processing, marketing, and consumption of food and fiber products (Johnson, 2019), in order to achieve economic goals that all societies seek to achieve and include: (Al-Sharafat, 2010)

- Achieving technical efficiency or productive efficiency, which means the production of the largest amount of goods and services in the agricultural sector using the available production elements.
- Achieving economic (distribution) efficiency means the production agricultural goods and services in the quantities required by society.
- Economic growth, which represents an increase in the amount of goods and services that society, can produce over time.
- Achieving economic stability means controlling the prices of goods and agricultural services without the occurrence of fluctuations to them in a way that ensures that the entry of members of society is unwanted in an unwanted manner, which weakens the purchasing power of money.
- Achieving justice and means justice in the distribution of income or national product among members of society.

The importance of the agricultural sector:

The importance of the agricultural sector appears through its contribution to economic development through: (Johnson, 2019)

- The agricultural sector contributes to providing many plant products and animal products such as all kinds of meat, dairy and its derivatives.
- The agricultural sector is a major source of income for many individuals working in this sector farmers or producers of drugs and agricultural fertilizers and tools used in production, both vegetable and animal, or workers in marketing and selling agricultural products, and also has an important role in terms of its ability to provide and use cash resources In the needs of economic development, but at the state level, the agricultural sector contributes to varying proportions in the gross national product and in a great degree in providing difficult currencies through the export process of agricultural products.
- This sector provides many raw materials that can be used as inputs for production in the industrial sector in particular, which leads to support and development of the latter. It provides cotton, for example, for the clothing industry. It also provides pills that can be disturbed by oils. For example, it provides many raw materials for the manufacture of pickles and jam Dry and canned foodstuffs and other materials that have contributed to the establishment of many industries based on the production of the agricultural sector.
- The problem of food security is the main challenge faced by the governments of the countries of the world, especially developing countries, due to the lack of local production from covering the increasing food needs, and for this reason, interest in this sector through effective and appropriate strategies that reduce the severity of this problem.
-Agriculture is an essential base for providing job opportunities, especially as it requires only minimal skills compared to other business activities, and usually accommodates workers who do not find job opportunities in other activities, and the percentage of the agricultural sector absorbing employment varies from one country to another according to the

prevailing economic systems, In developed countries, the agricultural sector accommodates less than 4% (Alo MA, Japan, France and Germany 2%, Italy 3%, Spain 4%) as a result of scientific progress in agriculture such as agricultural machines, while in the countries where its economy is on agriculture, it accommodates from 50 To 93.%

The most important theories explaining agricultural development:

Several theories have emerged that gave agricultural development a role in economic development: (Girard, 2013)

- Independent Development theory: This theory was built on two main criteria related to the agricultural sector, the first criterion to raise the standard of living for the total population accompanied by the increase in the growth rate of agricultural output, and the second criterion is an increase in the productivity of work at growing rates without the need to transfer agricultural workers outside the sector.
- Continuous development theory: This theory is a new pulse of agricultural development, as it was one of its priorities to pay attention to agricultural investment to be the wheel of agricultural development, and work to reclaim agricultural soil by using fertilizers, improving irrigation methods and establishing a sanitation network, and this theory was aimed at avoiding access to a stop point, then it is impossible to push agricultural development forward.
- Modern theories in agricultural development have emerged recent trends that seek to reshape the concept of agricultural development through new theories and analytical visions. These theories were associated with names such as: Barro, ROMER, LUCAS and others. Agricultural prices as a basic standard for agricultural development. (Hurnik, 2007)

Table No. 01 The effect of investment results in agricultural research on agriculture in the United States of America.

The period and the nature of the research	Annual return rate)%(	Percentage of change in productivity achieved in the state that has pledged to research
All agricultural research 1868-1962	65	Unaccounted
Agricultural tech research directed at 1927-1950	95	55
Agricultural scientific research directed at 1927-1950	110	33
Agricultural technical research directed in the south 1948-1971	130	67
Agricultural technical research directed in the north 1948-1971	93	43
Agricultural technical research directed in the West 1948-1971	95	67
Agrl scientific research directed at 1948-1971	45	32
Capacity and agricultural guidance administration 1948-1971	110	100

Source: Salah Wazzan, The Development of Arab Agriculture, Reality and Possibility, first edition, Center for Arab Unity Studies, Beirut, 1998, p. 397.

