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Farmers' Support Policies and Their Economic Impact on the Sustainable Development of the Agricultural Sector in Iraq

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ABSTRACT

The research aims to study the impact of policies on the agricultural sector in Iraq during the period (1990-2025) by studying the relationship between agricultural domestic product (the dependent variable) and a number of independent variables (government support, agricultural loans، cultivated area and agricultural mechanization). The data was collected from Ministry of Planning and Food and Agriculture Organization (FAO). The descriptive and quantitative method was used via using Autoregressive Distributed Lag (ARDL) model. Results through the bounds test showed the existence of a long-term equilibrium relationship. Between the model variables and the error correction model, there was a speed of adjustment towards long-term equilibrium that reached (29%). The research reached a number of recommendations, including that government support has a positive and significant impact on agricultural domestic product, while agricultural loans had a negative impact in the short term and a positive impact in the long term. It also turned out that agricultural mechanization has a negative impact in the short term due to weakness and lack of positive planning, while it has a positive impact in the long term. The results confirmed the importance of these supportive policies to achieve sustainable development in the agricultural sector in Iraq.

KEYWORDS: government support, agricultural loans, agricultural mechanization ARDL.

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INTRODUCTION

The agricultural sector is the most important essential element in achieving food security and the process of economic and agricultural development in Iraq(1). It represents one of the most prominent productive sectors capable of supporting the national economy, diversifying sources of income, and increasing agricultural production away from unilateral dependence on oil.(4) Although Iraq possesses the most important agricultural components of land and water resources and climate diversity, this sector still suffers from major challenges represented in the fluctuation of agricultural production, weak infrastructure,(8) limited use of modern technologies, climate change, risks in production, instability in agricultural prices, and low levels of support directed to farmers. In light of these challenges, the importance of policies supporting farmers has emerged as a strategic tool to enhance the agricultural sector's ability to face economic pressures, improve the efficiency of resource use, and achieve sustainable development and agricultural development,(10) as it helps these policies provide agricultural inputs, support agricultural mechanization, facilitate access to agricultural loans, and improve agricultural marketing systems,(5) to reflect positively on increasing agricultural productivity and improving income and living standards for farmers.(2) The importance of the research comes to study the role of policies supporting farmers and their impact on the sustainable development of the agricultural sector in Iraq,(3) through studying the reality of the agricultural sector and evaluating government support programs. The research problem is to what extent do policies supporting farmers contribute to promoting sustainable development of the agricultural sector in Iraq?(7) The research aims to analyze the most important policies supporting farmers in Iraq, measure the impact of government support on agricultural production

and income, and propose the most important solutions to enhance the process of sustainable development. (18)The research assumes that government support has a positive impact on agricultural production and cultivated area, improving income for farmers, and investing in modern irrigation techniques, which contributes to achieving agricultural sustainability and understanding the relationship between agricultural support and indicators of productive, economic, and environmental sustainability. (8)The research seeks to provide a scientific vision that helps decision-makers develop an effective policy that helps achieve sustainable agricultural development that suits the needs of the agricultural sector in Iraq in the future.

The data used from its secondary sources represented by Ministry of Planning - the Central Organization of Statistics and the website of Food and Agriculture Organization of United Nations. (3)The method of analysis was both descriptive and quantitative using the statistical program E-views 12 and (ARDL) Auto Regressive distributed lag model.

1- The model used:

LY=F (LX1, LX2, LX3, LX4).

LY: Natural logarithm of agricultural domestic product (million Iraqi dinars).

LX1: Natural logarithm of the amounts of government financial support (million dinars).

LX2: Natural logarithm of agricultural loans.

LX3: Natural logarithm of the cultivated area (dunum).

LX4: Natural logarithm of agricultural mechanization.

