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Economics of grain production in Arab countries

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Summary:

The demand for economic integration in the agricultural field among Arab countries is one of the current and strategic demands, especially in the circumstances of globalization, and given the widening food gap at the level of the Arab world as a whole, and at the level of each individual country, which increases the importance of identifying aspects of this problem is the difficulty of a single country to exploit all its resources as a result of the apparent imbalance in the distribution of those resources, and therefore this study aimed to monitor the most important aspects of Arab agricultural integration in the field of grain production.

The problem of research is the difficulty of any individual country to take advantage of all its resources as a result of the apparent imbalance in the distribution of those resources, so it requires the need to achieve full integration among all Arab countries to provide food requirements, especially grain, but it is met with many challenges that the research seeks to monitor and try to overcome what can be overcome to allow the transfer of capital, employment and productive goods, in order to strengthen their competitiveness in the face of global blocs, and the research aimed at monitoring the most important aspects of Arab agricultural integration by reaching the most appropriate quantitative estimate of the grain production function, To identify the most important factors affecting their production in the Arab world, as well as to estimate the flexibilities of this productive function and research on how to invest these results to develop agricultural production, in addition to analysing the reasons for different grain production from one Arab country to another and researching how to increase its production in the Arab world as a whole.

Taking advantage of the Hiamy and Rutan model to estimate and analysis the causes of variationand difference in agricultural productivity in the Arab countries, data related to the subject of the study have been relied upon from statistics, reports and studies of regional, Arab, and international organizations and bodies.

Introduction:

Many countries are keen to integrate into large economic entities as a means of obtaining numerous gains as a result of the savings in size and productive specialization based on the relative and competitive advantages enjoyed by each of the bloc countries, which increases the competitiveness of their products, thus increasing economic growth rates, creating more jobs and reducing unemployment rates, as well as the benefits they gain from improving terms of trade and facilitating the movement of goods, services, individuals, capital, technical and ecological knowledge and increasing employment rates.

Given the large and growing deficit in agricultural production in many Arab countries, the bulk of them have tended to implement policies and strategies aimed at increasing their productivity, by increasing the productivity of the ground unit, but achieving this goal is difficult to achieve, especially if each Arab country depends individually on its agricultural resources available to it, while it can be achieved in the event of agricultural integration among many Arab countries.

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Search problem:

The problem of research is the large and growing deficit in agricultural production, especially grain production, despite the expansion of the Arab agricultural area, where Arab countries extend over an area of about 1330 million hectares, and the area exploited in agriculture in 2014 is about 72 million hectares, which is equivalent to 5.4% of the total area. In 2014, arable land left untapped was about 11.9 million hectares, or about 16.5% of the total agricultural area exploited. However, its contribution to agricultural output remains weak, with 2015 reaching about $142 billion, bringing a modest growth rate of about 1.3% compared to 2014. During the period (2005-2015).(1)

Therefore, it is necessary to integrate all Arab countries to provide food requirements, especially cereals, on the one hand and to upgrade the export level on the other, but it is met with many challenges that the research seeks to monitor, with the aim of strengthening its competitiveness in the face of global conglomerates.

Search objectives:

This research aims to monitor the most important aspects of agricultural integration in grain production among the most important countries of the Arab world through:

1- To reach the most appropriate quantitative estimate of the grain production function, to identify the most important factors affecting their production in the Arab world, as well as to estimate the flexibilities of this productive function and to research how to invest these results in developing an Arab strategy for the development of agricultural production.

2- Analyses the reasons for the different production of these groups from one Arab country to another and look at how to increase their productivity in those countries, by allowing the transfer of production elements between those countries, considering the agricultural resources available in the Arab world.

Research method:

The research relied on descriptive and quantitative methods of analysis, presentation of data and drawing conclusions in addressing the problem of the study, which is to estimate the function of grain production in the Arab countries in order to identify the most important factors affecting production, through the use of the mathematical model of the Glass Logarithm Cup function Dual, based on national aggregate data, in the form of panel data rather than timeseries data, taking advantage of the Hayami and Rutan model, to estimate and analyses the causes of variation and difference in agricultural productivity in the Arab countries under consideration.

