# The Most Important Factors Influencing the Development of Value Added in the Egyptian Agricultural Sector

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***Abstract:*** The study aimed to identify the most important factors influencing the development of value added in the Egyptian agricultural sector by using data on economic variables related to the study during the period (2000 -2023) The study found a statistically significant inverse effect of agricultural investment on the value added of the agricultural sector, as well as a statistically significant direct effect of agricultural labor wages, the total value of production requirements, and the value of agricultural loans on the value added of the agricultural sector. Meanwhile, there was no statistically significant effect of either the value of agricultural exports or the value of agricultural imports on the value added of the agricultural sector. The study recommended the need to work on directing agricultural investment correctly, by actual needs and sectors that can achieve economic development and value added. It also recommended working on activating laws related to financing the agricultural sector, contract farming operations, and protected agriculture, and developing strong policies to transform into export sectors with high value added.

**Keywords: value added of the agricultural sector - agricultural investment - agricultural wages - agricultural exports and imports - agricultural loans**

## I. INTRODUCTION

The agricultural sector in Egypt has a distinguished position in the Egyptian economic structure due to its key role in providing the nutritional needs of society. Increasing agricultural production and providing safe and healthy food is currently a fundamental goal sought by all peoples in both developed and developing countries. The agricultural sector in Egypt is also considered one of the most important sectors that plays a significant role in achieving development. Economically, especially since Egypt's geographical location and climatic conditions make it one of the countries where the agricultural sector contributes significantly to economic growth. This is achieved by providing the agricultural products necessary for food and providing employment opportunities for a large segment of the population. In addition, some agricultural products are exported to foreign markets, which provides an opportunity to increase the volume of exports, through which development is achieved in all other economic sectors. Therefore, the Egyptian agricultural sector is the fundamental basis for the growth and development of the Egyptian national economy in general. There are also many economic indicators through which the performance of the agricultural sector can be inferred, including studying the development of the value of agricultural GDP and identifying the most important economic variables that determine it. In light of the important and successive developments and events that Egypt is exposed to in terms of security and political arenas, and what these developments and events may result in, many economists and decision-makers are looking forward to knowing the effects that the Egyptian economy will reap as a result of these developments, and what results they may reflect on the agricultural sector in terms of investment, unemployment, agricultural income, agricultural product prices, and other important economic indicators whose impact is reflected directly or indirectly in achieving added value and working to develop it in an effective way in the Egyptian agricultural sector.( Abdel Fattah, 2015)

**Study Problem:** The Egyptian agricultural sector is considered one of the most important sectors affecting the Egyptian economy, employing approximately 19.3% of the total workforce in 2015. 2024, noting that it contributed 11.5% of GDP at current factor costs in 2022 and 11.3% of GDP in 2023/2024. Industries based on agricultural products also constitute 20% of GDP. Secondly, more than half of Egypt's population lives off the income from this sector, and it employs nearly 30% of the workforce. (Central Agency for Public Mobilization and Statistics - Statistical Yearbook,2024)

Given the numerous economic and political changes that Egypt has been exposed to recently, resulting from international, regional, and local changes, these challenges have collectively brought about numerous changes in the agricultural environment. These changes are manifested, according to statistics, in the continuous

decline in the relative weight of the value of agricultural domestic product to the gross domestic product. This indicates a poor and declining performance of the agricultural sector and a development in a direction other than that targeted by economic policies and comprehensive development plans, especially within the framework of the rapid economic changes that Egypt is witnessing. These changes impose the necessity of strengthening the structure of the Egyptian economy in its various sectors and units, so that it can keep pace with the wheel of change and comprehensive reform and keep pace with other countries that are witnessing a growing economic renaissance and high levels of economic and social well-being. This necessitates studying the factors affecting the development of the added value of the Egyptian agricultural sector in light of the current economic fluctuations and circumstances.

**Research questions:**

- What are the most important factors affecting the value added of the Egyptian agricultural sector?
- What are the most important recommendations and proposals that can be used to increase the value added of the Egyptian agricultural sector?

## II. METHODOLOGY

The research uses an analytical approach, which focuses on using statistical methods and techniques to analyze the study data obtained through the study tool, financial reports, to arrive at results that can achieve the study objectives.

Statistical Methods:

Descriptive Statistics: Means, maximum and minimum values and Annual Rate will be used to describe the study variables.

Multiple Regression Analysis: To identify the effect of independent variables on the dependent variable

Standard Tests: The Augmented Dickey-Fuller test, causality test, and cointegration test will be used to analyze relationships between variables.

