Econometric Analysis of Domestic Agricultural Output and Digital Economy Indicators in Iraq for the Period (2004-2025)

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Abstract

This study aims to measure and diagnose the nature and extent of the impact of adopting circular economy practices and activities on enhancing and developing agricultural output indicators in Iraq for the period 2004-2025, with the goal of providing a scientific perspective that supports the transition towards sustainable agricultural development. The study employs a quantitative econometric approach using secondary time series data from governmental bodies and international organizations (such as the Iraqi Ministries of Agriculture and Planning, and the FAO and WTO). The econometric model measured the impact of independent variables representing circular economy indicators namely, the quantity of organic fertilizers processed (X1), bioenergy produced (X2), the share of renewable energy in total energy consumption (X3), and water use efficiency (X4), on the dependent variable of agricultural GDP at constant prices (Y). The econometric tests demonstrated the stationarity of the time series for the variables at the first differences (I(1)) and confirmed their cointegration using the Johansen-Josselius test, allowing for the application of the fully modified least squares (FMOLS) method for long-run estimation. The results showed a statistically significant positive impact of both water use efficiency (which was the most influential and scalable variable) and the quantity of organic fertilizers processed on agricultural output. While the production of bioenergy showed a significant negative impact due to direct competition for agricultural resources and the initial increase in costs, the renewable energy ratio variable did not register a significant impact due to the continued overall reliance on subsidized fossil fuels. The study reached a number of conclusions, most notably: confirming the study's main hypothesis regarding the statistically significant impact of circular economy practices on agricultural output development; identifying water use efficiency as the pivotal driver of growth in light of water scarcity and climate change; and the emergence of a non-linear slowdown in cumulative growth (TREND^2) subject to the law of diminishing returns due to infrastructure deterioration. Based on these results, the study offered several recommendations, the most important of which are: expanding support for the production and recycling of local organic fertilizers; regulating bioenergy projects to focus on non-consumable waste and refuse to avoid competition with food security; establishing a green finance fund to facilitate the acquisition of renewable energy technologies; restructuring policies supporting traditional fuels directed towards the agricultural sector in favor of clean energy; and a comprehensive investment shift towards closed irrigation networks to maximize water resource use efficiency.

Keywords: circular economy, water use efficiency, bioenergy produced, FMOLS Model, Iraq.

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Introduction

The contemporary world is witnessing a radical shift in the developmental concepts governing economic activities, driven by the accelerating increase in population growth rates, the escalating severity of environmental crises and climate change, as well as the severe depletion of natural resources resulting from the adoption of the traditional linear economy based on the (extract, manufacture, then dispose of as waste) model [1] . At the heart of these challenges, the agricultural sector stands out as one of the most vital and sensitive sectors, as it bears the responsibility of ensuring global food security, while it itself suffers from soil degradation, water scarcity, and enormous waste in the food value chain, leading to a decline in the efficiency and growth rates of agricultural output [2]. In light of the search for sustainable structural solutions, the concept of the circular economy has emerged as an alternative development strategy and an innovative economic model that seeks to decouple economic growth from resource depletion [3] . This concept is based on extending the life cycle of materials, minimizing waste, and recycling and recovering biological and technological resources [4]. When this model is applied to the agricultural sector, what is known as smart circular agriculture emerges [5]. This model relies on recycling nutrients, converting agricultural and animal waste into organic fertilizers and bioenergy, and optimizing water and energy use through closed-loop recycling technologies [6].

Studying the impact of the circular economy on agricultural output is of paramount importance in modern economic thought. Circular practices are no longer viewed merely as a tool for environmental protection, but also as an economic driver that directly contributes to enhancing and improving agricultural output (both quantitatively and qualitatively)[6]. Quantitatively, reducing the costs of traditional inputs (such as cement, chemical fertilizers, and pesticides) and replacing them with recycled, circular alternatives improves farmers' profit margins and increases overall production volume [7]. Qualitatively, circular practices contribute to the sustainability of soil fertility and ensure crop health, thereby increasing the market and export value of agricultural output and guaranteeing its sustainability for future generations [8]. Despite international theoretical arguments asserting that the shift towards a circular economy (through water recycling, the use of organic fertilizers derived from waste, and the adoption of renewable energy) constitutes a genuine catalyst for enhancing the efficiency and value of agricultural output, a profound knowledge and application gap exists in Iraq. This gap is manifested in the absence of quantitative and analytical frameworks for measuring the impact of circular practices on agricultural output, and in the ambiguity of the legislative and financial vision that hinders the transition from a depleting linear model to a sustainable circular one.