Sucking data management:

The research relied on published and unpublished secondary data, domestic and international available by official research bodies, from statistics, reports and studies of regional, Arab, and international organizations and bodies: the Arab Organization for Agricultural Development, the International Monetary Fund (National Accounts Data and Global Development Indicators), the UNDP-POGAR Database and the FAO Statistical Database.

- **The mathematical model used to estimate the functions of production:**

Estimating production functions is critical in the field of production economies in general and agricultural production, where the results of these estimates can be utilized when developing the development plans of a particular country or group of countries aimed at bringing

1) Arab criticism, "Unified Arab Economic Report"، 2016.

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their production of a particular commodity to its optimum size considering the available resources available to it, as well as the possibility of using productive function transactions in redistributing resources between those countries. To ensure optimal distribution and provide them together, it would have been difficult to reach if each of them had individual plans to increase their national products, not only that, but the results of the production functions are often used as a basis for the equitable distribution of production revenues on the production elements that contributed to it, which ensures the optimal distribution of resources, increases the efficiency of their use and enables the optimal volume of production.

One of the most important definitions of the productive function is that it represents the purely technical relationship between the quantity of production on the one hand and the quantities of production elements on the other at the level of the establishment, industry, or the level of the economic universe in a particular country.[2]

To estimate the Arab grain productivity function, an appropriate time series of data on the variables of that function is required, which, if available to some states, may be difficult to obtain for other countries.

Accordingly, the study will estimate the Arab grain production function based on the CT data of the Arab countries, and it is worth noting that this analysis is better than the analysis of time chains, especially since it is consistent with the study's research into the possibility of integration between Arab countries in the field of grain production, where the transition from note to note between the CT data set represents the transition from one Arab country to another.

[2)].

One of the most appropriate mathematical models used in this area is the Glass Douglas function model[3)] in its following form:

$$Y_{i\,x} = a\, X_{1x}^{b1}\, X_{2x}^{b2}\, X^{b3} \ldots\ldots X_{3n\,x}^{bn}$$

The research therefore used the mathematical model of the Double Glass Logarithmic Dal to estimate the overall grain production function in the Arab world for the period (2007-2013), and the research also used a model for (Hayami, Rotan) to estimate and analyses the causes of variation and variation in the productivity of hectares of grain in the Arab countries[4), 5)]

By performing the logarithm conversion of the previous model, the following linear logarithmic function was obtained:

$$\log Y_i = \log a + b_1 \log X_{1i} + b_2 \log X_{2i} + b_3 \log X_{3i} + b_4 \log X_{4i} + b_5 \log X_{5i} + b_6 \log X_{6i}$$

where:

- Y_i = Estimated crop production quantity (i) in the country (j).
- X_{1i} = crop Area (i) in the country (j).
- X_{2i} = agricultural labour in the country (j).
- X_{3i} = agricultural machinery for total tractors and harvesters in the country (j).

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2) The General Mathematical form of the Production Function is YF (L, K. R, S, N, E). where Y= Output, L=Labor Input, K = Capital Input, R= Raw materials, S= Land input, N= Returns to Scale, E=Efficiency parameter, see Koutsoyiannis, A, Modern Microeconomics, the Macmillan press LTD., 1975

2) Al, Saeed Abd El Hamid Al Bassioni Doctor, Quantitative economic study of grain production in Arab countries، Egyptian Journal of Agricultural Economics, Volume 8, Issue No. 1, March 1998.

3) Muhammad Iraqi Monastery Economic study of the possibilities of Arab agricultural integration in grain production master's degree, Faculty of Agriculture, Ain Shams University, 1978.

4) Intercountry Cross- section Production Function.

5) Hayami, Y & Rutan, V.W. Agricultural Development: An International Perspective, the Johns Hopkins Press, 1971.

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- **X_{4i} =** Total fertilizer consumption in the country (j).
- **X_{5i} =** percentage of enrolled in schools and university education in the country (j).
- **X_{6i} =** annual proportion of freshwater with drawls for agriculture in the country (j).

Several attempts have been made to choose the most appropriate form image where one or more of the variables described in the model as well as the deletion or addition of one or more countries, through the relative importance of Arab countries in grain production during the period (2007-2013), were excluded to find out This affects the estimation of the productivity function and flexibility of the remaining variables in the model and its statistical morale, as well as the conduct of familiar statistical tests to judge the accuracy and efficiency of estimates, such as the F test, the T test, the selection factor ($R^{2)}$ and the modified identification factor (R^{-2}).

