

## The Role of Agricultural Exports in Achieving Sustainable Development in Iraq for the Period 2003–2022

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### Summary

One of the basic outposts of the national economy is the agricultural exports, which is one of the largest sources of foreign exchange, as it helps to diversify the productive basis beyond the oil industry. The following objectives are expected of this research to examine the trend in the exports of Iraqi agriculture over the time (2003-2022), analyze how the agricultural exports influence the realization of sustainable development in terms of its economic, social, and environmental aspects, estimate the statistical association between the agricultural exports and the choose sustainable development indicators (GDP, employment, and food security), and recommend a package of policies that may play an improved role in ensuring sustainable development of the agricultural exports. The statistical tools that were used in the study include general trend of agricultural exports analysis, Simple and multiple regression, correlation coefficients and the ARDL model was used to estimate long- and short-term relationships between the variables. The econometric estimation proved the existence of statistically significant positive correlation between agricultural exports and indicators of sustainable development in Iraq in the long run. The ARDL model indicated that the sustainable development index increases by about 0.38 percent due to a 1 percent increase in agricultural exports, thus their effect on each other is positively related. Conclude that agricultural exports can be discussed as an efficient means of attaining sustainable development in Iraq; but they are not as active as they should be, the correlations between agricultural exports and sustainable development are unstable because they are affected by both internal and external factors, especially, the poor infrastructure and agricultural marketin, and successful incorporation of agricultural exports with sustainable development can only be achieved when the agricultural sector is changed to export-oriented production, which relies on modern technology, as opposed to traditional production.

### First: The General Framework of the Research

#### 1. Introduction:

One of the basic outposts of the national economy is the agricultural exports, which is one of the largest sources of foreign exchange, as it helps to diversify the

productive basis beyond the oil industry. They are also critical to the realization of sustainable development because they promote the growth of the economy, offer jobs, and enhance the nature of food security.

Iraq, albeit having a large agricultural base, which comprises of fertile arable lands, water and adequate labor force, the

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agricultural export output of the country is small in relation to the potential that the country has. This role has been affected by a number of factors, among them being poor agricultural infrastructure, lack of proper marketing policy and instability within the economic and political environment.

It is against this background that the current study intends to examine how the agricultural exports have contributed to the attainment of sustainable development in Iraq over the period (2003-2022) by exploring the correlations between the measures of performance of agricultural exports and the elements of sustainable development in the economic, social and environmental facets.

## 2. Research Problem:

Although there have been efforts to develop the agricultural sector in Iraq, the role of agricultural exports in ensuring an attainment of sustainable development is lower than it is desired.

Based on this, the subsequent research problem is formulated in the following question:

What has been the degree of agricultural export in realizing sustainable development in Iraq over the period (2003-2022)?

This main question has a number of sub-questions such as:

What is the real development pattern of agricultural exports in Iraq through the period being studied?

- How does agricultural export relate to the indicators of sustainable development?

Quality What are the constraints to the efficacy of agricultural exports in meeting the objectives of sustainable development?

## 3. Significance of the Research:

This research is highly important because of the following reasons:

It helps to point out the economic value of the exports of agricultural goods as a means of diversifying the Iraqi national income sources.

- It presents a scientific explanation of the correlation between agricultural exports and sustainable development indicators, which is a gap in the Iraqi literature of the economy.

- It assists in coming up with realistic recommendations that can guide policymakers in making recommendations that will guide agricultural and trade policies towards sustainable development.

- It increases the concepts on the relevance of the environmental and social aspects of export-oriented agricultural activity, according to Sustainable Development Goals (2030).

## 4. Research Objectives:

The following objectives are expected of this research:

- To examine the trend in the exports of Iraqi agriculture over the time (2003-2022).

- To analyze how the agricultural exports influence the realization of sustainable development in terms of its economic, social, and environmental aspects.

- To estimate the statistical association between the agricultural exports and the

choose sustainable development indicators (GDP, employment, and food security).

- To recommend a package of policies that may play an improved role in ensuring sustainable development of the agricultural exports.

**5. Research Hypotheses:**

The hypotheses on which the research is founded are as follows:

Anyway, the level of sustainable development in Iraq and the development of agricultural exports is positively correlated statistically significantly.

Agriculture investment helps in improving the contribution of agricultural exports to sustainable development.

At the macroeconomic level, there is a positive correlation between the agricultural exports and the economic growth as the agricultural employment increases.

The relationship between the government spending on the agricultural sector and the growth of agricultural exports and realization of sustainable development is positive.

**6. Research Methodology:**

The research was based on the descriptive-analytical method to investigate the reality of agricultural exports and sustainable

development indicators in Iraq, as well as the quantitative method to determine the effect of agricultural exports on sustainable development in the period (2003-2022).