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Based on this complex knowledge and developmental context, this study aims to provide an analytical and applied framework to diagnose and measure the nature and extent of the impact that the transition to circular economy applications can have on the structure and indicators of agricultural output. It also seeks to identify the latent opportunities and obstacles (technological, financial, and institutional) that impede the rapid adoption of this sustainable model, particularly in developing countries suffering from food gaps and clear environmental imbalances.

The agricultural sector in Iraq faces a severe structural crisis that threatens its food security and environmental and economic sustainability. The roots of this crisis lie in the historical and persistent reliance on a traditional linear economy based on excessive and resource-depleting consumption. This leads to massive waste of production inputs (such as water, fertilizers, and energy), as well as the generation of millions of tons of agricultural and animal waste that are burned or buried haphazardly, exacerbating pollution and soil degradation. In Iraq specifically, the dimensions of this problem are compounded, as the agricultural sector suffers from multiple climate shocks, including severe drought, a decline in historical water allocations, and accelerating desertification. This is compounded by structural imbalances resulting from oil revenues, which have led to a neglect of investment in sustainable agricultural technologies. On the other hand, the countries under study share similar challenges related to low productivity and quality of agricultural output, high costs of imported chemical inputs, and the absence of effective mechanisms for recycling and managing waste and food value chains.

Accordingly, the study problem is defined as the continuous decline in the efficiency and growth rates of agricultural output in Iraq due to the continued reliance on traditional linear models and the lack of scientific and applied knowledge regarding the extent of the impact and economic gains that can be achieved by transitioning to circular economy practices in light of current climatic and institutional challenges.

The study problem is centered on the main question: To what extent does adopting circular economy practices enhance and develop agricultural output in Iraq?

Thus, the study problem can be formulated through the following sub-questions:

1. What is the current state of agricultural output indicators and the level of adoption of circular economy practices (waste management, water recycling, clean energy) in Iraq?

2. Is there a statistically significant correlation between the independent variables of the circular economy (such as agricultural waste recycling rates and water recycling efficiency) and the dependent variable, which is agricultural output (quantitatively and qualitatively), in the short and long term?

5. What economic and policy strategies are proposed to accelerate the integration of circular economy mechanisms into national agricultural plans to maximize

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agricultural output and ensure its sustainability?

Study Objectives:

1. This study aims to achieve the following objectives:

The main objective of this study is to measure and diagnose the nature and extent of the impact of adopting circular economy practices on enhancing and developing agricultural output indicators in Iraq, in order to provide a scientific perspective that supports the transition towards sustainable agricultural development.

This main objective leads to a set of specific sub-objectives, as follows:

1. Diagnosis and description of the current situation: Monitoring and evaluating the current state of agricultural output indicators and identifying the levels of adoption of current circular economy practices (such as agricultural waste management, water recycling, and the use of clean energy) in Iraq.

2. Measurement and statistical (quantitative) analysis: Measuring and analyzing the nature of the correlation and the statistically significant impact of the independent variables of the circular economy on agricultural output (quantitatively and qualitatively) in the short and long term, using appropriate econometric models.

Material and Methods

Estimating the long-term equilibrium relationship between the dependent variable (agricultural GDP) and the independent variables (circular economy indicators) using the FMOLS method. The equation takes the following form:

Study Hypothesis: Circular economy applications and practices have a statistically significant positive impact on enhancing and developing agricultural output indicators (both quantitatively and qualitatively) in Iraq and the countries under study in the short and long term.