Study results

First: Estimating the function of producing the group of grain grains in the Arab world:

Using the mathematical model of the Glass Douglas Logarithmic Linear Function, it was possible to estimate the overall grain production function in the Arab world during the period (2007-2013), where (Form 1) shows the results of the estimate of the grain production function in its most important Arab producing countries, namely Egypt, Tunisia, Syria, Iraq, Morocco, Algeria, and Sudan, as follows:

Form 1:

$$\mathbf{Ln\ Y_i = -4.26 + 0.43 \ln X_{1i} + 0.25 \ln X_{2i} + 0.69 \ln X_{3i} + 0.57 \ln X_{4i} + 0.12 \ln X_{5i} - 1.82 \ln X_{6i}}$$

(-1.59) (1.69) (1.59) (2. 47) (5.59) (0.38) (-1.52)

$R^2 = 0.68$ $R^{-2} = 0.63$ F = 14.73 N = 49

It is clear from (Model 1) that the flexibility of the response of grain production to change in the area under cultivation of it was about 0.43, and the statistical morale of this flexibility has been proven, which indicates that the increase in grain area in an Arab country by 1% could increase grain production in that country by 0.43%, and the flexibility of the response of grain production to change in agricultural labour (X_{2i}), the number of agricultural machinery (X_{3i}), agricultural fertilizer (X_{4i}), the percentage of learners (X_{5i}), annual proportion of freshwater (X_{6i}) of grains during the study period (2007-2013) was estimated at 0.25, 0.69, 0.57, 0.12 respectively, in addition to the flexibility, proportion of fresh water used for agriculture during the period (2007-2013) estimated at (-1.82).

The results of the impact of these variables on grain production in the Arab countries have been confirmed from the previous model, and it has been shown that the flexibility and fresh water for agriculture purposes indicates a decrease in the importance of this variable in influencing the volume of grain production in the most important producing countries, to rely most Arab countries on irrigation from wells.

It is also clear from the model itself that there is a difference in the amount of flexibility of the response of the variables studied, which indicates the different relative importance of these variables, where it was found that the number of agricultural machinery is the most important factor affecting grain production, followed by the variable agricultural fertilizers and then the cultivated area followed by agricultural employment, and the adjusted identification factor (R^{-2}) in the model indicates that 63% of the change in grain production among the Arab countries studied is due to the variables included in the model, while the rest is due to changes other than 2. The spirit of the model has been demonstrated by the calculated value of F 14.73, and by excluding the freshwater variable for agriculture for its negative value, it was obtained (Model 2), in which the statistical morale of the rest

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of the variables improved, and all its moral productive flexibilities and signals are in line with economic logic, which is best estimated at the grain production function of the countries studied during the period (2007-2013).

Form 2:

$$\mathbf{Ln\ Y_i = -\ 6.39 + 0.\ 14\ ln\ X_{1i} + 0.\ 19\ ln\ X_{2i} + 0.35\ ln\ X_{3i} + 0.58\ ln\ X_{4i} + 0.\ 35\ ln\ X_{5i}}$$
(-2.75) (0.82) (1.22) (2.07) (5.58) (1.28)

$\mathbf{R^2 = 0.66}$ $\mathbf{R^{-2} = 0.62}$ $\mathbf{F = 16.69}$ $\mathbf{N = 49}$

The model shows that the flexibility of grain production response to change in the area under cultivation was about 0. 14,the statistical morale of this flexibility has been demonstrated, and this indicates that an increase in the area of grain in an Arab country by 1% could increase grain production in that country by 0.14%, and the flexibility of grain production response to change in agricultural employment (X_{1i}), the number of agricultural machinery (X_{2i}), agricultural fertilizers (X_{3i}) and the proportion of learners (X_{4i}) of grain during the study period (2) From the previous model, the statistical morale of the flexibilities of each of the previous variables was estimated at 0.19, 0.35, 0.58, respectively.

It is also clear from the model that there is a difference in the amount of flexibility of the response of the variables studied, which indicates the different relative importance of these variables, where it is found that the fertilizers consumed are the most important factors affecting grain production, followed by the variable number of agricultural machinery and then the percentage of learners followed by agricultural employment respectively, and indicates the adjusted selection factor (R-2) In the model, 62% of the change in grain production among Arab countries is due to the variables in the model, and the rest is due to other unstudied variables and the morale of the model as a whole has been proven to be 16.69.