Table (1) The dependent variable and independent variables (amounts of government financial support, agricultural loans, cultivated area and agricultural mechanization) in Iraq for the period (1990-2025)

Years	agricultural domestic product Y (Million Iraqi dinars) (1)	amounts of government financial support (Million dinars) X1 (2)	agricultural loans X2 (3)	cultivated area X3 (4)	agricultural mechanization X4 (5)
1990	4613	571	110	14575106	1004
1991	6629	1673	89	21837165	215
1992	22872	7808	237	28354342	4083
1993	49864	16359	160	13836115	8105
1994	333524	90713	124	13130469	9951
1995	1378274	350299	92	13070557	22787
1996	1208982	37086	5.4	12783885	11107
1997	1276367	56613	1.5	12956769	16576
1998	1868379	26726	52	14126038	25619
1999	2482616	87159	349	13687349	45419
2000	2327277	107859	21409	8657220	61666
2001	2863495	206491	33209	10000262	107472
2002	3512658	244070	56897	13714912	151437
2003	2486865	322356	12941	13874780	210986
2004	3693768	187334	21032	13519582	270535
2005	5064158	154133	28361	14697937	272863
2006	5568985	289472	104828	14046330	319477
2007	5494212	392636	112553	14158805	381889
2008	6042017	1059680	143329	14235579	1511113
2009	6832552	864529	151788	10513473	1098255
2010	8366232	1361003	207670	11874778	1633233
2011	9918316	917714	279964	11519456	2310672
2012	10484949	1120608	489719	12697845	2354542
2013	13045856	1566785	317850	14046330	2440258
2014	13128622	1551216	268559	14158805	1814321
2015	8160769	1148708	390179	14458712	1678400
2016	7832046	279641	231598	13514532	1748322

2017	6598384	447061	118237	13874780	1684033
2018	7572265	451748	21005	13511298	332112
2019	10411174	451748	27406	14697937	267567
2020	13130927	451748	4457	14546314	256037
2021	11912818	263231	17622	13158805	264567
2022	10922787	263231	16495	14456321	255590
2023	11349847	100000	15654	13877895	1004
2024	12765490	284596	17622	13511298	215
2025	12498476	297845	16495	14697937	4083

Source: Columns (1) and (2): Ministry of Planning / Central Organization of Statistics / Directorate of National Accounts.

MATERIALS AND METHODS

In this chapter, the variables included in the model will be studied, which represents the agricultural domestic product (the dependent variable) and the explanatory variables(16) (government support, agricultural loans, cultivated area and agricultural mechanization), the ARDL method will be used. Through this model, the short-term relationship is determined and the bounds test is used to clarify the presence or absence of a long-term relationship for the variables in the model.(6)

Among the factors affecting the agricultural gross domestic product in Iraq are:(17)

1- Government supports: These are the financial resources provided by the government to support goods and services or provide them to productive activities, to reduce costs, increase agricultural production(9), and improve the standard of living to reach the process of economic development and achieve social justice for individuals.

2- Agricultural loans: These are financing tools granted to farmers in the agricultural sector in order to help them develop support for the production process(19) and thus increase both efficiency and production and achieve agricultural development and sustainable development.(11)

3- Cultivated area: It is the cultivated area of land that was used to grow crops during a specific period of time or a specific agricultural season and is an important indicator for measuring agricultural activity and agricultural productivity.(10)

4- Agricultural mechanization: This is the introduction of modern technologies such as agricultural machinery and equipment for use in plowing, cultivation(14), harvesting, and irrigation, in order to reduce human labor, reduce the costs of agricultural production, and increase agricultural production(12).

RESULTS AND DISCUSSION

To evaluate the model, the following steps are followed: Unit Root Test (Augmented Dickey Fuller): Augmented Dickey Fuller test aims to measure the stationarity of the time series, as shown in table (2). The results obtained are presented below(20): The Augmented Dickey Fuller test showed that the model variables were nonstationary at the level but became stationary after taking their first difference. (13)Therefore, the appropriate model is ARDL model,(15) which is a prerequisite for model (2).