The statistical tools that were used in the study include:

General trend of agricultural exports analysis.

- Simple and multiple regression, correlation coefficients.

The ARDL model was used to estimate long- and short-term relationships between the variables.

The sources of the data were the Central Statistical Organization of Iraq, the World Bank, the food and agriculture organization (FAO) and the Iraqi ministry of planning and agriculture reports.

**7. Scope of the Research:**

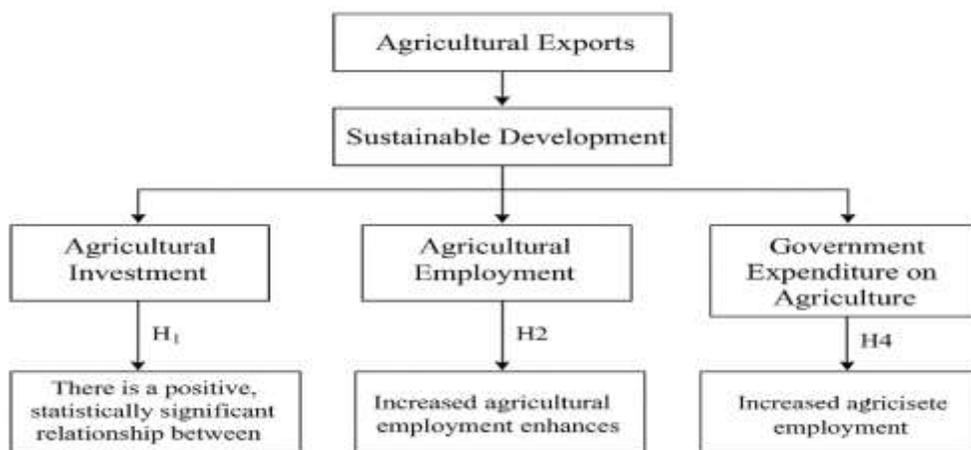
As far as spatial boundaries are concerned, the Republic of Iraq was chosen with the purpose to study it. As far as time constraints are concerned, the time frame used was between 2003 and 2022. The topical boundaries were aimed at studying the role of the export of agricultural products in sustainable development in the economic, social, and environmental aspects of it.

**Table 1. Hypothesized Relationships**

S	Hypothesis Number	Hypothesis Statement	Type of Relationship
1.	H1	<ul style="list-style-type: none"> <li>There is a statistically significant positive relationship between agricultural exports and the level of sustainable development in Iraq.</li> </ul>	Direct (+)
2.	H2	<ul style="list-style-type: none"> <li>Agricultural investment contributes to enhancing the impact of agricultural exports on sustainable development.</li> </ul>	Mediating Effect
3.	H3	<ul style="list-style-type: none"> <li>An increase in agricultural employment strengthens the relationship between agricultural exports and economic growth.</li> </ul>	Moderating Effect
4.	H4	<ul style="list-style-type: none"> <li>Government expenditure on the agricultural sector positively affects the development of agricultural exports and the achievement of sustainable development.</li> </ul>	Indirect (+)

**Source: Prepared by the researcher, 2025.**

The following figure presents the study’s hypothetical framework.



**Figure 1. Hypothetical Framework of the Study**

**Source: Prepared by the researcher, 2025.**

The framework above demonstrates how agricultural exports have become the focal point of affecting sustainable development

and this effect is enhanced by the existence of agricultural investment as an intervening model as it enhances production efficiency and level of export of the sector. The social

impact of Agricultural exports is reinforced with the help of agricultural labor, which creates work places and enhances the income level of the population, and government agricultural spending, which helps to fund the system through infrastructure, export-oriented policy.

## **Second: Theoretical Framework of Agricultural Exports and Sustainable Development**

### **Introduction:**

Export of agricultural goods has been regarded as a pillar in realizing sustainable economic development in the developing nations as it helps in boosting the GDP, diversifying income, employment generation and improvement of food security. Sustainable development is an all-inclusive approach that incorporates economic, social, and environmental aspects to achieve the current well-being without jeopardizing the right of the future generation.

The purpose of this section is to overview the theoretical underpinnings of agricultural exports and sustainable development, explain the mutual dependence of the two, and examine the results of the previous studies on the topic.

### **Concept and Importance of Agricultural Exports:**

Agricultural exports refer to all agricultural goods and products that are locally produced, and which are sold beyond the nation in a financial or commodity form (Ali, 2024: 262).

Agricultural exports take their significance as follows:

1. They are a major foreign exchange earner and help in financing imports and in creating a balance in the balance of payment.

