AN ECONOMIC ANALYSIS OF EFFECT OF THE ECONOMIC DEVELOPMENT INDICATORS IN AGRICULTURAL LOCAL PRODUCTS IN IRAQ FOR THE PERIOD 2000-2019

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ABSTRACT

This research aims to study the measurement of the most important factors affecting agricultural production in Iraq for the period 2000-2019. Both descriptive and quantitative methods were used in analyzing the gross domestic product, per capita income, agricultural worker productivity, agricultural exports, and their impact on the agricultural production in Iraq. It should be noted that the model data was transformed into logarithmic form, and the analysis using Eviews software showed that the signal of the GDP was negative during the study period, which is contrary to economic theory. The reason for this is that the increase in this variable was not directed towards the agricultural sector, but towards other sectors, and it was statistically significant. However, the signal of per capita income was positive, consistent with economic theory, despite not being statistically significant. The signal of agricultural worker productivity was also positive and statistically significant, consistent with economic theory. As for the agricultural export variable, its signal was negative, contrary to economic theory, due to the fluctuation of agricultural product prices and the difficulty of new exporters entering the market, especially small farmers. The research recommended the necessity of directing the support towards the agricultural GDP and working on establishing a free market at the country's borders to facilitate export procedures.

Keywords: Agricultural exports, agricultural worker productivity, gross domestic production.

INTRODUCTION

The agricultural sector in Iraq is an important in the Iraqi economy, which is the second most important economic sector after the oil sector, in addition to being a basic source to secure local needs of food, as increasing agricultural production and providing safe and healthy food is currently a basic goal sought by peoples in developed and developing countries (4) The agricultural sector also plays a main role in providing agricultural products necessary for food and industry, providing job opportunities for a large part of the population, in addition to exporting some agricultural products for foreign markets, which provides the opportunity to increase the volume of exports and thus achieve economic development in other economic sectors (1) The agricultural domestic product is one of the most important economic indicators through which the performance of the agricultural sector is inferred, which expresses the total values of final goods and services produced by the economy during a certain period of time (3). Despite this importance of agricultural production to the fact that its contribution to the GDP is not commensurate with its importance at the time when the demand for Agricultural products, especially self-contained ones (2), and from here many decision-makers and researchers are looking to know the effects and developments that can be reflected on the agricultural sector in Iraq, for example, unemployment, investment, agricultural income and other important economic indicators, which are reflected directly on the agricultural domestic product in Iraq. The importance of the study lies in the fact that it deals with an important and contemporary issue with an economic, social and political impact, because sustainable agricultural development is a national need that does not accept compromise, because the country is subjected to political, economic and security pressures and that achieving sustainable agricultural development in Iraq will lead to achieving food security for the population, providing raw materials for national industries and helps to rid the country of the high bill for importing foodstuffs, reducing the deficit in the balance of payments, which began to constitute a heavy burden on the country's general budget and helps the country

in diversifying exports in order to free it of their rentier character as well as creating a green surface for the land. where the importance of this study also emerged in Iraq for the absence of a clear vision, transparency, economic mismanagement, wars and foreign policies of neighboring countries in blocking large quantities of water supply as well as the lack of rainfall that led to an increase in decertified areas and environmental pollution. All these reasons combined greatly affected the agricultural sector, This encourage the researcher through this study to show the most important obstacles facing this vital sector in Iraq as the backbone of sustainable agricultural development and then develop solutions that can be achieved according to the possibilities available in it. The problem of research is that Iraq has recently been exposed to many economic and political fluctuations that led to many changes in the agricultural environment, it was shown by the decline in the ratio of agricultural production to GDP, which indicates low levels of the agricultural sector and heading to other productive sectors. The research aims to analyze and identify the most important factors affecting the agricultural domestic product in Iraq, to reach the most important solutions that helps agricultural policymakers in addressing the problems to which these factors are exposed so that the agricultural sector can take its role. The data was obtained from the official authorities, represented by the Ministry of Agriculture, the Department of Planning and Follow-up, as well as the Ministry of Planning/ Central Statistical Organization, in addition to the Baghdad Chamber of Commerce.

Materials And Methods:

The most important economic indicators

Several indicators can be adopted in explaining the role of economic development in agricultural product, including the following:

First: The contribution of the agricultural sector in GDP

It is noted in Table 1 that the highest value of agricultural production was in 2006 and amounted to 7597524.4 dinars, the lowest value was 4598970.7 dinars in 2016. as for the GDP, it was the highest value in 2019, which amounted to 225818116.2 dinars, while the lowest value was 66398213 dinars in 2003. The highest contribution rate was in 2003, which amounted to 7.1%. The table also shows a noticeable decrease in the contribution rate, especially in the years the last of the study is due to the security events after 2014 and caused the exit of a lot of agricultural lands in many governorates, which in turn reflected on production.