Table (2) (ADF the variables in the model

Variables test	**Sig.**	**Ly**	**L(X1)**	**L(X2)**	**L(X3)**	**L(X4)**
At level						
With* Constant*	t-s	-5.369224	-5.221235	-5.361290	-0.313154	-2.937568
	Prob.	0.0002	0.0002	0.0001	0.9121	0.0003
		***	***	***	No	***
With Constant &Trend	t-statistic	-2.844706	-3.143543	-3.131696	-2.562902	-2.652782
	Prob.	0.1963	0.1138	0.11154	0.2984	0.2954
		No	no	No	No	No
None	t-statistic	-0.623217	2.13376	2.027847	0.929451	0.659451
	Prob.	0.4392	0.9908	0.9880	0.9020	0.9070
		No	no	No	No	No
At first difference						

With Constant	t-statistic	-2.929365	-2.967688	-3.029605	-5.973257	-4.965432
	Prob.	0.0534	0.0492	0.0431	0.0000	0.0000
		**	**	**	***	***
With* Constant &Trend*	t-statistic	-3.186389	-3.857987	-3.976429	-5.837005	-4.865439
	Prob.	0.1056	0.0265	0.0204	0.0002	0.0004
		No	**	**	***	***
None	t-statistic	-3.130540	-2.693774	-2.739772	-5.595787	-6.595776
	Prob.	0.0028	0.0088	0.0078	0.0000	0.0000
		**	*	*	***	***

Source: Outputs of the statistical program (E-views 12).

Table (3) Var. Test*

(VAR Lag Order Selection Criteria)
(Endogenous variables: LY LX1 LX2 LX3 LX4)
(Exogenous variables): C
Date: 1/5/2026 time: 5:10
Sample: (1990- 2025)

Lag	LogL	*	LR*	FPE*	AIC*	SC	HQ*
0*	-265.3457	NA*	0.357289	18.79109	18.13212	19.45987	
1*	-129.556	198.3156	0.000880	12.7346	16.36460	13.12546	
2*	-78.06043	49.70327	0.001452	12.55588	18.54598	15.12654	
3*	129.23454	97.1053	3.459877	1.777454	9.045987	4.126548*	

Source: Outputs of the E-views 12 statistical program.

Table (3) shows var. test, where the lagged period was tested based on the five criteria, which are (LR*, FPE1*, AIC*, SC* and HQ*) as shown in table No. (3), which shows that the best lagged period was (3).

Table (4) Bounds Test between independent variables and dependent variable

((Null Hypothesis: No levels relationship)) Bounds Test

	*I(1)	I(0)*	(Signif).	(Value	Test Statistic
			Asymptotic: n=1000		
F-statistic	**44.66543**			**10%**	
1.73	**2.88**				
K	**5**			**5%**	**2.04** **3.24**
				2.5%	**2.32** **3.5 5**
				1%	**4.6** **7.05**
Sample Size	**(36)**		**Finite Sample: n=(35)**		
	(10%)	**(-1)**	**(-1)**		
	(5%)	**(-1)**	**(-1)**		
	1%	**-1**	**-1**		

Source: (Outputs of the statistical program) (E-views 12).

Bounds test was conducted, and table (4) shows that F value of the Bounds Test was (44.66), when compared with the special tables, the test contains two limits (upper and lower), and the calculated F value came out greater than the upper limit for a sig

level of 1%, is (4.6), therefore, we reject the null hypothesis and accept the alternative hypothesis, which indicates the existence of a long-term relationship between the explanatory variable.

(Table) (5) ECM (Error Correction Model)

ARDL Error Correction Regression
(Dependent Variable): D(LY)
(Selected Mode)l: (3, 3, 3, 3, 3, 3,)
CASE 1: No Constant and No Trend
Date: 10/11/25 Time: 04:37
(1990 -2025)
Included observations 36

(ECM Regression 36)

(Variable)	(Coefficient)	(Std. Error)	(t-Statistic)	(Prob.)
d(LY(-1))	0.516534	0.076906	29.40187	0.0014
d(LY(-2))	-0.14757	0.015349	-9.699208	0.0107
d(LX1)	0.054549	0.011165	3.725735	0.0320
d(LX1(-1))	0.34654 8	0.011181	23.50016	0.0019
d(LX1(-2))	0.015170	0.009896	1.532987	0.2650
d(LX2)	-0.482398	0.040107	11.40267	0.0076
d(LX2(-1))	0.342353	0.054787	7.978770	0.0179
d(LX2(-2))	0.598991	0.043292	13.83610	0.0052
d(LX3)	-0.144598	0.008475	17.47824	0.0045
d(LX3(-1))	-0.048252	0.011199	-4.308796	0.0499
d(LX3(-2))	0.188625	0.009993	18.87587	0.0028
d(LX4(-1))	-0.350987	0.015359	-22.18393	0.0050
D(LX4(-2))	-0.14876	0.012364	-11.89085	0.0080
CointEq (-1) *	-0.29854	0.007449	-34.56407	0.0009

Source: Outputs of the E-views 12 statistical software.