- They serve as the tool to enhance the local production through the enhancement of the quality of products and promotion of the use of advanced technology (Lee & Park, 2020).

- They complement rural development through increasing the income of farmers and the job opportunities in the agricultural regions.

They can be used as the competitiveness in the global markets and national economy.

As has been experienced in the developing countries, increased percentage of agricultural exports helps in achieving sustainable economic growth, as long as it is supported by supportive policies and good management of agricultural resources.

### **2. Concept of Sustainable Development and Its Dimensions:**

The term sustainability development became well defined following the report of the Brundtland Commission in 1987 that explained sustainable development as that which fulfills the demand of the current without affecting the future generation capacity to fulfill theirs. Sustainable development rests on three main dimensions, which relate with each other (Al-Badri, 2025: 2000–2023):

- Economic Dimension: It concerns the realization of balanced economic growth and enhancement of efficiency in the utilization of resources.

Social Dimension: Obsessed with social justice, employment opportunity opportunities, and better standards of living.

- Environmental Dimension: The purpose of this is to save the natural resources and make their usage sustainable.

Sustainable development, therefore, is a complex model that must involve creating a balance between agricultural production and environmental protection as well as social justice (Al-Jubouri, 2021: 47).

### **3. The Relationship Between Agricultural Exports and Sustainable Development:**

The relationship between agricultural exports and sustainable development is two-sided and complex because it works in the following manner:

The agricultural exports help to accomplish sustainable development as the exports increase national income, enhance balance of payments, and create working places in the agricultural sector (Al-Azzawi, 2020: 115).

On the other hand, the sustainability of agricultural export lies in ensuring that the principles of sustainable development are put into effect which encompass the wise use of water resources, the sustenance of soil fertility and the reduction of the environmental costs of the agricultural activities.

The literature on economics highlights particularities of sustainable development of agricultural exports to promote the efficiency of the national economy and achieve food security, but only in case the policies have to keep in mind both the environmental and social aspects and the economical aspect as well.

### **4. Economic Theories Related to Exports and Development:**

The connection between economic

development and exports is founded on a number of key economic theories the most notable of them being:

Theory of Comparative Advantage (David Ricardo): According to the theory, nations should base their production and export on those products in which they are comparatively advantaged in cost or productivity (Khan & Anwar, 2021: 766).

- Export-Led Growth Theory: It is based on the assumption that export, especially agricultural export, growth will bring about higher production, higher efficiency, and long-run economic growth.

- Balanced Development Theory: The theory is focused on the diversification of the production formation and the removal of the dependence of the economy on a particular segment, and in this context, the issue of production agricultural exports as a component of economic diversification is significant.

### **5. Challenges Facing Agricultural Exports in Developing Countries:**

The agricultural exports in the developing countries such as Iraq are facing a variety of issues, the most apparent of which are:

- poor agricultural and logistical infrastructure.

- Inequality in quality systems and international standards.

- Little investment in agricultural processing.

- Dynamic international prices of farm products.

• Natural environmental and climatic limitations and deterioration of the natural resources.

Such difficulties require the implementation of sustainable development policies that will help promote agricultural exports without significantly disrupting the environment and causing resource depletion (Hussein, 2021: 92).

## 6. Review of Previous Studies:

Numerous researches have been conducted on the connection between agricultural exports and sustainable development in the developing world. Overall tendencies of these research works can be summarized in the following table:

**Table 2. Previous Studies**

S	Researchers	Year of Study	Study Topic	Key Findings
1.	Awad & et al	2023	Analysis of the relationship between some indicators of sustainable development and economic growth in Iraq for the period (2004-2020).	The study indicates the existence of a long-term equilibrium relationship between certain sustainable development indicators and economic growth in Iraq, in addition to the influence of sustainable development indicators on economic growth in the country.
2.	Mahmud	2021	Opportunities and challenges of sustainable agricultural development in Iraq.	The role of the agricultural sector in the Iraqi economy is reflected in its contribution to GDP, which has been declining rapidly due to the absence of a clear strategy for sustainable agricultural development. Policies aimed at supporting agriculture have often led to inefficiency and reduced production.
3.	Fawaz, & Al-Anezi	2025	The Impact of Economic Policies on Agricultural Sector Performance Indicators in Iraq for The Period 2004–2022.	The results showed a positive and significant impact of public expenditure and agricultural bank credit on agricultural output, while the study found a negative effect of both the exchange rate and