Data Sources and Analysis Methodology: The study relies on secondary data, specifically time series data for the period 2004-2025. This data will be obtained from governmental and international sources, such as the Ministry of Agriculture, the Ministry of Planning/Central Statistical Organization (for Iraq), the Food and Agriculture Organization of the United Nations (FAO), the World Trade Organization (WTO), and online sources. The analysis will employ a model where agricultural GDP is the dependent variable, and the following are the independent variables for the selected countries: quantity of treated animal manure, bioenergy production, bioenergy consumption, quantity of treated wastewater, and arable land.

$$Y = B0 + B1X1 + B2X2 + B3X3 + B4X4 + Ui$$

Where:

Y = Agricultural GDP / Million Dinars at constant prices

X1 = Quantity of treated fertilizer / kg

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X2 = Bioenergy production (terajoules)

X3 = Percentage of renewable energy used out of total energy

X4 = Water use efficiency (USD/m^3)

B0 = Constant term

B1…B10 = Coefficients of variables

Ui = Random variable

Results and Discussion

First: Testing the Stationability of Time Series for Economic Variables

Table (1) shows the unit root test using the ADF, the results of which were calculated under three conditions: the presence of a constant term only, a constant term and a time trend, and the absence of a time trend and a constant. The results showed the presence of a unit root in the time series for most variables at their original level, confirming the absence of stationarity and leading to the acceptance of the null hypothesis that a unit root exists in the time series data. However, after taking the first difference of the variables and performing the unit root test, the results indicate that stationarity is present at the first difference for all variables. This means rejecting the null hypothesis and accepting the alternative hypothesis, confirming that the time series for the variables are stationary at their first difference.

After establishing the stationarity of the time series and confirming that most of the variables used in the study are stationary at the first difference, we can use cointegration to test for the existence of a long-term equilibrium relationship between the model variables.

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Table (1): Results of the ADF unit root test for the study variables

UNIT ROOT TEST RESULTS TABLE (ADF)
Null Hypothesis: the variable has a unit root

	At Level					
		Y	X1	X2	X3	X4
With Constant	t-Statistic	-2.7631	-0.7330	-0.4667	-2.9058	-1.0149
	Prob.	***0.0815***	***0.8172***	***0.8756***	***0.0615***	***0.7282***
		*	n0	n0	*	n0
With Constant & Trend	t-Statistic	-2.6929	-1.4617	-3.5580	-4.2295	-1.5789
	Prob.	***0.2490***	***0.8103***	***0.0601***	***0.0161***	***0.7666***
		n0	n0	*	**	n0
Without Constant & Trend	t-Statistic	-0.3040	1.4341	3.6414	-1.7960	-0.9407
	Prob.	***0.5639***	***0.9572***	***0.9997***	***0.0696***	***0.2979***
		n0	n0	n0	*	n0
	At First Difference					
		d(Y)	d(X1)	d(X2)	d(X3)	d(X4)
With Constant	t-Statistic	-3.5840	-3.6968	-3.8887	-4.2053	-4.3609
	Prob.	***0.0160***	***0.0127***	***0.0100***	***0.0049***	***0.0031***
		**	**	***	***	***
With Constant & Trend	t-Statistic	-3.5305	-3.6579	-3.5598	-5.9801	-4.4093
	Prob.	***0.0631***	***0.0500***	***0.0647***	***0.0006***	***0.0119***
		*	*	*	***	**
Without Constant & Trend	t-Statistic	-3.6675	-3.5344	-0.2110	-4.0589	-4.4243
	Prob.	***0.0009***	***0.0013***	***0.5945***	***0.0004***	***0.0001***
		***	***	n0	***	***

Notes:
a: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1% and (no) Not Significant
b: Lag Length based on SIC
c: Probability based on MacKinnon (1996) one-sided p-values.

Source: Eviews 10 software output.

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Table(2). Results of the Johansen-Joselius cointegration test for the study variables for the period (2004-2025)

Date: 08/05/26 Time: 13:01
Sample (adjusted): 2006 2025
Included observations: 20 after adjustments
Trend assumption: Linear deterministic trend
Series: Y X1 X2 X3 X4
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.872636	94.73695	69.81889	0.0002
At most 1 *	0.691682	53.52277	47.85613	0.0134
At most 2 *	0.590856	29.99027	29.79707	0.0475
At most 3	0.357382	12.11653	15.49471	0.1514
At most 4	0.150937	3.272429	3.841466	0.0704

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.872636	41.21419	33.87687	0.0056
At most 1	0.691682	23.53249	27.58434	0.1519
At most 2	0.590856	17.87374	21.13162	0.1346
At most 3	0.357382	8.844100	14.26460	0.2994
At most 4	0.150937	3.272429	3.841466	0.0704

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Eviews 10 software output.