The table shows the great influence of scientific and agricultural technology research, whether at the annual return level, which ranged between 45% and 130% or the change in productivity, which ranged between 32% and 100% (Wazzan, 1998), It is worth noting that the return on agricultural research is large and noticeable in the regions. The relatively late in this field, i.e. in the areas that have not yet been discovered in full secrets and capacity, and we have seen through the table, which shows the high levels of the annual return rates in the agricultural sector in W and MA as a result of scientific research Technology and agricultural counseling, we can also clarify the impact of investment in agricultural research on production in some countries of the world according to the next:

Table No. 02 Agricultural research on production in some countries of the world

Study, Researcher and History	Period	Annual internal % % return rate	Commodity	Country
1972 Auoshoh	1967-1924	110-77	cotton	Brazil
Hayami Wakino 1977	1950-1915	27-25	the rice	Japan
Bray 1980	1977-1961	35-30	rice , cotton	Bangladesh
1972 DOUNKAN	1969 -1948	68-57	Pasture improvement	AUSTRALIA
1973 EVANSON WAYHA	1971-1953	40	Total agricultural production	INDIA
1958 GRELISHIZ	1955-1940	40-35	Hybrid yellow corn	USA

Source: Salah Wazzan, previously mentioned reference, p. 398

We note that the returns on investment in agricultural research have reached significant levels, such as Brazil, with rates of internal return that exceeded the full percentage, meaning that it entered the stage of doubling production. The lowest levels of return were 25% in Japan, which is a good percentage for a country like Japan, especially in the agricultural sector. The FAO indicated that investment In agricultural research, despite its high costs, it constitutes the most beneficial investment and the highest return according to the most conservative and stringent economic standards. (Riad, 2011)

3 - Results:

To know the validity of the study model from an economic and analogical perspective, it is necessary to know the extent to which it achieves the basic assumptions for building an economic model mentioned above, and this is through: (Engle, 1987)

- **Testing the goodness of fit in the model:**

The goodness of fit in the model is known through the coefficient of determination R^2 and R ^¯ 2. We note that 0.97 = R^2, which is just as R ^¯ 2 = 0.96, which means that 96% to 97% of the changes occurring in the dependent variable PIB are explained by The independent variables are a large proportion and verify the quality of the model.

- **Statistical significance test for parameters (Student):**

The statistical significance test is done through the Student test or through the statistical probability of the parameters. Through the table we notice that the probability (Prob) of the independent variables (SOUT = 0.004), (VA = 0.005), (BC = 0.04) were all less than the significance level of 0.05, which is This means that all parameters are statistically significant, and the constant part is positive, which is therefore acceptable from an economic point of view.

- **Statistical significance test for the model (Fisher) :** (Philips, 1988)

From the table, Fisher's statistic is .97137 = FC, while 3.49 = Ft (tabulated at degrees of freedom 3 and 12). Since: > Ft FC, we reject the null hypothesis H0 and accept the alternative hypothesis H1, meaning that not all model parameters are equal to zero, and R^ 2 is completely different from zero, which means that the model has statistical significance at degrees of freedom 3 and 12 and with a probability of 0.00, that is, less than 0.05.

- **Testing the stability of the model coefficients - Chow test:**

We have previously indicated that this test aims to know the extent of the stability of the model over time, or the extent of the stability of the model's parameters over time. This test goes through stages, which is dividing this model into two samples, the first with a length of 9 observations from 2001 to 2009 and the second with 7 observations from 2010 to 2016, considering At this stage, huge sums of money were pumped to strengthen the agricultural sector

- **Normal distribution test:**

From the results of the study, the value of Jarque - Bera = 0.905810, which is less than the tabulated value of a chi-square distribution with a degree of freedom of 2 and a significance level of 5%, which is estimated at 5.99. We also

note that the probability prob = 0.63, which is greater than 5%, and therefore the distribution of the residuals is a normal distribution.