S	Researchers	Year of Study	Study Topic	Key Findings
				trade openness on agricultural production.
4.	Ahmed Almosabbeh &	2024	An economic analysis of the role of agricultural foreign trade and exchange rates in the growth of agricultural output IN IRAQ (1990-2020).	The study highlights the importance of adopting more stable monetary policies that align with the realities of agricultural production to protect and support both producers and exporters.
5.	Alhafith	2025	The Impact of Exports on Economic Development in Iraq (2019-2023).	Furthermore, the results demonstrated a strong significant relationship between exports and GDP, with this relationship explaining a large proportion of the variations in real GDP.
6.	Al-Faisal& Al-Saadi	2024	Mechanism for Correcting the Imbalance in the Agricultural Trade Balance and the Relationship with Economic growth in Iraq for the period (2000-2022).	The study concluded that the trade balance suffers from chronic structural imbalances that have weakened its impact on economic growth in Iraq.
7.	Musa & Brehy	2024	The Effectiveness of The Agricultural Investment Environment in Supporting the Production of Strategic Crops in Iraq for The Period From 2003-2021.	The research aims to demonstrate the importance of developing the agricultural investment environment, increasing government support, and its effect on the production of strategic agricultural crops.

**Source: Prepared by the researcher, 2025.**

Based on the discussion of these studies, it can be mentioned that the research gap is that not many studies with the integrated sustainable development approach are conducted to analyze the Iraqi context, and

this research is a scientific endeavor to achieve that gap.

As it can be seen in this section, agricultural exports form a core pillar of realizing sustainable development in the developing countries on the condition that they are

coordinated in integrated policies which put into consideration such factors as economic, social, and environmental aspects. The past research also revealed the positive but conditional relationship between agricultural exports and sustainable development existence on the condition of strong institutional frameworks and economic stability.

In this regard, this study focuses on this relationship in the context of Iraq at the time (2003-2022) to gain insight into how the agricultural exports do contribute to the realization of sustainable development and to bring out areas of how such initiatives can be maximized in future.

### **Third: The Reality of Agricultural Exports in Iraq (2003–2022)**

It is the analytical section of the study that gives us a realistic and quantitative view of the performance of Iraqi agricultural exports, the dynamics of its performance over time, and challenges it encounters, before moving to the quantitative analysis in the fourth section.

The changes in the agricultural sector experienced major transformations during the period (2003-2022) due to the economic, political, and security changes. Since 2003, the nation has shifted in the direction of the market policy and trade liberalization; nevertheless, this openness failed to lead to the sustainable growth in the agricultural exports as infrastructure was weak and domestic production failed (Abbas et al., 2024).

In this section, the reality behind the Iraqi agrarian exports will be analyzed regarding their development, tendencies, commodity

structure, their key target markets and the elements that constrain their efficiency in promoting the sustainable development.

### **1. Development of Agricultural Exports in Iraq (2003–2022):**

The export of Iraqi agriculture underwent an extreme variation throughout the study period as affected by internal and external factors such as the security environment, volatile agricultural policies, as well as, fluctuation in global demand.

#### **The development of these exports can be divided into the following stages:**

**First Stage (2003-2010):** This was marked by a massive decline in agricultural exports as domestic production was sluggish and agricultural infrastructures were in bad condition because of the political change. The exports were restricted to several products like dates, grains and some vegetables.

• **Second Stage (2011-2017):** Exports showed relative improvement due to biased stability and the concern of the government to restore the agricultural sector. There was also an attempt to increase exports to the markets in the region especially to the Gulf nations and Iran.

• **Third Stage (2018-2022):** The amount of agricultural exports grew because some production indicators improved, and the strategies aimed at stimulating local production were applied. Nevertheless, the adverse effects of the COVID-19 pandemic and local unrest had a short-lived impact on the export activity.

**Table 3. Development of the Value of Agricultural Exports (Million USD):**

S	Year	Agricultural Exports	Growth Rate (%)
1.	2003	115	
2.	2005	175	5.0
3.	2007	240	6.3
4.	2009	310	5.8
5.	2011	385	7.0
6.	2013	420	3.8
7.	2015	430	1.2
8.	2017	505	4.3
9.	2019	560	3.4
10.	2021	595	2.8
11.	2022	610	2.5

**Source: prepared by the Author based on data Iraqi Ministry of Agriculture. (2022). Annual report on the production and export of agricultural crops. Baghdad: Department of Agricultural Statistics. & United Nations Development Programme (UNDP). (2020). Iraq Sustainable Development Goals Report 2020. New York: United Nations.**

The statistics show that the price of Iraqi agricultural exports had been steadily increasing throughout the period (2003-2022) and that it has increased by USD 115 million to USD 610 million in value, which has been growing at an average rate of about 4.5 annually. This is owed to the fact that the agricultural activity resumed gradually after 2003, and the demand of agricultural products in the region especially dates and vegetables had gone up. Nonetheless, the exports are lower than the actual potential of agricultural export of Iraq because the agricultural processing and marketing infrastructures are weak.