Second: The disparity and different productivity of hectares of grain crops among Arab countries:

To justify the difference in the productivity of hectares of grain in the most important Arab countries producing them (Egypt, Tunisia, Syria, Iraq, Morocco, Algeria, and Sudan), we conclude from (Model 3) that the percentage difference in the productivity of hectares of grain between an Arab country and another is the group of percentages of the difference. The average share of the components of the studied production is weighted by its productive flexibility, and negative differences mean that the state in question increases the share of the different component or factor of production, so this difference is excluded from the total percentage of differences, and only positive differences are calculated [1),2)].

Form 3:

$$\mathbf{(Y_a - Y_b)/\ Y_a = e_L\ (L_a - L_b)/\ L_a + e_M\ (M_a - M_b)/\ M_a + e_F\ (F_a - F_b)/\ F_a + e_S\ (S_a - S_b)/\ S_a}$$

where:

- **Y:** It is a production of the hectare i of grain in a particular Arab country.

1) Hayami, Y & Rutan, V.W., Agricultural Development: An International Perspective, the Johns Hopkins Press, 1971.

2) Saeed Abd Al Hamid Al Bassioni Doctor, Former Reference.

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- **F, S, L, M:** The average share of hectares of grain from agricultural labour (L), agricultural mechanization (M), consumer manure (F), percentage of learners (S) respectively.
- **a,** b**:** Expresses the developed country (with the highest yield of hectares of grain (a) and less developed countries (b) respectively.
- **E:** Refers to the productive flexibility of a productive element, where (eL) expresses the flexibility of grain response to change in agricultural employment, as well as (eM) expresses the flexibility of the response of grains to change in the number of agricultural machineries used in agriculture, and (eF) expresses the flexibility of grain response to change to the amount of fertilizer consumed, and (eS) expresses the flexibility of grain response to the proportion of learners.

Egypt's hectare productivity is one of the highest in Arab countries, with average grain yield productivity in Egypt at about 7.67 tons/ha, on average for the study period (2007-2013), while in Tunisia it was about 2.91 tons/hectare, followed by Syria, Iraq, and Morocco. Algeria and Sudan by 1.46, 1.40, 1.22, 1.08, 0.25 tons/ha respectively as an average for the period (2007-2013), and above all, Egypt can take the country with a higher relative advantage in grain production for the rest of the Arab countries under study.

The data (Table 2) showed how the percentages of differences between the productivity of hectares in any Arab country and its counterpart in Egypt were calculated, attributable to the difference between the [1), 2)] average share of grain hectares of production elements, namely agricultural employment, agricultural mechanization, consumed agricultural fertilizers and the proportion of learners, using (Table 2), (Model 3) and estimated production flexibilities (Form 2).

The results (Table 2) also indicated that the productivity of hectares of grain in Tunisia is 4.76 tons/ha lower than in Egypt, and the results indicate that only 15.42% of that difference is due to the lack of agricultural employment in Tunisia from Egypt, while 28.39% The difference in productivity is due to the lack of use of agricultural machinery, while about 47.12% is due to the decline in agricultural fertilizers, and 28.27% of the difference in productivity is due to the lack of educated people, as noted in general, the depreciation of agricultural fertilizers is the first responsible for the decline in grain productivity in Tunisia.

The results (Table 2), (Model 3) also indicate that the productivity of hectares of grain in Syria is 6.21 tons/ha lower than in Egypt, and that 15.29% of that difference is due to the lack of agricultural employment in Syria from Egypt, and about 28.15 46.72% of this difference is due to the lack of agricultural fertilizers in Syria from Egypt, and about 28.03% due to the lack of educated people, as noted in general, the lack of agricultural fertilizers is the first responsible for the decline in grain productivity in Syria.

The results (Table 2), (Model 3) also show that the production of hectares of grain in Iraq is about 6.26 tons/ha lower than in Egypt and shows that the difference between Egypt's and Iraq's productivity is mainly due to a shortage of agricultural labour of only 11.71% and about 21.21%. 56% of the difference in productivity is due to the lack of agricultural machinery, about 35.78% due to the lack of agricultural fertilizers, and about 21.47% to the lack of educated people, as noted in general from the above that the shortage of agricultural fertilizers is the first responsible for the decrease in grain productivity in Iraq than in Egypt.