After conducting the cointegration test between the variables, it was found that there are a number of cointegration vectors between these variables. The results of the trace λ test shown in Table (Trace Statistics), which is 94.75, are greater than the critical value of 69.81, and the prop value of 0.0002 is less than 5%. This means rejecting the null hypothesis and accepting the alternative hypothesis R>1, which states that there are three cointegration vectors and that the equation is integral. As for the statistic (maximum eigenvalue), it indicates that the statistical value of (41.28) is greater than the critical value of (33.87) and the probability value (prob=0.005) is less than 5%, which means rejecting the null hypothesis (r=0) and accepting the alternative hypothesis that there is a cointegrating vector and that the equation is integrated, which indicates the existence of a long-term equilibrium relationship between the study variables and that they are moving in the same direction in the long run despite the existence of some deviations in the short run.

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Given the non-stationary nature of the data at the I(0) level and its first-order integral I(1), and the established cointegration relationship between the study variables, the focus shifted to estimating the long-term relationship parameters. The Fully Modified Least Squares (FMOLS) methodology was employed. The significance of this methodology lies in its ability to provide efficient estimates that overcome the biases of ordinary least squares (OLS) resulting from autocorrelation and intravariateness.

Table (3) illustrates the results of these parameter estimations, which clarify the nature and direction of the relationship between the independent economic variables reflecting circular economy indicators and agricultural GDP.

Table (3) Estimated regression results for economic variables according to the FMOLS method

Dependent Variable: Y
Method: Fully Modified Least Squares (FMOLS)
Date: 08/05/26 Time: 13:08
Sample (adjusted): 2005 2025
Included observations: 21 after adjustments
Cointegrating equation deterministics: C @TREND @TREND^2
Long-run covariance estimate (Bartlett kernel, Newey-West fixed bandwidth = 3.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X1	0.188110	0.088607	2.122968	0.0521
X2	-15273.62	5828.178	-2.620650	0.0202
X3	747089.0	746946.0	1.000191	0.3342
X4	32010697	10079779	3.175734	0.0067
C	16347259	8530772.	1.916270	0.0760
@TREND	1198146.	397051.4	3.017609	0.0092
@TREND^2	-21365.22	11611.77	-1.839962	0.0871

R-squared	0.777779	Mean dependent var	4091109.
Adjusted R-squared	0.682542	S.D. dependent var	1525459.
S.E. of regression	859496.5	Sum squared resid	1.03E+13
Long-run variance	6.86E+11		

Source: Eviews 10 software output.

Interpretation of the Long-Run Fully Modified Least Squares (FMOLS) Model Results

Table (3) presents the results of the Fully Modified Least Squares model. The estimation results show good overall statistical significance for the model, as the modified model explains 68.25% of the

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changes in agricultural GDP in Iraq (Y). The remaining 32% is attributed to other factors not included in the model. The following is the economic interpretation of each independent variable:

1- Quantity of Treated Organic Fertilizer (X1)

The results showed a statistically significant positive effect of the quantity of treated organic fertilizer at a significance level of 10% ($p < 0.0521$, coefficient 0.1881). This positive effect is attributed economically to the fact that relying on treated organic fertilizer leads to improved soil fertility in the long term and increased microbial productivity. This, in turn, positively impacts agricultural crop productivity and its contribution to agricultural GDP, as well as reducing reliance on chemical fertilizers, which are costly and have harmful environmental effects.

2- Bioenergy Produced (X2)

This variable registered a statistically significant negative effect at the 5% level, with a p-value of 0.0202 and a coefficient of -15273.62. The economic explanation for this adverse result is attributed to the phenomenon of direct competition for agricultural resources. Expanding bioenergy production in Iraq may require reclaiming agricultural land, water resources, or crop residues that could be directly allocated to supporting food and livestock production. Furthermore, the initial investment and technological costs of bioenergy technologies are high compared to the direct added returns for the agricultural sector in the early stages.