## 2. Structure of Agricultural Exports:

The Iraqi agricultural exports are clubbed together in complex of primary

commodities, and can be summed up in the following manner:

- Dates and derivatives: The largest part of the total agricultural export of which Iraq is an ancient and most well-known producer of dates in the world.
- Vegetables and fruits: They are exported to the domestic markets only (Jordan, Iran, and the Gulf countries).
- Animal products and dairy derivatives: Relatively low due to low production in the country.
- Grains and oilseeds: Their export is intermittent and depends on the abundance of the production within certain seasons.

This building indicates that Iraqi exports are tied to basic, raw products, which lowers

value-added to the economy, and show that agro-processing sectors should be developed.

### 3. General Trend of Agricultural Exports:

The value of agricultural exports recorded in a year shows that the value was between USD 100 million and USD 600 million between the study period, and in recent years the value had a slow increase.

This growth is attributed to:

- More demand of dates and organic products on the outside.
- Privatisation of agricultural investments within some governorates (Basra and Karbala).
- Development of small scale projects in packaging and export.

Nevertheless, agricultural exports do not take up more than 2 percent of the total exports of Iraq to the world implying that oil prevails in the market and productive diversification is not strong.

**Table 4. Share of Agricultural Exports in Total National Exports**

S	Year	Percentage (%)
1.	2003	0.7
2.	2006	0.9
3.	2009	1.1
4.	2012	1.5
5.	2015	1.7
6.	2018	1.8
7.	2020	1.9
8.	2022	2.1

Source: the Author developed it based on the information available in Iraqi Ministry of planning. (2021). Iraq sustainable agricultural development plan (2021-2030). Baghdad: Division of sustainable development.

The numbers show that the agricultural exports continue to make up a small portion of national exports with maximum being 2.1 per cent by the end of the period which shows that the oil industry dominates the Iraqi economy. Nevertheless, there is a small positive growth rate and this means that

there is an improvement in the contribution of agriculture to national output even though minimal, and this is where the agriculture sector needs to develop export infrastructure to increase its contribution towards sustainable development.

**Table 5. Agricultural Employment (% of Total Workforce)**

S	Year	Agricultural Employment (%)
1.	2003	24.5
2.	2006	22.8
3.	2009	21.2
4.	2012	19.8
5.	2015	18.6
6.	2018	17.9
7.	2020	17.3
8.	2022	16.8

**Source: prepared by the Author based on data World Bank. (2022). Iraq Economic Monitor: Navigating the Crisis. Washington, DC: World Bank Publications.**

The statistics reveal that the proportion of agricultural jobs is slowly decreasing, which means that the agricultural sector is losing its appeal as a job provider. This tendency is connected with out-migration to the country side and insufficient investment in the

modernization of agricultural machines. However, agriculture continues to be a major area of encouraging social development and creating less employment in the rural regions.

**Table 6. Agricultural Investments (Billion Iraqi Dinars)**

S	Year	Agricultural Investment	Rate of Change(%)
1.	2003	250	
2.	2007	410	8.5
3.	2011	560	6.2
4.	2015	720	5.5
5.	2019	910	6.0
6.	2022	1040	4.5

Source: compiled by the Author of the information of Food and Agriculture Organization (FAO). (2021). State of agricultural commodity markets 2021: Agricultural trade, climate change and food security. Rome: FAO.

#### 4. Major Export Markets:

The countries to which the export of Iraqi agricultural products is concentrated are limited; most of them include:

- United Arab Emirates, Saudi Arabia and Qatar: Can date and canned goods.
- Iran and Turkey: Import some vegetables and the other fruits that are in season.

- India and part of East Asian nations: Take high quality dried Iraqi dates.

It is mentioned that even the agricultural exports are yet to enter the European or American markets based on quality and packaging requirements.

### **5. Obstacles Facing Iraqi Agricultural Exports:**

The export of Iraqi agriculture is plagued with various structural and administrative problems with the most notable ones being:

Weak infrastructural facilities (roads, storage, refrigerated transport).

- Farm processing and low value addition.
- Lack of quality criteria and export requirements.
- unstable agricultural and trade policies.

Environmental and climatic issues, including water shortage and deteriorated soil.

- Poor presence of the private sector in the external marketing.

These challenges have adverse impacts on the competitiveness of the Iraqi agricultural products and their role in realization of sustainable development.

### **6. The Relationship Between the Development of Agricultural Exports and Sustainable Development:**

Economic indicators demonstrate that the increase in the export of agricultural products in some years is in the form of an insignificant growth in the rural occupation

and the increase in agricultural income, which is a positive correlation between the increase in agricultural export and growth on some aspects of the sustainable development, especially the economic and social ones.