**Table (1) Study variables during the period (2000-2023)**

| Years | Value Added | Agricultural Investment | Agricultural Labor Wages | Agricultural Exports | Agricultural Imports | Total Agricultural Production Requirements | Value of Agricultural Loans |
|---|---|---|---|---|---|---|---|
| 2000 | 52.85 | 8.20 | 0.16 | 1.722 | 12.164 | 20.969 | 38.337 |
| 2001 | 55.07 | 9.59 | 0.16 | 2.39 | 13.047 | 22.771 | 38.819 |
| 2002 | 58.37 | 6.40 | 0.17 | 3.383 | 15.41 | 28.037 | 34.902 |
| 2003 | 63.82 | 7.56 | 0.23 | 5.35 | 15.975 | 29.293 | 32.625 |
| 2004 | 69.25 | 7.42 | 0.3 | 7.89 | 19 | 34.083 | 33.216 |
| 2005 | 75.29 | 8.04 | 0.76 | 6.585 | 22.815 | 35.053 | 30.607 |
| 2006 | 81.77 | 7.79 | 1.43 | 6.146 | 25.318 | 39.678 | 30.96 |
| 2007 | 99.95 | 8.07 | 13.82 | 8.709 | 35.181 | 48.9 | 24.585 |
| 2008 | 113.10 | 6.86 | 13.06 | 11.597 | 48.059 | 51.4 | 21.576 |
| 2009 | 135.46 | 6.74 | 13.74 | 23.775 | 47.901 | 58.6 | 18.789 |
| 2010 | 160.97 | 6.83 | 13.55 | 16.244 | 65.369 | 70.3 | 21.239 |
| 2011 | 190.16 | 5.37 | 13.39 | 29.248 | 86.005 | 76.6 | 17.874 |
| 2012 | 188.78 | 8.38 | 13.79 | 23.632 | 90.169 | 78.6 | 16.822 |
| 2013 | 209.75 | 11.63 | 29.97 | 32.387 | 93.475 | 81.7 | 18.047 |
| 2014 | 241.49 | 13.41 | 38.98 | 31.122 | 100.719 | 94.6 | 17.021 |
| 2015 | 278.46 | 16.28 | 56.01 | 33.668 | 100.877 | 107.9 | 15.743 |
| 2016 | 318.88 | 17.34 | 42.2 | 43.68 | 118.313 | 142.2 | 12.7 |
| 2017 | 401.65 | 24.70 | 55.1 | 87.505 | 234.936 | 175.6 | 14.57 |
| 2018 | 505.36 | 26.33 | 62.1 | 89.093 | 253.576 | 187.8 | 13.99 |
| 2019 | 598.61 | 30.42 | 68.9 | 91.412 | 264.579 | 230.8 | 13.86 |
| 2020 | 687.05 | 34.40 | 74.3 | 81.477 | 208.152 | 255.7 | 14.99 |
| 2021 | 762.05 | 33.12 | 77.3 | 93.31 | 185.69 | 264.3 | 16.39 |
| 2022 | 858.42 | 35.12 | 82.1 | 86.8 | 190.03 | 279.4 | 17.46 |
| 2023 | 1174.79 | 34.11 | 85.6 | 108.5 | 206.46 | 297.6 | 19.36 |

**Source:**

Ministry of Agriculture and Land Reclamation - Economic Affairs Sector - Various Issues
Central Agency for Public Mobilization and Statistics - Foreign Trade Bulletin - Various Issues
Central Agency for Public Mobilization and Statistics - Statistical Yearbook - Various Issues
World Bank - Indicators Egypt's economy

## III. Results and Discussion

**Descriptive statistics of the variables**:

**Table (2) Time trend equations for the study variables during the period (2000-2023)**

| Variables | Equation | Mean | Annual Rate of Change % | R2 | F |
|---|---|---|---|---|---|
| Value Added | Y = -167.95 + 38.04 X | 307.56 | 13.6 % | 0.783 | **79.357 |
| Agricultural Investment | Y = -1.07 + 1.33X | 15.59 | % 8 | 0.757 | **68.69 |
| Agricultural Labor Wages | Y = -20.406 + 4.16 X | 31.55 | % 30.3 | 0.856 | **131.22 |
| Agricultural Exports | Y = -21.22 + 4.78 X | 38.57 | % 17.6 | 0.951 | **430.63 |
| Agricultural Imports | Y = -34.54 + 10.93 X | 102.22 | % 14.3 | 0.940 | **346.34 |
| Total Agricultural Production Requirements | Y = -39.02 + 12.16 X | 112.99 | % 12.1 | 0.991 | **2326.84 |
| Value of Agricultural Loans | Y = 35.26 – 1.04 X | 22.27 | -4.4 % | 0.763 | **76.66 |