Economic analysis of the study results:

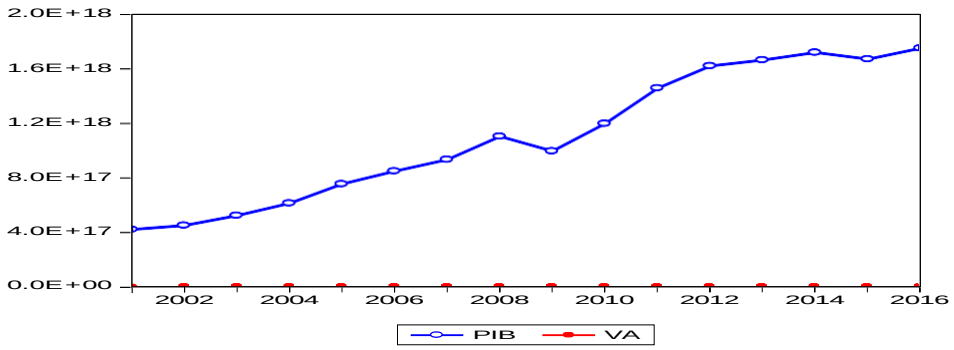
The results of the standard study of the impact of agricultural production on economic growth by focusing on the value added in the agricultural sector as one of the most important indicators of agricultural production in addition to other independent variables and the gross domestic product as one of the most important indicators of measuring economic growth concluded that the model passed all the necessary statistical tests to be accepted as a valid model. For the standard study, this means that all the independent variables explained the dependent variable significantly, by 97%, according to the coefficient of determination calculated in this model. This study also allowed the extraction of the multiple linear regression equation using the least squares method according to the following relationship:

PIB = 1.5297020369e+17 + 1300736.74238*SOUT + 434522.282891*VA - 934159.802859*BC

The above confirms the high explanatory power of this model, as we find that the estimated gross domestic product is close to the observed (true) values. Through the residual curve, we find that most of the residual values during the study period were within the confidence range and expressed by the dashed lines, meaning that these values did not exceed the shown dashed lines. In the graph, with the exception of some values (for the remainders) in the years 2005, 2006 and 2014, the estimated values were very close to the real values for the rest of the years. Thus, the extracted equation highlights the type and strength of the relationship between the gross domestic product and the rest of the other independent variables.

Accordingly, the most important thing that can be said is that supporting agricultural production in Algeria depends on improving the amount of value added in the production process, according to the following mathematical relationship: VA = PB - CI

Figure No.01 Development of gross domestic product and value added for the period 2001-2016



Source: Eviews output

Modeling the factors affecting agricultural production:

In order to estimate the relationship between inputs and outputs in the agricultural sector, we will model the agricultural production function according to the appropriate relationships in Algeria and study the extent of the impact of the explanatory variables used on agricultural production**.**

Table No. 04 Development of agricultural production, agricultural work, demand for agricultural products, consumption of fixed capital, import of agricultural equipment

years	Import of agr equipment (million DZD) IMP	Fixed capital (million DZD))(K	Demand for agr products (million DZD) AD	Work (worker) L	Raw agr production (mil DZD) P
2001	11 983.7	452.20	45 129	1 312 069	505 136
2002	11 812.6	389.10	48 462	1 220 224	510 637

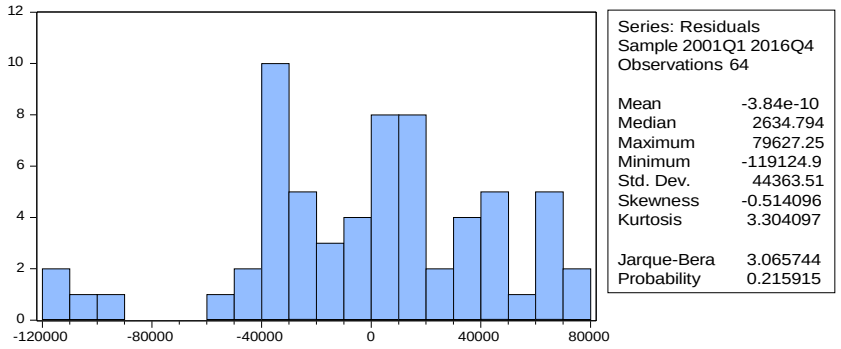
2003	9 958.5	422.70	50 065	1 412 340	630 893
2004	11 999.9	400.70	56 295	1617 125	710 494
2005	11 723.1	455.80	56 697	1 618 724	715 461
2006	6 968.2	452.60	64 203	1 609 633	793 556
2007	10 137	609	75 979	1 170 898	885 091
2008	11 269.7	797.60	138 040	1 252 000	902 126
2009	16 926	698.30	136 709	1 242 000	1 157 175
2010	25 405.8	2 504.50	232 505	1 136 000	1 269 838
2011	28 195.7	1 678.80	231 679	1 034 000	1 478 482
2012	25 573.6	2 146.20	232 146	912 000	1 775 127
2013	40 320.6	4 307	234 307	1 141 000	2 021 415
2014	30 439.95	4 340.40	234 340	889 000	2 191 907
2015	23 307.67	5 237.20	65 237	917 000	2 398 163
2016	34 809.99	6 342.30	66 342	865 000	2 625 494

Source: Ons, Retrospective of economic accounts 1963-2014, n°: 197/2016, January ,2016pp: 40-79.
-Ons, The economic counts 2015-2018, n°: 861, pp: 10-12.