Table 1. Agricultural production, GDP and relative importance at constant prices

Year	GDP	AP	%
2000	112208511.5	5635053.8	5.021
2001	114190796.9	6592833	5.773
2002	104822921	6665386.2	6.358
2003	66398213	4718909.9	7.106
2004	101845262.4	5546188.3	5.445
2005	103551403.4	7286558.3	7.036
2006	109389941.3	7597524.4	6.945
2007	111455813.4	5494212.4	4.929
2008	120626517.1	4730388.9	3.921
2009	124702847.9	4898773.9	3.928
2010	132687028.6	5560824.4	4.190
2011	142700217	6565656.3	4.601
2012	162587533.1	6019561.4	3.702
2013	174990175	7459173.9	4.262
2014	175335399.6	7309016	4.168
2015	182051372.6	4613210.7	2.533
2016	199476600.2	4598970.7	2.305
2017	201528215.6	4603348	2.284
2018	213447410.3	4778159.2	2.238
2019	225818116.2	5033281.2	2.228
Average	**136100624.3**	**5785342**	

Source: Ministry of Planning / Central Bureau of Statistics.

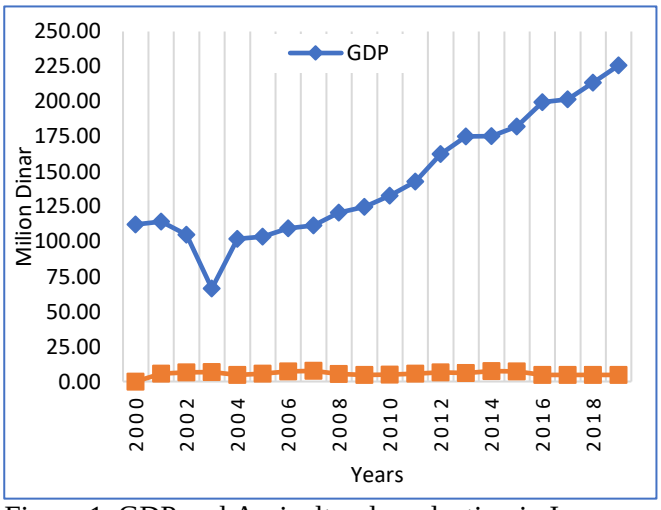

Figure 1. GDP and Agricultural production in Iraq. Source: By researcher based on Table 1.

Results of Table 1 showed that the amount of agricultural output for the period from (2000-2003) was characterized by a semi-stable state until it

became a decline in agricultural product in 2004, where it was characterized by fluctuation, then returned to semi-stability from the period (2005-2013), returned to excessive instability in 2014 and then the return of the amount of agricultural output for the period from (2015-2019) to a high increase, that the reason for the instability in the amount of agricultural output for the years (2004-2014) was due to several reasons, including:

- Lack of government interest, political instability, and poor security.
- Iraq economy depends mainly on the oil sector.

Second: Average per capita income

It is the most used indicator to determine the level of development in a country, and constitutes a new starting point for evaluating sustainability, as the per-capita agricultural production indicator reflects the development in the value of agricultural output associated with the population growth rate. It is used to measure the level of social welfare of the population (7), where it was found according to Table 2 shown below that the gross domestic product of agricultural output during the period from (2019-2000), it is clear through the table below that the highest average per capita in Iraq was in 2002 and it reached 260723 dinars, the lowest average per capita share was in 2017 and it amounted to 118939.8 dinars.

Table 2. Per-capita income in Iraq for the period from 2019-2000 at constant prices

Year	Per-capita	Year	Per-capita
2000	233955.6	2010	171155.2
2001	229429.4	2011	193938.1
2002	260723.1	2012	175973.3
2003	179153.8	2013	212537.7
2004	204355.1	2014	203002.6
2005	260578.6	2015	131010.2
2006	206242.7	2016	127151.2
2007	185102	2017	118939.8
2008	154699.1	2018	120330.2
2009	154708.9	2019	122540.5
Average: 184976.3			

Source: Ministry of Planning / Central Bureau of Statistics.