3- Renewable Energy Percentage of Total Energy (X3)

The results showed a positive effect, but it was not statistically significant, with a p-value of 0.3342. This is explained economically by the fact that the agricultural sector in Iraq still relies primarily on subsidized traditional fossil fuels for its operational processes (such as water pumping, agricultural mechanization, and transportation). Consequently, the use of renewable energy technologies remains at initial and limited levels and has not yet reached the critical mass or operational level that would allow it to produce a tangible and sustainable impact. The structure of agricultural production and GDP.

4- Water Use Efficiency (X4)

The effect of water use efficiency was positive and statistically highly significant at the 1% significance level, with a p-value of 0.0067 and a coefficient of 32010697. This strong effect reflects the strategic importance of water resource management in Iraq, as increasing water use efficiency through modern irrigation technologies reduces water waste, allows for horizontal expansion of cultivated areas, and ensures the sustainability of production under conditions of water scarcity and climate change. This, in turn, increases the overall productivity of production factors and directly contributes to maximizing the value of agricultural GDP.

5- General and Non-Linear Trends (TREND and TREND^2)

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The general trend variable (TREND) showed a significant positive effect at the 1% level (0.0092), while the quadratic trend (TREND^2) showed a significant negative sign at the 10% level (0.0871). This economic behavior is explained by a non-linear curve that follows the law of diminishing returns, as the agricultural sector witnessed growth. While there has been positive technological development over time, the rate of this growth has begun to slow down in recent stages as a result of aging infrastructure and pressing environmental and climatic challenges.

Statistical Tests for Model Validity

The Jarque-Bera Normality Test

This test is used to ensure that the residuals follow a normal distribution, which is a fundamental requirement for guaranteeing the validity of the statistical tests used in the model. We observe from the results in Figure (1) that the value of the Jarque-Bera test is approximately (1.05) with a probability value of (0.58), which is significantly greater than the standard significance level (0.05). Therefore, we reject the alternative hypothesis and accept the null hypothesis, which states that the residuals are normally distributed. This means that the residuals of the estimated economic variables in the model follow a normal distribution, which is a good indicator of the quality and efficiency of the estimated model.

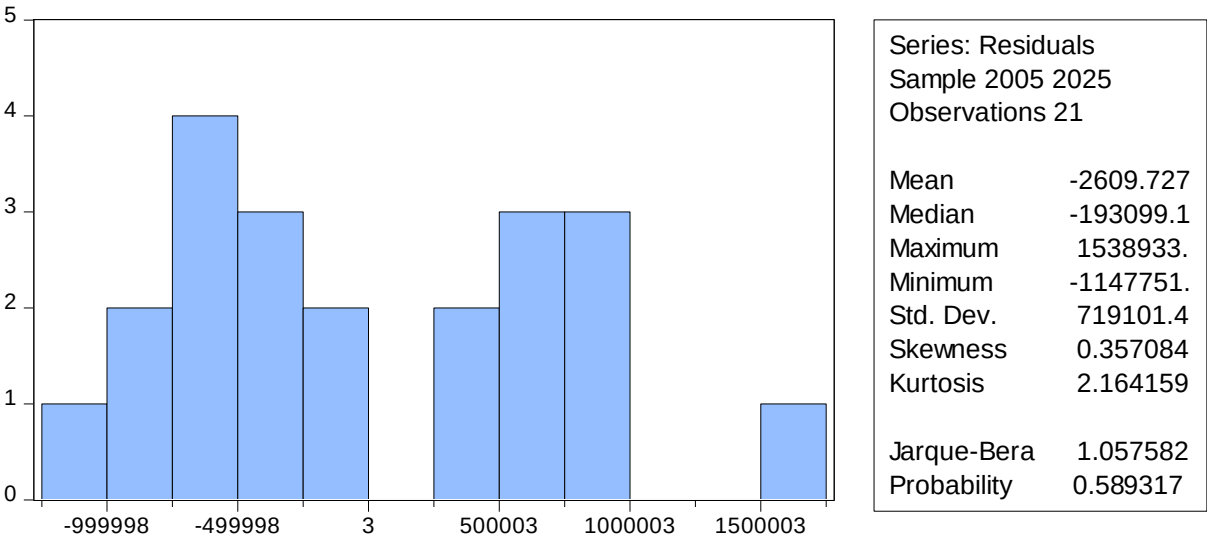


Figure (1) shows the normal distribution of residuals. Source: Prepared by the researcher based on the outputs of the (Eviews 10) program.