Through the results extracted from the Eviews program, we first notice that the number of views after the conversion has become 64 views, and the quality of the model is known through the coefficient of determination R^2 and R ^¯2, so we notice that 0.99 = ^2, and R ^¯2 = 0.99, which means that 99% Of the changes occurring in P, the dependent variable, is explained by the independent variables, which is a very large percentage. However, we note that the constant part was negative and insignificant, and therefore the model is not acceptable from an economic standpoint. Therefore, we will cancel the agricultural work variable, which was also statistically insignificant, and replace it with the imports variable from Agricultural equipment (IMP) as a variable independent of local fixed capital.

Through the results extracted from the Eviews program and after substituting the independent variable (work) with the variable (imports of agricultural equipment), we found that the constant part is positive and statistically significant, and that most of the variables are significantly different from zero, and the overall significance of the model is different from zero, considering Fisher's probability Prob. F-Statistic = 0.00000 is less than 0.05, and therefore the model is economically acceptable. The quality of the model is through the coefficient of determination R^2 and R ^¯2. We note that 0.99 = R^2, and R ^¯2 = 0.99, which means that 99% of the changes occurred In P, the dependent variable is explained by the independent variables used, which is a very large percentage, and for the normal distribution of the model, the results were as follows:

Figure No. 02 normal distribution of the model



Source: Eviews software

We notice from the results of the study that the value of Jarque - Bera = 3.065744, which is less than the tabulated value of a chi-square distribution with a degree of freedom of 2 and a significance level of 5%, which is estimated at

5.99. We also note that prob = 0.21, which is greater than 5% and 10%, and therefore the distribution of the residuals is Normal distribution.

However, in order to avoid false results in this model, a root test should be performed and then cointegration, since we obtained a series with 64 observations.

Unit root test: (Dickey, 1981)

The results of the unit root test variables were according to the table:

Table No. 05 Static test data for model variables

Decision	**1rst Difference**			**LEVEL**			
	None	Trend and Intercept	Intercept	None	Trend , Intercept	Intercept	
	1.6133	3.1715	2.5930	1.6129	3.1700	2.5922	Critical at 10%
Static at difference 1	1.7093	3.6940	2.7067	1.3334	1.0271	2.0727	P
Static at difference 1	2.1309	3.2192	2.8847	1.6115	1.7586	1.0744	AD
Static at difference 1	4.8552	4.2852	3.7657	1.5435	1.4954	0.7509	K
Static at differ 1	4.3062	4.6041	2.9216	0.5034	2.8625	0.6653	IMP

Based on Eviews data

We should point out that the presence of a unit root for the variables means that the calculated t is less than the tabulated t at the critical values tabulated according to Mackinnon. In this table, the tabulated values were calculated at a 10% significance level and in all models. Accordingly, we note that the critical value is at 10% calculated for all study variables. It was less than the scheduled t of 10% and in all models we note that:

- The calculated tintercept for p was 2.0727, which is less than 2.5922
- The calculated ttrend and intercept for p was 1.0271, which is less than 3.1700.
- The calculated tnone for p was 1.334, which is less than 1.6129.
- The absence of a unit root for the variables means that the calculated t is greater than the tabulated t at 10%, and in all models, whether Intercept, Trend and Intercpet, None.

Cointegration test (Angel-Granger test):

This test is based on studying the null hypothesis that there is no cointegration, by estimating multiple regression and then testing the unit root of the series of remainders. If there is a unit root for the remainders, this means that the series of remainders is unstable, and therefore the presence of a unit root means accepting the null hypothesis, that is, there is no cointegration. The opposite is true, and from here we test the residual series.