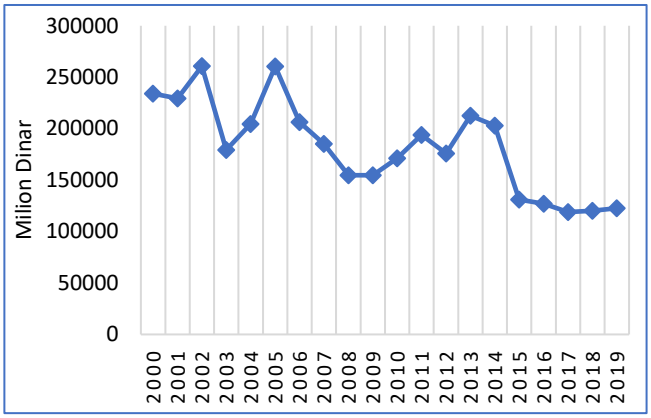

Figure 2. Per-capita income in Iraq.
Source: By researcher based on Table 2.

The results of the average per capita agricultural output for the period (2019-2000) shown in the table above showed a significant difference between the annual rates of change in the Iraqi per capita for the period (2014-2005), where it became a continuous increase until it decreased after that for the period (2015-2018) and then returned to rise in the last year 2019.

The reason for the instability in the results is due to several factors, including:

- Lack of government support for agricultural producers.
- The political circumstances that Iraq went through during this period.
- Iraq's dependence on oil in the composition of GDP mainly.

Third: Productivity of the agricultural worker:

The productivity of the agricultural worker depends on the market value of the final product .The agricultural workforce is one of the most important elements responsible for managing and using other elements of agricultural production, as it is one of the basic components of agricultural activity, the average productivity index of the agricultural worker reflects the productive efficiency in general, and the technical efficiency of the agricultural sector in particular (5).

Table 3. shows the productivity of the worker in Dinar for the period (2019-2000), in which the productivity of the agricultural worker ranged between 3368350 dinars as a minimum in 2000

and 12140850 dinars as a maximum in 2013, as it is generally observed a slight increase in the productivity of the agricultural worker, while there were noticeable slight declines during the mentioned period.

Table 3. Productivity of the agricultural worker in Iraq at constant prices

Year	Productivity	Year	Productivity
2000	3368350	2010	11408600
2001	4119450	2011	9844050
2002	5022800	2012	10107950
2003	3533650	2013	12140850
2004	5218550	2014	12026300
2005	7110800	2015	7290600
2006	7773450	2016	7252900
2007	7624100	2017	7148500
2008	8334606	2018	7989500
2009	9371350	2019	9207500

Average: 7794693

Source: Ministry of Planning/ Central Statistical Organization.

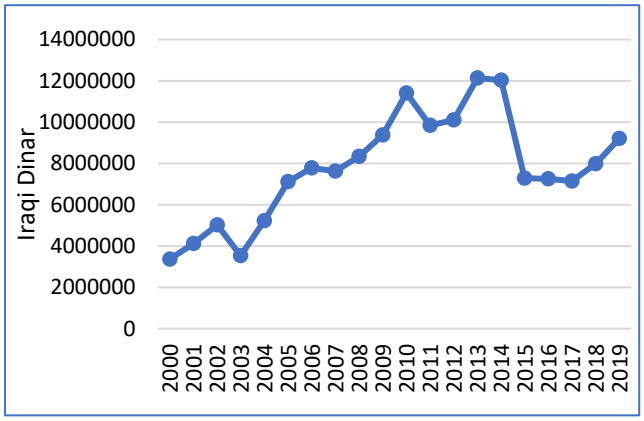

Figure 3. Productivity of the agricultural worker in Iraq.
Source: Researcher based on Table 3.

Through the data of Table 3, we find that the productivity of the agricultural worker was low in the year 2000, then returned to a slight increase in the years (2001-2002), then decreased slightly in the year 2003, then returned to the continuous increase until the year 2014 and then decreased significantly through (2015-2019). Because the productivity of the worker still depends on traditional methods of agricultural production and the lack of use of modern technologies.

Fourth: Agricultural Exports

Agricultural exports are an important indicator to indicate the extent of the agricultural sector's contribution to the development of the national economy, and it is one of the sources of obtaining hard currency and includes Iraqi exports related to the agricultural sector in the first place (dates and animal products of wool and skins, as well as some types of birds) and when observing Table 4, we find that Iraqi agricultural exports ranged between 206 million dollars as a maximum in the year 2019. and a minimum of 5 million dinars in 2000.

Table 4. Agricultural exports in Iraq (Million Dollars)

Year	Agricultural Exports	Year	Agricultural Exports
2000	5	2010	170
2001	7	2011	171
2002	11	2012	174
2003	6	2013	180
2004	89	2014	183
2005	104	2015	187
2006	132	2016	190
2007	152	2017	194
2008	159	2018	202
2009	162	2019	206

Average: 134.2

Source: Ministry of Planning/ Central Statistical Organization.