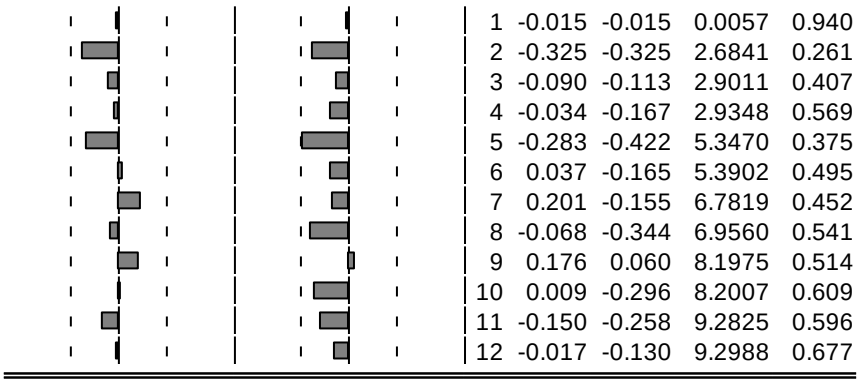
2- Autocorrelation coefficient of residuals (Q-statistics)

This test is used to validate the model and ensure it is free from the autocorrelation problem.

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Table (4) Results of the Q-statistics Autocorrelation Test

Date: 08/05/26 Time: 13:39
Sample: 2004 2025
Included observations: 21



Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
		1	-0.015	-0.015	0.0057	0.940
		2	-0.325	-0.325	2.6841	0.261
		3	-0.090	-0.113	2.9011	0.407
		4	-0.034	-0.167	2.9348	0.569
		5	-0.283	-0.422	5.3470	0.375
		6	0.037	-0.165	5.3902	0.495
		7	0.201	-0.155	6.7819	0.452
		8	-0.068	-0.344	6.9560	0.541
		9	0.176	0.060	8.1975	0.514
		10	0.009	-0.296	8.2007	0.609
		11	-0.150	-0.258	9.2825	0.596
		12	-0.017	-0.130	9.2988	0.677

*Probabilities may not be valid for this equation specification.

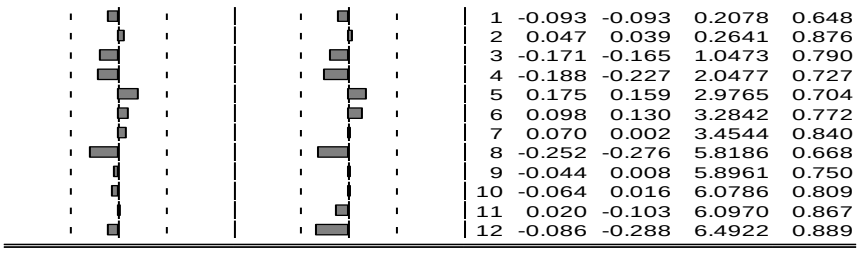
Source: Eviews 10 software output.

The results shown in Table (4) indicate that the autocorrelation coefficients for the residuals fall within the 95% confidence interval, and all probability values are greater than the significance level (0.05). Therefore, we reject the alternative hypothesis and accept the null hypothesis, which confirms that the model is free from the autocorrelation problem for the residuals.

3- Residuals Squared Test: This test is used to detect the instability of the residuals, i.e., to determine whether the residuals fluctuate stably or not, by examining the squares of the residuals.