Economic analysis of the study results:

The results of the standard study of the effect of fixed capital consumption (K) and demand for agricultural products (AD) on raw agricultural production (P) concluded that the model was suffering from the presence of a unit root for all study variables, and after conducting the first difference, the variables became static and stable at this difference. We also conducted a cointegration test and found that there was a cointegration between the variables. Finally, the error correction model was reached. This model passed all the necessary statistical tests to be accepted as a valid model for standard study after the correction process. All the independent variables explained the dependent variable below average, by 28%. According to the coefficient of determination calculated in this model, this study also allowed the regression equation to be extracted using the least squares method and with a lag of 1 according to the following relationship:

DP = 13892.7152599 + 0.494030290159*DAD + 31.9781230505*DK - 0.135994698955*RE(-1)
(0.13599469855) represents the error correction factor, that is, correcting the path between the independent and dependent variables in the long term to reach stability because the variables are destined to stabilize in the long term, and this is done by correcting the deviations of these variables, We review the following table, which shows the components of the plant production function for the period 2001-2016:

Table No.06 Development of the quantity of agricultural plant production, agricultural work, agricultural support allocations and agricultural capital.

Years	Fixed capital consumption (million DZD) (Cff)	Agricultural support allocations (Sub)	Work (worker) Tr	Q of agr (thousand quintals ( )QT)
2001	452.20	44 676.6	1 312 069	64 765
2002	389.10	48 073.1	1 220 224	90 805
2003	422.70	49 642.1	1 412 340	96 266
2004	400.70	55 894.1	1617 125	97 809
2005	455.80	56 241.1	1 618 724	100 699
2006	452.60	63 750	1 609 633	87 732
2007	609	75 370.4	1 170 898	88 275
2008	797.60	137 242.7	1 252 000	121 666
2009	698.30	136 010.4	1 242 000	132 936
2010	2 504.50	230 000	1 136 000	150 577
2011	1 678.80	230 000	1 034 000	163 126
2012	2 146.20	230 000	912 000	178 549
2013	4 307	230 000	1 141 000	169 397
2014	4 340.40	230 000	889 000	183 449
2015	5 237.20	60 000	917 000	182 925
2016	6 342.30	60 000	865 000	183 000

Source: Ons, Retrospective of economic accounts 1963-2019, n°: 197/2019, 2019, pp: 40-79.

We will enter the following variables: Quantity of agricultural plant production (QT) as a dependent variable for each of the following independent variables: agricultural work (TR), agricultural support allocations (SUB), fixed capital consumption (Cff), then we estimate it using the least squares method and subject the model to standard study and economic.

To know the validity of the model from the economic point of view and from the point of view of standard study, the extent to which it achieves the basic assumptions for building an economic model mentioned above must be studied, and this is done through:

-Testing the goodness of fit in the model:

The quality fit in the model is known through coefficient of determination R^2 and R ^¯ 2. We note that 0.87 = R^2, which is also R ^¯ 2 = 0.84, which means that 84% to 87% of the changes occurring in quantity of agricultural production are the dependent variable. It is explained by the independent variables, which is an acceptable ratio and achieves the quality of the model.

- Statistical significance test for parameters (Student)

The probability of the model parameters was statistically significant at the 0.05 level of significance, with the exception of agricultural work, which did not have statistical significance. The part is a positive constant, However, in order for the model to have economic and analogical significance, we eliminate the agricultural work component, which has no statistical significance. .

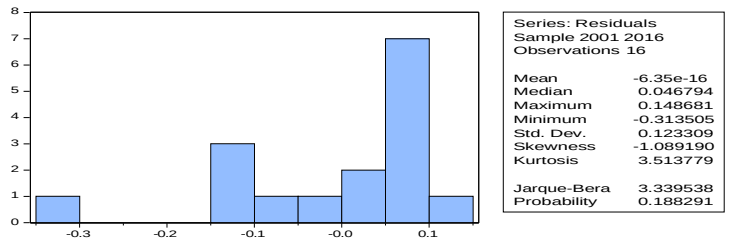
- Statistical significance test for parameters (Student)

We note that the probability of the model parameters was statistically significant at the 0.05 level of significance

- **Statistical significance test for the model (Fisher)**

This model has statistical significance at 3 and 12 degrees of freedom and with a probability of 0.00, i.e. less than 0.05. The results of this test were as follows:

Figure No. 03 normal distribution test



Source: Eviews software

We notice from the results of the study that the value of Jarque - Bera = 3.339538, which is less than the tabulated value of a chi-square distribution with a degree of freedom of 2 and a significance level of 5%, which is estimated at 5.99. We also note that the probability prob = 0.18, which is greater than 5%, and therefore the distribution of the residuals is a normal distribution. .