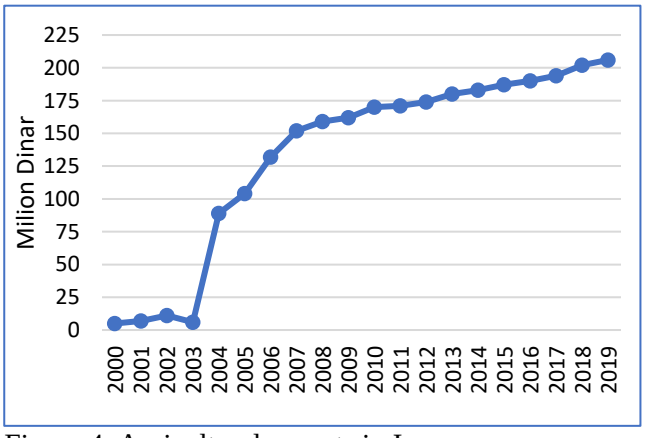

Figure 4. Agricultural exports in Iraq.
Source: By researcher based on Table 4.

Through the table, we see that the value of agricultural exports from the year (2004-2000)

was increasing and slightly decreasing. After these years (2005-2019), the increase in agricultural exports has become very large. This confirms the strength of the sector's contribution to the GDP and the high Iraqi trade balance.

Second: The impact of statistical indicators on agricultural production in Iraq

Statistical analysis of data:

Econometrics is a major tool that contributes to evaluating the components of economic theory in the light of giving numerical estimates that bring them closer to reality to be more logical and acceptable to obtain quantitative estimates that can be used in making economic decisions, forecasting and studying structural changes. Before we conduct economic and econometric analysis, a statistical analysis must be carried out, and the table below shows that the rate of agricultural output (Y) in Iraq during the study period reached 5785341 with a standard deviation of 0.655873. Either the GDP rate X_1 was 1533847.1 with a standard deviation of 0.286379, while the average per capita X_2 was 228913.7 with a standard deviation of 1158124, either the productivity rate of the agricultural worker X_3 reached 5130 during the study period and a standard deviation of 8206949 for exports X_4 it had an average of 126.35 with a standard deviation of 6553410.

Table 5. Basic Effects of Selected Variables Data in Iraq

	Y	X1	X2	X3	X4
Mean	5785341.4	1533847.1	228913.7	5130	126.35
Medium	5433021.2	1509700	235618.6	4987	138.40
Maximum	7595524	225818116.2	327054.3	8373	206
Minimum	4598770	66398213	94414.1	2323	5
Std.dev	0.655873	0.286379	1158.124	8206949	6553410
Deviation	0.791186	0.557813	0.444946	0.076634	0.813392
Cortosis	2.677186	2.283433	1.965126	1.823638	2.081240
Jarque_bera	2.825470	1.904598	2.018110	1.524596	1.935851
Possible	0.243476	0.385853	0.364563	0.466593	0.221567
Sum	23412664	295259881.7	887163.6	8227766	6553891
Sum.sq	10.75225	2.050327	33531258	1.655241	1.676346
Control	20	20	20	20	20

Source: Calculated by the researcher.

Estimated model

The methodology that we do depends on a single equation with several variables, within the framework of this methodology the double logarithmic function of the relationship between the agricultural product as dependent variable (Y) and the explanatory variables was estimated.

(X_1, X_2, X_3 and X_4) Independent factors take the following form:

$$Y = B_o + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4$$

Where *Y*: Agricultural production, *X1: GDP, X2*: per capita income, *X3*: Agricultural worker productivity and X4: Agricultural exports.

For the period from (2000-2019) and the parameters (B_1, B_2, B_3 and B_4) represent the elasticities of the four explanatory variables, according to economic theory, all these variables are supposed to take a positive sign. It should be noted that the model data has been converted to logarithmic form before the standard analysis to exclude the effect of significant differences in the amount and interpretation of the coefficients estimated as elastics for the dependent variable Y. The four explanatory variables mentioned above and most importantly, this logarithmic transformation reduces the problem of variance difference (hetero).