The (Table) (5) (ECM) estimation for the study of the impact of farmers supporting policies on agricultural product in Iraq period (1990–2025). The error correction coefficient showed a significant negative value of (-0.29), indicating a long-term equilibrium relationship between agricultural product and the explanatory variables of the study, correcting approximately 29% of the short-term imbalance towards long-term equilibrium.

Government support (LX1) had a significant positive impact on agricultural product, reaching (0.05), this indicates that government support policies lead to a reduction in agricultural production costs and consequently an increase in agricultural product, reflecting the role of government policies in supporting the agricultural sector and achieving sustainable development. Agricultural loans (Lx2), however, had a negative impact reaching (-0.48), this translates into a significant positive impact in the long term, meaning that agricultural loans do not directly increase agricultural product but require time to be converted into productive investments, highlighting the role of credit allocation. The cultivated area (LX3) had a negative impact of (-0.14), as horizontal expansion requires a long period to prepare agricultural land and begin the agricultural production cycle. Agricultural mechanization (LX4) showed a negative short-term impact of (-0.35), this means that introducing agricultural mechanization without prior and efficient planning or appropriate training on its use may lead to increased operating costs without achieving an increase in agricultural production.

(Table 6) LONG-RUN VARIABLES

Variable	Coefficient)	Std. Error*	t-Statistic*	Prob*.
(LX1)	0.383276	0.013349	27.21654	0.0015
(LX2)	-4.65964	1.218876	-3.002968	0.0876
(LX3)	0.522765	0.368250	1.481046	0.2878

(LX4)	0.27881	0.037834	7.08503	0.0154

Source: Outputs of the E-views 12 statistical software.

The long-term equation is as follows:

$$ly = (0.384376lx1 - 4.659645lx2 + 0.52234lx3 + 0.278814lx4)$$

The equation shows that lx1 represents government support and has a direct and positive relationship with agricultural product because government support is directed towards investment, is stable, and is linked to agricultural productivity. Therefore, it leads to increased resource utilization efficiency in this sector and higher agricultural productivity. However, lx2 represents agricultural loans and has an inverse relationship with agricultural product because loans are used for consumption purposes and lead to poor resource management, there are also climatic risks, and the financing does not translate into an increase in agricultural product. The variable lx3 represents cultivated area and has a direct relationship with agricultural product because increasing cultivated area leads to increased production volume and higher agricultural product. The variable lx4 represents agricultural mechanization and has a direct relationship with agricultural product because mechanization leads to increased efficiency in agricultural land use, reduced production costs, increased agricultural production, and faster agricultural operations.

(diagnostic tests in the model)

1-(Autocorrelation Test):

Table (7) shows the autocorrelation test using the Lagrange multiplier. The results showed no autocorrelation, and the Lagrange multiplier (LM) test yielded a probability value of (0.40), this means we accept the null hypothesis, and the model does not suffer from an autocorrelation problem, so the model is good.

Table (7) Lagrange Multiplier (LM) Test

*Breusch-Godfrey Serial Correlation LM Tes*t:		
Null hypothesis: No serial correlation at up to 2 lags		
F-statistic*	0.40564	Prob. 0.9065
*Obs*R-squared* 0.4654	1.491637	Prob. Chi-Square (2)

Source: E-views statistical software output.

2- Testing the Homogeneity of Variance:

Table (8) shows that, based on the Breusch-Pagan-Godfrey test, the calculated F-value was obtained at (0.17), with a significance level of (0.96). Furthermore, the results of the test performed on the model confirmed that the Chi-Square statistic was (0.65), which is also greater than (0.05). Therefore, the null hypothesis is accepted, and there is no problem of Heteroskedasticity.