Economic analysis:

By estimating the standard model of agricultural plant production, we have extracted the following function:

$$\mathbf{QT=}\ \exp^{9}.cff^{0.24}.sub^{0.13}$$

Through the following equation we derive the following results:

- The agricultural work component was eliminated from the model, considering that it was not statistically significant, that is, it did not have the necessary and expected effect. This is due to the traditional and well-known conditions of the lack of a stimulating work environment in this sector, especially field of income.
- We also notice from the equation that if we assume that fixed capital consumption increased by δ, the volume of production will increase by 0.24 while other production factors remain constant. If agricultural support allocations increase by δ, the volume of production will increase by 0.13.

These results confirm what we previously concluded that the impact of agricultural production factors was not in the way we expected. We notice the absence of the impact of agricultural work in improving agricultural production and productivity. Moreover, agricultural mechanization and the various tools used in the production process, which represent fixed capital, did not have an impact in the way expected in particular. In the absence of a real impact on agricultural work, financial support allocations always confirm that they are dependent on effective and non-random management in this sector.

Modeling the agricultural animal production function:

To model the Animal production function We follow the same previous steps, and in this modeling we will focus on the most important animal products through the following table

Table No. 07 Development of livestock heads, red meat production, green fodder areas.

Years	Areas of green fodder (thousand hectares) (Agf)	Red meat production (thousand tons) (Vr	Heads of cattle (thousand heads) Anmx
2001	331,27	255,28	22286
2002	300,28	265,88	22099
2003	272,79	293,58	22642
2004	341,20	212,00	23631
2005	394,60	225,28	24354
2006	111,15	209,14	25266
2007	401,34	229,57	25918
2008	99,44	235,93	25633

2009	120,02	271,59	27350
2010	121,26	265,01	29218
2011	136,64	265,00	30509
2012	229,04	266,00	31000
2013	364,88	418,40	33735
2014	426,78	463,18	35339
2015	384,50	516,20	34635
2016	301,50	529,80	35533

Source: Ons, Retrospective of economic accounts 1963-2018, n°: 197/2018, January 2018, pp: 40-79.
Arab Organization for Agricultural Development, Yearbook of Arab Agricultural Statistics, Volume 23-36.

We will enter the following variables: Red meat production (Vr) as a dependent variable for each of the following independent variables: total heads of livestock (Anmx), green fodder areas (Agf), after excluding agricultural work that was not statistically significant and we estimate it using the least squares method and subjecting The model for econometric and economic study using the Eviews program. To know the validity of the model from the economic standpoint and from the standpoint of econometric study, the extent to which it achieves the basic assumptions for building an economic model mentioned above must be studied, and this is done through:

Statistical significance test for parameters (Student)

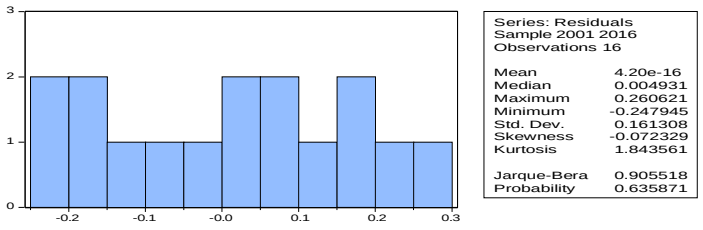
From the table we notice that the probability (Prob) of the model parameters was statistically significant at the significance level of 0.05.

Statistical significance test for the model (Fisher)

This model has statistical significance at 3 and 12 degrees of freedom and with a probability of 0.00, i.e. less than 0.05.

The results of this test were as follows:

Figure No. 04 normal distribution test



Source: Eviews software

We notice from the results of the study that the value of Jarque - Bera = 0.905518, which is less than the tabulated value of a chi-square distribution with a degree of freedom of 2 and a significance level of 5%, which is estimated at 5.99. We also note that the probability prob = 0.63, which is greater than 5%, and therefore the distribution of the residuals is a normal distribution. .