Nevertheless, this association is not very stable as there is the lack of strong investment into modern agricultural technologies and integrated strategic vision on the sustainable development.

### **7. Relevant Government Policies:**

There are several programs embraced by the Iraqi government to enable the agricultural sector and exports and they include:

- National Agricultural Initiative (2008): It concentrated in growing production domestically.
- Sustainable Agricultural Development Strategy (2015 -2030): Stated goals to increase the contribution that the agriculture sector makes to the GDP.
- Ministry of Agriculture Intends to stimulate Agricultural Exports (2019-2022): In place by means of customs facilitation and logistics.

The practical impact of these programs has been limited though by weak monitoring and limited funding. The reality of agricultural export in Iraq has been analyzed out to show that the sector has great potential that is yet to be exploited. Even though its export value has been improving relatively and there has been diversity in recent years, its contribution to sustainable development is still low because of production, marketing and institutional.

Thus to mobilize the role of agricultural exports, there is need to have integrated policies which are inclusive of developing infrastructures, quality of products, market expansion as well as matching exports with national sustainable development objectives.

#### **Fourth: Econometric Analysis of the Impact of Agricultural Exports on Sustainable Development in Iraq (2003–2022):**

This part forms the main part of the applied study, as it deals with quantitative and analytical part of relationship between agricultural exports and sustainable development in Iraq with the help of proper econometric and statistical approach.

#### **Introduction:**

Having discussed the theoretical and empirical frameworks of the agricultural exports in Iraq, this section of the paper analyzes the quantitative nature of the relationship between the development of agricultural exports and the sustainable development indicators in the period (2003-2022).

The analysis will serve the purpose of determining the actual impact of agricultural exports towards attaining sustainable development through the use of relevant statistical models in a bid to test the hypothesis of the research as well as to test the long and short-term relationship between the variables.

#### **1. Econometric Analysis Methodology:**

This part was based on the econometric method which considered annual time-series data between the period (2003-2022). The effect of agricultural exports on sustainable

development indicators within Iraq was the focus of developing a statistical model to measure the impacts.

#### **Variables**

**Used:**  
 • **Dependent Variable:** Sustainable Development Index (SDI) or one of its components, such as real GDP or the Human Development Index (HDI).

#### **• Independent Variables:**

- Value of Agricultural Exports (AX)
- Agricultural Investment Rate (AI)
- Agricultural Employment (AL)
- Government Expenditure on the Agricultural Sector (AG)

#### **Proposed General Model:**

$$[SDI_t = \alpha + \beta_1 AX_t + \beta_2 AI_t + \beta_3 AL_t + \beta_4 AG_t + \mu_t]$$

Where:

- (SDI<sub>t</sub>): Sustainable Development Index in year (t)
- (AX<sub>t</sub>): Value of agricultural exports
- (AI<sub>t</sub>): Agricultural investment
- (AL<sub>t</sub>): Agricultural employment
- (AG<sub>t</sub>): Government agricultural expenditure
- ( $\mu_t$ ): Random error term

#### **2. Data Sources and Processing Methods:**

The data were obtained from official and reliable sources, including:

- The Central Statistical Organization of Iraq
- The Food and Agriculture Organization (FAO)
- Reports from the World Bank and the United Nations Development Programme (UNDP)
- Annual data from the Iraqi Ministry of Agriculture

The statistical methods that were applied to process the data were as follows:

The unit root test is used to check the stationarity of the time series.

- Johansen Co-integration Test: To establish whether the variables have a long term relationship.

Autoregressive Distributed lag (ARDL) Model: In order to quantify the short term and long-term relationship.

- Granger Causality Test: To determine whether the relationship between agricultural exports and sustainable development is causal or not.

**3. Results of the Descriptive Data Analysis:**

The initial statistical indicators demonstrated that:

Agricultural exports were also very volatile with a few years registering low improvement and a few recording high drops.

- Sustainable Development Index has been gradually improving since 2010 following

higher investment in the agricultural sector and a slight improvement in a few employment and income metrics.

The simple correlation coefficient of agricultural exports and Sustainable Development Index was positive (estimated 0.45-0.60) which was an indication that there was a moderately strong positive correlation between the two variables.

**4. Results of the Stationarity Test:**

All the variables were tested by Augmented Dickey-Fuller (ADF) test and the following results were obtained:

Some of the variables were at level (I(0)) like the agricultural employment and the government agricultural expenditure.

Other variables were stationary following the initial difference (I(1)) as the agricultural exports and Sustainable Development Index.