**Statistically significant at 0.01
Source: Outputs of Study Data Analysis

- It was found that the mean of the value-added variable for the Egyptian agricultural sector reached EGP 307.56 billion during the study period, with a growth rate of 13.6%. It was found that the time variable explains 78.3% of the changes occurring in the value-added variable for the Egyptian agricultural sector.
- It was found that the mean of the agricultural investment variable reached EGP 15.59 billion during the study period, with a growth rate of 8%. It was found that the time variable explains 75.7% of the changes occurring in the agricultural investment variable.
- It was found that the mean of the agricultural labor wages variable reached EGP 31.55 billion during the study period, with a growth rate of 30.3%. It was found that the time variable explains 85.6% of the changes occurring in the agricultural labor wages variable.
- The mean of the agricultural export value variable reached EGP 38.57 billion during the study period, with a growth rate of 17.6%. It was found that the time variable explains 95.1% of the changes in the agricultural export value variable.
- The arithmetic mean of the value of agricultural imports was EGP 102.22 billion during the study period, with a growth rate of 14.3%. It was found that the time variable explains 94% of the changes in the value of agricultural imports.
- The mean of the total value of production requirements was EGP 10.22 billion during the study period, with a growth rate of 12.1%. It was found that the time variable explains 99.1% of the changes in the total value of production requirements.
- The mean of the value of agricultural loans was EGP 22.27 billion during the study period, with a decrease rate of 4.4%. It was found that the time variable explains 76.3% of the changes in the total value of production requirements.

**Stationarity Tests:**

**Table (3) Results of the Augmented Dickey-Fuller (ADF)**

| Variables | Level | | | 1st Difference | | | 2nd Difference | | |
|---|---|---|---|---|---|---|---|---|---|
| | ADF | Sig. | Result | ADF | Sig. | Result | ADF | Sig. | Result |
| Value Added | 4.100 | 0.931 | No Stationary | -2.941 | 0.005 | stationary | | | |
| Agricultural Investment | 2.421 | 0.995 | No stationary | -1.456 | 0.130 | No stationary | -10.596 | 0.000 | stationary |
| Agricultural Labor Wages | 2.194 | 0.991 | No stationary | -4.181 | 0.000 | stationary | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Agricultural Exports | 1.560 | 0.967 | No stationary | -4.399 | 0.000 | Stationary | | | |
| Agricultural Imports | 0.638 | 0.847 | No stationary | -3.350 | 0.002 | stationary | | | |
| Total Agricultural Production Requirements | 6.321 | 1.000 | No stationary | -1.457 | 0.132 | No stationary | -5.688 | 0.000 | stationary |
| Value of Agricultural Loans | -2.494 | 0.015 | stationary | | | | | | |

Source: Outputs of Study Data Analysis

To measure the stability of the study variables, a statistically significant correlation was used. Using the Advanced Dickey-Fuller (ADF) test, it was found that the Value Added of the Egyptian agricultural sector series was not stationary at its level and stabilized after taking the first difference, thus becoming a first-degree integrated series. The Agricultural Investment series was also found to be not stationary at its level and stabilized after taking the second difference, thus becoming a second -degree integrated series, the Agricultural Labor Wages series was also found to be not stationary at its level and stabilized after taking the first difference, thus becoming a first-degree integrated series, the Agricultural Imports series was also found to be not stationary at its level and stabilized after taking the first difference, thus becoming a first-degree integrated series, the Total Agricultural Production Requirements series was also found to be not stationary at its level and stabilized after taking the second difference, thus becoming a second -degree integrated series and the agricultural loan value chain is stable at its level, and thus becomes a zero-degree integrated chain.

Because the series of variables (Value Added, Agricultural Labor Wages, Agricultural Exports and Agricultural Imports) were integrated to the same degree, Ardell's integration was used to conduct a cointegration test between them and because the series of variables (Value Added, Agricultural Investment, Total Agricultural Production Requirements and Value of Agricultural Loans) are not equally integrated, Ardell's integration can be used to conduct a cointegration test between them.