Table (5) Residuals Squared Test for Economic Variables

Date: 08/05/26 Time: 13:11
Sample: 2004 2025
Included observations: 21



Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
		1	-0.093	-0.093	0.2078	0.648
		2	0.047	0.039	0.2641	0.876
		3	-0.171	-0.165	1.0473	0.790
		4	-0.188	-0.227	2.0477	0.727
		5	0.175	0.159	2.9765	0.704
		6	0.098	0.130	3.2842	0.772
		7	0.070	0.002	3.4544	0.840
		8	-0.252	-0.276	5.8186	0.668
		9	-0.044	0.008	5.8961	0.750
		10	-0.064	0.016	6.0786	0.809
		11	0.020	-0.103	6.0970	0.867
		12	-0.086	-0.288	6.4922	0.889

*Probabilities may not be valid for this equation specification.

Source: Eviews 10 software output.

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We note from the results of the standard test shown in Table (5) that all the probability values for all of the slowing periods are much greater than the significance level (0.05). Therefore, we reject the alternative hypothesis and accept the null hypothesis, which states that the model is free from the problem of instability of variance, that is, the variance or dispersion of the random variable is constant or homogeneous. Thus, we obtain what is called (homogeneity of variance) for the economic variables.

Conclusions

1. The study's hypothesis, which states that circular economy applications and practices have a statistically significant positive impact on enhancing and developing agricultural output indicators (quantitatively and qualitatively) in Iraq and the countries under study in the short and long term, was confirmed.

2. Investment in treated organic fertilizers constitutes a strategic driver for sustainable agricultural growth.

3. The lack of significance in renewable energy in Iraq indicates a stagnation in the green transition due to distorted price structures and government subsidies directed towards fossil fuels.

4. Water use efficiency is the pivotal and most influential factor in increasing agricultural output in both Iraq and Syria, reflecting the high vulnerability of these two countries to climate risks and water scarcity.

5. The presence of a non-linear slowing trend (TREND^2) in the Iraqi model demonstrates that cumulative agricultural growth suffers from the law of diminishing returns due to the aging of environmental infrastructure.

Recommendations

1. Support organic fertilizer inputs: Establish regional and local factories to recycle agricultural and animal waste and convert it into high-quality organic fertilizers, while providing tax incentives for manufacturers.

2. Regulate bioenergy projects: Implement specific regulations to ensure that crops and food products are not used in bioenergy production, limiting their use to waste and refuse unfit for consumption in Iraq.

3. Establish a green finance fund: Create interest-free, low-interest loan funds for farmers to purchase and install renewable energy systems, reducing the initial capital investment burden.

4. Restructure subsidy policies: Gradually phase out subsidies on fossil fuels used in agricultural operations in Iraq and direct the available funds towards supporting solar and wind energy technologies for irrigation.

5. Transition to modern, closed irrigation systems: Inject substantial government investments in Iraq to convert open irrigation canals into closed pipe networks to maximize water use efficiency.

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Appendices: Data on agricultural GDP and green economy indicators in Iraq for the period 2004-2025

X4	X3	X2	X1	Y	Year
0.09	0.4	1445	9405225.8	1522541	2004
0.08	2.4	1481	12295290	2125913	2005
0.07	2.6	1516	14549581	2230290	2006
0.06	2	1550	14806414	2809267	2007

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0.09	1.1	1584	12194442	2292039	2008
0.1	1.2	1617	14609557	3270673	2009
0.1	1.7	1663	15672689	4047897	2010
0.1	1.1	1710	16445264	5527377	2011
0.13	1.3	1758	16659694	5950335	2012
0.14	1.5	1807	15977249	7308920	2013
0.13	1	1856	15005862	6473564	2014
0.12	0.8	1935	13062589	3135634	2015
0.07	0.9	1938	13306278	3046229	2016
0.08	0.5	1982	14098385	2829149	2017
0.07	0.5	2088	14800273	2812973	2018
0.09	0.9	2008	17216540	5091660	2019
0.05	1.1	2039	17913236	6236120	2020
0.03	1.1	2190	25071083	4106249	2021
0.04	1.1	2220	27150634	3475136	2022
0.035	1.1	2230	25592359	3813035	2023
0.0375	1.1	2230	26371496	4949541	2024
0.03625	1.1	2230	25981928	4381288	2025

Sources: This data is obtained from governmental and international sources, such as the Ministry of Agriculture, the Ministry of Planning/Central Statistical Organization (in Iraq), the Food and Agriculture Organization of the United Nations (FAO), the World Trade Organization (WTO), and electronic sources.

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