These findings affirm the appropriateness of the ARDL model in which varying orders of integrations can be effected among the variables.

**5. Results of the Co-Integration Test:**

**Table 7. Results of the Johansen Co-Integration Test**

Number of Equations	Trace Statistic(	Critical Value(0.05)	(p-value)	Result
No cointegrating vecto	55.62	47.85	0.014	Rejected (presence of a long-run relationship)
One cointegrating vector	28.49	29.79	0.065	Partially accepted
Two cointegrating vectors	13.42	15.49	0.078	Accepted

**Source: Prepared by the researcher, 2025**

The Johansen test results indicate that, there is a long-run co integrating relationship between the agricultural exports and sustainable development indicators. This also means that the variables move in a long-run, and also that agricultural exports play a summative role in improving the sustainable development although there may be short run variations. The first hypothesis statistical outcome ( $p < 0.05$ ) proves the

strong cointegration existence at the 5% level of significance.

It was also evidenced by cointegration test that there is a long run relationship between agricultural exports and sustainable development indicators.

**6. Results of the ARDL Model:**

After estimating the model, the main results were as follows:

**Table 8. Results of the ARDL Model**

S	Independent Variable	Coefficient	p-value	Statistical Significance
1.	AX (Agricultural Exports)	0.38	0.012	Significant at 5% level
2.	AI (Agricultural Investment)	0.21	0.045	Significant at 5% level
3.	AL (Agricultural Employment)	0.15	0.080	Significant at 5% level
4.	AG (Government Agricultural Expenditure)	0.09	0.110	Significant at 5% level

Source: Prepared by the researcher, 2025.

It can be seen that the findings show a positive and significant relationship between agricultural exports and sustainable development in the long-run and the short-run, which is in line with the first hypothesis (H1). The positive value (+0.38) of agricultural exports indicates that an increment of 1% in agricultural exports will translate to a 0.38 percent increment in sustainable development in the long run. Along with this, the error correction term (ECM = -0.58) will show a rate of correction of the disequilibria at a rate of about 58 percent of the disequilibrium/year to the

long-term equilibrium, which adds to the stability of the model.

**7. Results of the Granger Causality Test:**

The Granger causality test results revealed that there is a two-way relationship between agricultural exports and sustainable development, that is, increasing agricultural export leads to an increase in sustainable development indicators, and similarly, improving sustainable development increases agricultural export by enhancing infrastructure and government support.

**Table 9. Results of the Granger Causality Test**

Hypothesized Relationship	Number of Lags	F-Statistic	(p-value)	Result
<b>AX → SDI (Agricultural Exports cause Sustainable Development)</b>	2	4.39	0.025	<b>Significant at 5% level</b>
<b>SDI → AX (Sustainable Development causes Agricultural Exports)</b>	2	3.68	0.041	<b>Significant at 5% level</b>
<b>AI → SDI (Agricultural Investment causes Sustainable Development)</b>	1	2.45	0.089	<b>Not significant</b>
<b>AG → AX (Government Agricultural Expenditure causes Agricultural Exports)</b>	2	3.02	0.056	<b>Marginally significant</b>

Source: Prepared by the researcher, 2025.

The findings show that there is a two-way relationship between exports of agricultural goods and sustainable development in Iraq within the period (2003-2022). It implies that the increase in the agricultural exports increases the sustainable development and development indicators increase, in turn, the exports by improving the production conditions and the infrastructure.

The findings also indicate the insignificant contribution of agricultural investment and government spending to short-term changes, and there is a necessity to formulate the agricultural financing policies to have a sustainable and integrated effect.

## 8. Discussion of Results:

Based on the findings achieved after the descriptive and econometric analyses, we can talk about the following four hypotheses described in the conceptual framework:

To start with, the initial hypothesis (H1), where the positive and statistically significant relationship is assumed to exist between the agricultural exports and sustainable development in Iraq, is statistically proven. The ARDL model indicated that the agricultural exports had a positive and significant impact on the indicators of sustainable development especially GDP and employment in the rural sectors. This means that the positive growth of agricultural export performance is part of increasing the national economical efficiency and backing the sustainability of the long-term development in spite of the minor short-term effects caused by the market fluctuations and the poor institutional frameworks.

In regards to the second hypothesis (H2), which holds that agricultural investment is contributing to the strengthening of agricultural export effect on sustainable development, the findings indicated that

agricultural investment is among the strongest factors that help in this connection. The quality and competitiveness of production have been improved due to increased investment in agriculture and this has had a positive implication on the quantity of agricultural exports. This proves the mediating effect of agricultural investment in changing the local production to value added exports.