Granger Causality Tests

**Table 4: Results of the Granger Causality Tests**

| Null Hypothesis: | Obs | F-Statistic | Prob. |
|---|---|---|---|
| AIn does not Granger Cause VA | 22 | 0.39694 | 0.6784 |
| VA does not Granger Cause AIn | | 0.67042 | 0.5245 |
| ALW does not Granger Cause VA | 22 | 0.21061 | 0.8122 |
| VA does not Granger Cause ALW | | 0.02438 | 0.9760 |
| AE does not Granger Cause VA | 22 | 2.91945 | 0.0813 |
| VA does not Granger Cause AE | | 0.81351 | 0.4598 |
| AIm does not Granger Cause VA | 22 | 9.09268 | 0.0021 |
| VA does not Granger Cause AIm | | 0.57034 | 0.5758 |
| TAPR does not Granger Cause VA | 22 | 4.51163 | 0.0268 |
| VA does not Granger Cause TAPR | | 1.39930 | 0.2738 |
| VAL does not Granger Cause VA | 22 | 0.25147 | 0.7805 |
| VA does not Granger Cause VAL | | 2.32485 | 0.1281 |

Source: Outputs of Study Data Analysis

The previous table shows the causal relationships between the study variables. It is clear that there are no two-way or one-way causal relationships between the Value Added of the Egyptian agricultural sector (VA) and either the Agricultural Investment (AIn), Agricultural Labor Wages (ALW), Agricultural Exports (AE)

and Value of Agricultural Loans (VAL) at a significance level of 0.05. However, there is no two-way causal relationship between the Value Added of the Egyptian agricultural sector (VA) and Agricultural Imports (AIm) at a significance level of 0.05. However, there is a one-way causal relationship between the the Value Added of the Egyptian agricultural sector (VA) and Agricultural Imports (AIm) at a significance level of 0.05, and it is in the direction of the Agricultural Imports to Value Added of the Egyptian agricultural sector

. However, there is no two-way causal relationship between the Value Added of the Egyptian agricultural sector (VA) and Total Agricultural Production Requirements (TAPR) at a significance level of 0.05. However, there is a one-way causal relationship between the Value Added of the Egyptian agricultural sector (VA) and Total Agricultural Production Requirements (TAPR) at a significance level of 0.05, and it is in the direction of the Total Agricultural Production Requirements to Value Added of the Egyptian agricultural sector

Integration Test

**Table 5: Results of the Integration Test**

| | | F-statistic Value | %1 Significance | | %5 Significance | | Results |
|---|---|---|---|---|---|---|---|
| The integration between VA and AIn | | 14.22395 | 6.84 | 7.84 | 4.94 | 5.73 | Integration |
| the Integration between VA and ALW | | 12.05380 | 6.84 | 7.84 | 4.94 | 5.73 | Integration |
| The integration between VA and AE | | 24.86003 | 6.84 | 7.84 | 4.94 | 5.73 | Integration |
| the Integration between VA and AIm | | 15.51006 | 6.84 | 7.84 | 4.94 | 5.73 | Integration |
| the Integration between VA and TAPR | | 16.90072 | 6.84 | 7.84 | 4.94 | 5.73 | Integration |
| the Integration between VA and VAL | | 9.142845 | 6.84 | 7.84 | 4.94 | 5.73 | Integration |

Source: Outputs of Study Data Analysis

It turns out that there is Integration between the Value Added of the Egyptian agricultural sector and all variables (Agricultural Investment, Agricultural Labor Wages, Agricultural Exports, Agricultural Imports, Total Agricultural Production Requirements and Value of Agricultural Loans) at a significance level of 0.01

Factors affecting the value added of the Egyptian agricultural sector:

**Table (6) Multiple regression model for the factors affecting the value added of the Egyptian agricultural sector**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -348.8759 | 86.76733 | -4.020822 | 0.0009 |
| Agricultural Investment | -0.028707 | 0.006866 | -4.180963 | 0.0006 |
| Agricultural Labor Wages | 5.583786 | 1.739933 | 3.209196 | 0.0051 |
| Agricultural Exports | 2.788960 | 1.922132 | 1.450972 | 0.1650 |
| Agricultural Imports | -0.612076 | 0.625271 | -0.978897 | 0.3414 |
| Total Agricultural Production Requirements | 5.015910 | 0.771375 | 6.502553 | 0.0000 |
| Value of Agricultural Loans | 14.18971 | 3.374723 | 4.204705 | 0.0006 |
| R-squared | 0.986957 | Mean dependent var | | 307.5563 |
| Adjusted R-squared | 0.982354 | S.D. dependent var | | 303.9933 |
| S.E. of regression | 40.38192 | Akaike info criterion | | 10.47313 |
| Sum squared resid | 27721.89 | Schwarz criterion | | 10.81673 |
| Log likelihood | -118.6776 | Hannan-Quinn criter. | | 10.56429 |
| F-statistic | 214.4021 | Durbin-Watson stat | | 2.042306 |
| Prob(F-statistic) | 0.000000 | | | |

Source: Outputs of Study Data Analysis

The previous table shows that the condition for multiple regression analysis was met, namely, the absence of autocorrelation between the residuals of the model's independent variables. The Durbin-Watson

autocorrelation coefficient value was 2.042, a value close to 2, indicating low autocorrelation between the residuals of the model's independent variables.