Table (8) Variance Test(Heteroskedasticity)

Hetero Test:(Breusch-Pagan-Godfrey)		
Null hypothesis: Homoskedasticity		
(F-statistic)	0.178660	(Prob). F(27,1) 0.9605
(Obs*R-squared)	24.24107	(Prob. Chi-Square) (27) 0.6569
(Scaled explained SS)	0.056663	(Prob. Chi-Square) (27) 1.0000

Source: E-views statistical software output.

3- Stability Tests (CUSUM and CUSUMSQ)

These coefficients become unstable if the graph moves outside the boundaries at this level. The results showed structural stability among the study variables and consistency in the model in both the short and long term. The estimation line falls within the confidence intervals throughout the study period, indicating the stability of the estimated parameters in the model, as shown in figure (1).

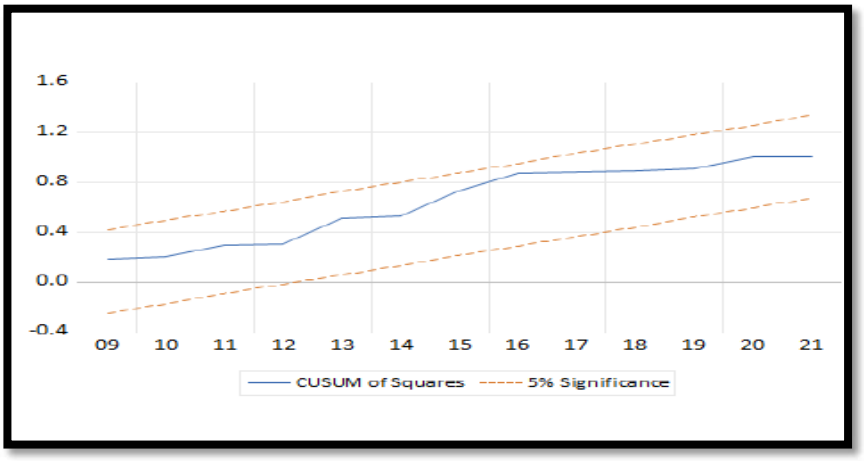

Figure (1): CUSUMSQ test
Source: (Researcher's work based on the E-views 12 statistical program).

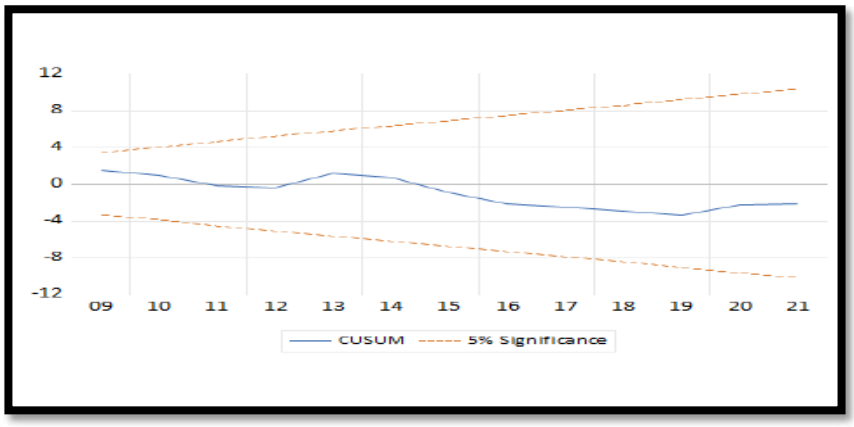

Figure (1): (CUSUM test)
Source:(Researcher's work based on the E-views 12 statistical program).

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

1- The effectiveness of government support has a positive impact on agricultural product, indicating that incentive policies contribute to increased agricultural production.

2- The results of the boundary test confirmed a long-term equilibrium relationship between the variables (government support, agricultural loans, cultivated area, and agricultural mechanization) and agricultural product.

3- The error correction rate (29%) indicates that the agricultural sector needs time to return to equilibrium.

Recommendations:

1- Provide government support for all agricultural inputs to direct them towards main strategic crops to achieve food security and sustainable development.

2- Facilitate all credit procedures, including low-interest loans, to encourage farmers to adopt modern technologies.

3-Expand agricultural mechanization, support the import of agricultural equipment, and train all personnel to increase agricultural productivity.

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