Economic analysis:

By estimating the standard model for agricultural animal production (red meat), we have extracted the following function:

$$VR= \exp^{-10}.Anmx^{1.3}.Agf^{0.19}$$

Through the following equation we derive the following results:

- The elasticities of total animal heads (Anmx) and green fodder area (Agf) were respectively 1.3 and 0.19, and the sum of the elasticities reached 1.49. Thus, we note that the elasticity of total animal heads (livestock) was high compared to the elasticity of green fodder area;
- We also notice from the equation that if we assume that livestock increased by a percentage of δ, then the volume of production will increase by a percentage of 1.3 while the other elements of production remain constant. If green fodder areas increase by a percentage of δ, the volume of production will increase by a percentage of 0.19.

-Through the sum of the elasticities, which were greater than one, we notice that the yield to scale was increasing, meaning that the production of red meat was increasing increasingly whenever we added units of the production factors Anmx and Agf, meaning that the new unit of these production factors increased production more than the previous one.

After reviewing the components of the red meat production function and estimating this function, we will attempt to estimate the white meat production function using the following table:

Table No. 08: Development of the number of slaughtered poultry heads, white meat production, incomes of freelancers in the agricultural sector

Years	Incomes of freelancers in the agricultural sector (billion DZD) Rv	White meat production (thousand tons) Vb	Number of slaughtered poultry heads (million heads) Pl
2001	317,6	201	80,4
2002	321,8	151	60,4
2003	443	152	60,8
2004	502,3	153,3	61,32
2005	497,7	168,55	67,42
2006	544,5	131,75	52,7
2007	608,4	142,575	57,03
2008	609,8	142,075	56,83
2009	812,5	190,825	76,33
2010	882,1	263,25	105,3
2011	1044,7	267,4	106,96
2012	1280,2	265,4	106,16
2013	1447,5	418,4	167,36
2014	1593	463,175	185,27
2015	317,6	512,2	204,88
2016	321,8	512,25	204,9

Source : Ons, Retrospective of economic accounts 1963-2018, n°: 197/2018, January 2018, pp: 40-79.

Arab Organization for Agricultural Development, Annual Book of Arab Agricultural Statistics, Volume 23-36.

We will enter the following variables: White meat production (Vb) as a dependent variable for each of the following independent variables: the number of slaughtered poultry heads (Pl), the incomes of freelancers in the agricultural sector (Rv). We estimate them using the least squares method and subject the model to econometric and economic study using the Eviews program. .

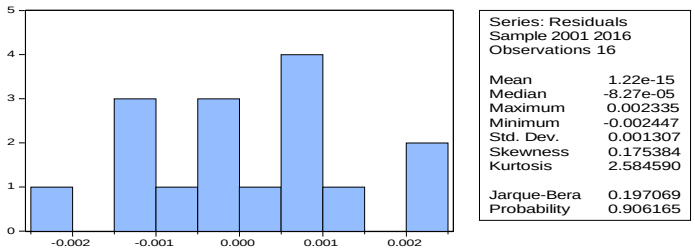
We do the following tests:

1 -Statistical significance test for the model (Fisher)

This model has statistical significance at 3 and 12 degrees of freedom and with a probability of 0.00, i.e. less than 0.05.

The results of this test were as follows:

Figure No. 05 normal distribution test



Source: Eviews software

We notice from the results of the study that the value of Jarque - Bera = 0.197069, which is less than the tabulated value of a chi-square distribution with a degree of freedom of 2 and a significance level of 5%, which is estimated at 5.99. We also note that the probability prob = 0.90, which is greater than 5%, and therefore the distribution of the residuals is a normal distribution.

Economic analysis:

By estimating the standard model for agricultural animal production (white meat), we arrived at the following function:

$$\mathbf{VR=}\ \exp^{-5.9}\mathbf{.}PL^{0.99}.RV^{0.0002}$$

Through the following equation we derive the following results:

We note that the elasticity of output was high in relation to the number of heads of slaughtered poultry, with a value of 0.99, while farmers' incomes had no effect in stimulating an increase in white meat production.

We also notice from the equation that if we assume that the number of slaughtered poultry heads increased by δ, the volume of production will increase by 〖δ〗^0.99, with the other factors of production remaining constant. If farmers' incomes increase by δ, the volume of production will increase by 〖δ〗^0.0002;

After reviewing the components of the white meat production function and estimating this function, we will attempt to estimate the milk production function as the most important consumer product using the following table:

Table No. 09 Development of the number of cows, milk production, and incomes of freelancers in the agricultural sector.