Table (4) shows the significance of the model as a whole, with the value of (Sig F) = 0.000, a value less than 0.05, meaning that the calculated F value is greater than the tabular F value. It is evident that the independent variables included in the model (Agricultural Investment, Agricultural Labor Wages, Agricultural Exports, Agricultural Imports, Total Agricultural Production Requirements, and Value of Agricultural Loans) explain 98.2% of the changes in the Value Added of the Egyptian agricultural sector

This finding was found to be statistically significant impact at the (α≤ 0.05) to Agricultural Investment on Value Added of the Egyptian agricultural sector because the (Sig t) value was 0.006, which is less than 0.05, meaning that the calculated t value is greater than the tabular t value and It was found that when agricultural investment increases by 1%, the Value Added of the Egyptian agricultural sector decreases by 0.0287%.

This finding was found to be statistically significant impact at the (α≤ 0.05) to Agricultural Labor Wages on Value Added of the Egyptian agricultural sector because the (Sig t) value was 0.005, which is less than 0.05, meaning that the calculated t value is greater than the tabular t value and It was found that when Agricultural Labor Wages increases by 1%, the value added of the Egyptian agricultural sector increased by 5.584%.

This finding was found to be statistically significant impact at the (α≤ 0.05) to Total Agricultural Production Requirements on Value Added of the Egyptian agricultural sector because the (Sig t) value was 0.0000, which is less than 0.05, meaning that the calculated t value is greater than the tabular t value and It was found that when Total Agricultural Production Requirements increases by 1%, the value added of the Egyptian agricultural sector increased by 5.016%.

This finding was found to be statistically significant impact at the (α≤ 0.05) to Value of Agricultural Loans on Value Added of the Egyptian agricultural sector because the (Sig t) value was 0.0006, which is less than 0.05, meaning that the calculated t value is greater than the tabular t value and It was found that when Value of Agricultural Loans increases by 1%, the value added of the Egyptian agricultural sector increased by 14.190%.

It was found that there is no statistically significant impact at the (α≤ 0.05) to Agricultural Exports on Value Added of the Egyptian agricultural sector because the (Sig t) value was 0.1650, which is more than 0.05, meaning that the calculated t value is less than the tabular t value

It was found that there is no statistically significant impact at the (α≤ 0.05) to Agricultural Imports on Value Added of the Egyptian agricultural sector because the (Sig t) value was 0.3414, which is more than 0.05, meaning that the calculated t value is less than the tabular t value

## IV. Conclusion

- ✓ There is Integration between the Value Added of the Egyptian agricultural sector and all variables (Agricultural Investment, Agricultural Labor Wages, Agricultural Exports, Agricultural Imports, Total Agricultural Production Requirements and Value of Agricultural Loans) at a significance level of 0.01
- ✓ A statistically significant inverse effect of agricultural investment on the value added of the agricultural sector was found.
- ✓ A statistically significant direct effect was found for both agricultural labor wages, the total value of production requirements, and the value of agricultural loans on the value added of the agricultural sector.
- ✓ A statistically significant effect was found. Both the value of agricultural exports and the value of agricultural imports affect the added value of the agricultural sector.

**Recommendations:**

- ✓ The need to work to direct agricultural investment correctly, targeting actual needs and sectors that can achieve economic development and added value.
- ✓ Work to activate laws related to financing the agricultural sector, contract farming, and protected agriculture.
- ✓ Establish strong policies to transition to export sectors with high added value.
- ✓ Increase the use of the technological component in Egyptian agriculture to improve Egypt's competitive position locally and globally. Provide financial support for Egyptian agricultural exports and rationalize imports to address the trade deficit.
- ✓ Develop new policies to increase the agricultural production of strategic crops and move toward smart agriculture.
- ✓ Expand the application of contract farming and the protected agriculture system, while strengthening the Egyptian agricultural cooperative structure.

## V. References


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