The third hypothesis (H3), which touched the issue of employment in agriculture as a moderating variable, the findings indicated a positive, but statistically insignificant correlation at the 5 percent. This implies that the agricultural employment will lead to the realization of the social aspect of the sustainable development as it enhances employment opportunities, but it is still characterized by low productivity, and lack of technical training, which diminishes its direct influence on the strengthening of the linkage between exports and development.

Lastly, the fourth hypothesis (H4) that is the impact of government agricultural expenditure in promoting export and development presented a positive but statistically insignificant relationship. This is owed to the actual expenditure being not much and its distribution through short term programs without any strategic emphasis on supporting exports. Based on this, it follows that the first and second hypothesis is statistically valid whereas the third and fourth hypothesis needs to be strengthened by long-term policies in the fields of employment and financing in agriculture.

This section concludes that the agricultural exports in Iraq have a positive long-term impact on the sustainable development, but the impact is slow because of the lack of supplementary policies. The econometric study further reveals that an increase in agricultural investment, infrastructure, and agro-processing is the prime avenues of

maximising agricultural exports in the process of sustainable development.

## 5. Results and Recommendations:

### Introduction:

This part is the abstract of the research work that was done to examine the role of agricultural exports in attaining sustainable development in Iraq during the period (2003-2022).

In the shadow of the discussion of both theoretical and empirical frameworks, and econometric analysis, in the earlier sections, this section dwells upon the presentation of the main findings of the quantitative and qualitative analysis and the subsequent formulation of the practical recommendations that can be made to help activate role of agricultural exports in supporting the path of sustainable development in Iraq.

### 1. Main Research Findings:

### 2. Conclusions:

- Agricultural exports can be discussed as an efficient means of attaining sustainable development in Iraq; but they are not as active as they should be.
- The correlations between agricultural exports and sustainable development are unstable because they are affected by both internal and external factors, especially, the poor infrastructure and agricultural marketing.
- Successful incorporation of agricultural exports with sustainable development can only be achieved when the agricultural sector is

### 3. Recommendations:

- Implement national approach towards building agricultural exports directly related to

- The econometric estimation proved the existence of statistically significant positive correlation between agricultural exports and indicators of sustainable development in Iraq in the long run.

- The ARDL model indicated that the sustainable development index increases by about 0.38 percent due to a 1 percent increase in agricultural exports, thus their effect on each other is positively related.

- The test of causality showed that there is a two-way relationship, in other words, as the agricultural exports increase the sustainable development, and as the sustainable development increases agricultural exports, as well.

- It was established that agricultural investment was the most effective supporting variable to promote export in the sustainable development followed by agricultural employment, and finally, government expenditure with different degrees of influence.

changed to export-oriented production, which relies on modern technology, as opposed to traditional production.

- The lack of focus on agricultural processing and agricultural research decreases the added value of agricultural products and undermines competitiveness of agricultural products in international markets.

- Iraq agricultural policy should be restructured to aim at enhancing quality, minimizing costs in production and enabling it to have easy access to foreign markets.

the Sustainable Development 2030 plans, such as production, processing and marketing development.

- Enhance the quality of the agricultural products through the use of food safety standards and international standards so that they can access the global markets.
- Promote foreign and domestic investment in the agro-processing sectors so as to create value added and competitiveness.
- Infrastructure (cold chain transportation, storage, packaging, agricultural ports): develop the agricultural infrastructure and logistical infrastructure to accommodate supply chains and exports.
- Engage the services of agricultural research centers and universities in trying to come up

#### 4. Suggestions for Future Research:

- Background: The agro-processing industries have been identified as potentially affecting the competitiveness of Iraqi agricultural exports.
- Research Question: How does climate change relate to agricultural production and food export in Iraq?
- Discuss how agricultural innovation and modern technologies have been useful in enhancing the efficiency of agricultural exports.
- The question is: How does regional trade agreements impact the agricultural exports performance?

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with production technologies and modern irrigation techniques.

- Give subsidies to farmers and exporters in terms of concessional loans and tax exemption to export-oriented agricultural projects.
- Diversify export markets through signing of new trade agreements with regional and Asian countries and enhancing marketing of Iraq goods externally.
- Incorporate the environmental and social aspects in agricultural policies, so as to make the natural resources sustainable, and the quality of life of rural people better.

The paper finds that to improve the contribution of agricultural export in attaining sustainable development in Iraq, there is need to have overall structural reforms in agricultural, production, and trade policies. This future direction needs to be a balance and increase in the agricultural output as well as to protect the natural resources and also to provide their social equity in the way the benefits are distributed.

Therefore, the turn on of agricultural exports as part of sustainable development creates not only a boost to the economy but also helps in the construction of a diversified stable national economy that is able to face the future.

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