Years	Incomes of freelancers in the agr sector (billion DZD) Rv	Milk production (thousand tons) Lait	Number of cows (million heads) Vch
2001	317,6	1650,00	1,65
2002	321,8	1544,00	1,54
2003	443	1588,00	1,59
2004	502,3	1709,00	1,71
2005	497,7	1682,00	1,68
2006	544,5	1773,54	1,77
2007	608,4	1851,18	1,85
2008	609,8	1878,52	1,88
2009	812,5	2377,64	2,38
2010	882,1	2401,00	2,40
2011	1044,7	2667,95	2,67
2012	1280,2	2670,00	2,67
2013	1447,5	3400,67	3,40
2014	1593	3648,55	3,65
2015	317,6	3895,00	3,90
2016	321,8	3450,00	3,45

Source : Ons, Retrospective of economic accounts 1963-2014, n°: 197/2018, January 2018, pp: 40-79.
- Arab Organization for Agricultural Development, Annual Book of Arab Agricultural Statistics, Volume 23-36.

We will enter the following variables: Milk production (Lait) as a dependent variable for each of the following independent variables: number of cows (Vch), incomes of freelancers in the agricultural sector (Rv). We estimate them using the least squares method and subject the model to econometric and economic study using the Eviews program. We conduct tests. next:

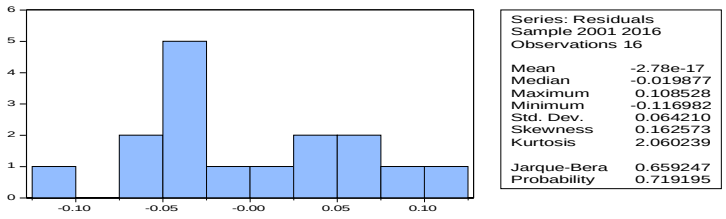
Statistical significance test for parameters (Student):

From the table we notice that the probability (Prob) of the model parameters was statistically significant at the significance level of 0.05.

Statistical significance test for the model (Fisher):

This model has statistical significance at 3 and 12 degrees of freedom with a probability of 0.00, i.e. less than 0.05, The results of this test were as follows:

Figure No. 06 normal distribution test



:

Source: Eviews software

We notice from the results of the study that the value of Jarque - Bera = 0.659247, which is less than the tabulated value of a chi-square distribution with a degree of freedom of 2 and a significance level of 5%, which is estimated at 5.99. We also note that the probability prob = 0.71, which is greater than 5%, and therefore the distribution of the residuals is a normal distribution.

Economic analysis:

By estimating the standard model of milk production, we have derived the following function: Lait= $\exp^{4.7}.Vch^{0.3}.RV^{0.4}$

Through the following equation we derive the following results:

-We note that the output elasticities for the number of cows and farmers incomes were 0.3 and 0.4, respectively and the sum of the elasticities reached 0.7.

-We also notice from the equation that if we assume that the number of cows increased by δ, the volume of production will increase by 〖δ〗^0.3 while the other factors of production remain constant. If farmers' incomes increase by δ, the volume of production will increase by 〖δ〗^0.4.

Through the sum of the elasticities, which were less than one, we notice that the yield to scale was decreasing, meaning that milk production was increasing in a decreasing manner whenever we added units of production factors, meaning that the new unit of these production factors increased production by a smaller percentage than the previous one.

4- Conclusion:

The contribution of the agricultural sector to the gross domestic product was decent, and this is what the study we conducted highlighted through the large gap between the agricultural value added and the gross domestic product. The fact is that these results did not differ from those of previous studies, which indicates that the agricultural sector needs accompanying support. With effective financial support and increased incentives to exploit the available capabilities fruitfully so that we can work to create wealth that supports the economy.

Through the study, we concluded that the contribution of agriculture to the gross domestic product, one of the indicators of economic growth, was modest and did not reach the required level despite the financial support directed to this sector, we also noted that the impact of both the demand for agricultural products and the consumption of fixed capital on agricultural production, which were used as independent variables. After excluding the agricultural labor component due to the absence of an effective impact in the standard study, they were below average, which did not exceed 30%, even though they are among the most important factors stimulating the production process. Accordingly, the weak contribution to the gross domestic product, which is one of the most important indicators of economic growth, means weakness in supporting economic growth, etc. It can be said that supporting the agricultural sector of the national economy will not have a clear and effective impact as long as 97% of the changes occurring in the dependent variable (the national economy) are caused by the independent variable (the fuel sector).

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