The standard model was estimated by a double logarithmic model (Log _Log), which is the best mathematical model in such an analysis, the

relationship was expressed by the following equation:

$$Lny = b_0 + b_1 Lnx_1 + b_2 Lnx_2 + b_3 Lnx_3 + U_t$$

Before the analysis, the time series stability process was performed to ensure that the data was free from the unit root problem, and it was found after the test that all the data were stable or static and that the regression results were not fake and reliable

Dependent Variable: LY
Method: Least Squares
Date: 05/31/22 Time: 10:39
Sample: 2000 2019
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.20200	4.180003	2.679902	0.0171
LX1	-0.080451	0.072920	-1.103277	0.0121
LX2	0.203674	0.343333	0.593226	0.5619
LX3	0.246600	0.434299	0.567813	0.0023
LX4	-0.118936	0.064638	-1.840044	0.0856

R-squared	0.628785	Mean dependent var	15.55501
Adjusted R-squared	0.226409	S.D. dependent var	0.181366
S.E. of regression	0.159518	Akaike info criterion	-0.620997
Sum squared resid	0.381692	Schwarz criterion	-0.372064
Log likelihood	11.20997	Hannan-Quinn criter.	-0.572402
F-statistic	2.390196	Durbin-Watson stat	1.924547
Prob(F-statistic)	16.435654		

Figure 5. The double logarithmic models
Source: By the researcher based on Eviews 10 program.

From an economic point of view, we find that the constant *c* has reached to 11.20200 and its significance has been proven.

The signal of GDP x_1 came negative, so it was contrary to the economic theory, and the reason for this may be attributed to the fact that the increase in GDP during the study period was directed to other sectors, the oil sector, mining, or armament, which negatively affected spending and agricultural production during the study period, and it was also significant.

As for the second variable, the average per-capita x_2, its signal was positive, and this is identical to the logic of the economic theory, as the average per-capita income increases, agricultural output increases.

As for the third variable, the productivity of the agricultural worker x_3, its signal was positive, identical to the logic of the economic theory, as the productivity of the agricultural worker increases, the agricultural output increases, and its significance has also been proven

As for the fourth variable, agricultural exports x_4, its signal was negative, which is contrary to the logic of the economic theory, the reason is that by increasing agricultural exports, there is supposed to be an increase in agricultural output, but the opposite happened and the reason for the emergence of a negative x_4 signal may be due to the fluctuation of prices of agricultural products in the study period, in addition to the difficulty of entering new exporters to the market and bureaucracy in the procedures for granting export licenses to farmers, especially small farmers, and the distortion of market prices.

In terms of standard tests or economic problems, it was found in the light of the estimated model that the value of D-W was 1.92, which means that the model is free from the problem of autocorrelation, and it was confirmed that the model does not suffer from an autocorrelation problem by conducting a double test Lagrange LM using the Eviews program Which depends on the deceleration periods and since the data is a time series and not cross-sectional data, the model does not suffer from the hetero problem and this topic has been confirmed, although, Pagan-Godfry test has performed, which depends on the dynamics of squared residuals.

The value of R^2 was 0.62, meaning that 62% of the explanatory variables were interpreted and 38% were not included in the model and their effect was absorbed by the random variable.

Table 6 Correlation Coefficient Matrix

	X1	X2	X3	X4
X1	1.000000	0.046352	0.332150	0.678894
X2	0.046352	1.000000	-0.178956	0.566000
X3	0.332150	-0.178956	1.000000	0.069971
X4	0.678894	0.566000	0.069971	1.000000

Source/Researcher's work based on research data

ISSN 2072-3857

CONCLUSIONS:

There is a lack of real guidance to support the agricultural output during the study period, by directing the state to support the oil sector in the first place, as oil supplies 55% of the state budget, and therefore there was a clear deficiency in the agricultural side, both plant and animal. There is a noticeable improvement in the average per-capita income through the increase in the average income of individuals, especially after the year 8330 and thus a positive impact on the increase in agricultural production. Because of point 8, the productivity of the agricultural worker increased during the same period, and this was reflected positively by increasing the agricultural output. The existence of a real problem in improving agricultural exports is due to the bureaucracy of government procedures and the fear of some farmers entering into bad speculation due to the fluctuation of the prices of agricultural commodities. The research recommends fully support to agricultural production, sustainable agricultural development and granting soft loans, especially to small farmers, to encourage them to increase output and reduce migration from the countryside to the city. Work to continue improving the average per capita income because of its positive repercussions on the development of agricultural reality and improve the quality of the product of all kinds. Encouraging investment in the agricultural field, especially in areas that are directly related to the basket of food consumed and access to the experiences of some countries that have successful experiences in the agricultural sector and try to transfer experiences from these countries to the country to benefit from them. Work to establish free markets on the borders of the country to facilitate export procedures and reduce red tape at border crossings of all kinds.

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ISSN 2072-3857