(Table 2) ,(Model 3) found that the productivity of the hectare of grain in Morocco is 6.44 tons/ha lower than in Egypt, and 15.86% of that difference was due to the lack of agricultural employment in Morocco from Egypt, and the shortage of agricultural machinery by about 2 9.21%, the shortage of agricultural fertilizers by about 48.47%, and the decrease in the percentage of learners

1) Ibrahim Mohammed Abdelaziz Al-Hafnia, The Arab Common Market, and its expected role in agricultural development in the Arab countries master's degree, Department of Agricultural Economics, Faculty of Agriculture, Al-Azhar University, 2004.

2) Dina Farouk Mahmoud Enany, Arab agricultural integration considering the most important contemporary international variables., Ph.D.., Department of Agricultural Economics, Faculty of Agriculture, Ain Shams University, 2014.

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by about 29.08%, as noted in general from the above that the shortage of agricultural fertilizers is the first responsible for the low production of grains in Morocco for the productivity of hectare grains in Egypt.

The results (Table 2), (Model 3) also show that the production of hectares of grain in Algeria is 6.59 tons/ha lower than in Egypt and shows that the difference between Egypt's productivity and Algeria is mainly due to a shortage of agricultural labour of only 18.26% and about 33.33%, 62.00% of the difference in productivity is due to the lack of agricultural machinery, about 55.80% due to the lack of agricultural fertilizers, and about 33.48% to the lack of educated people, as noted in general by the previous lack of agricultural fertilizers is the first responsible for the decrease in grain productivity in Algeria than in Egypt.

The results (Table 2), (Model 3) also indicate that the productivity of the hectare of grain in Sudan is 20.27 tons/ ha, and that 16.23% of that difference is due to the lack of agricultural employment in Sudan from Egypt, and about 29.8%, 7% is due to the lack of agricultural machinery, and 49.58% of that difference is due to the lack of agricultural fertilizers in Sudan from Egypt, and about 29.74% due to the lack of educated people, as noted in general from the above that the shortage of agricultural fertilizers is the first responsible for the decline in grain productivity in Sudan.

It is already clear that the productivity of hectares of grain can be increased in Tunisia, Syria, Iraq, Morocco, Algeria and Sudan to match Egypt's hectare production of grains, and increase the self-sufficiency of these countries from grain by providing agricultural fertilizers consumed in grain production, as well as providing and exchanging seeds and seeds and selected seeds among the Arab countries studied, especially since (Egypt, Algeria) have good experience in this area, which has led to significant increases in the productivity of hectares of grain in the last 10 years, and the need to work to provide Trained agricultural employment, as well as raising the proportion of learners and the need to exchange experiences in the field of education, agricultural research and agricultural extension methods for farmers, raising the efficiency of the use of agricultural machinery and mechanization, represented by harvesters and agricultural tractors to Arab countries less efficient in the use of agricultural mechanization, as well as the possibility of cooperation to encourage increased agricultural productivity of grains as well as work to rationalize irrigation water and develop drainage systems and surface irrigation methods used in the grain-producing countries in the Arab countries under study.

Third: The possibility of increasing the productivity of hectares of grain in the light of Arab agricultural integration:

Given the difference in the irrigation system in Egypt from that of most Arab countries, and the fact that the majority of the cultivated area of grain in Egypt, if not all of them depend on surface irrigation, it is difficult to assume that the productivity of hectares of grain can be reached to the level of hectare productivity in Egypt in all cultivated areas in all Arab countries, and the closest alternative to application and the reality is that this can be limited to irrigated land in other[1)] Arab countries.

In order to arrange for the above and using the results (Table 2) based on transactions (Model 2), possible increases in the productivity of the hectare of grains could be calculated, if the Arab States were integrated into the field of grain production, assuming that the elements of production and exchange of experiences and knowledge among Arab States could be transferred to the level of efficiency of employment, agricultural mechanization, the amount of fertilizer consumed, as well as the efficiency of surface irrigation and its availability to all Arab states to the current level in Egypt.

It should be noted that these increases are not necessarily the maximum possible increases, because the productivity of hectares of grain in Egypt has not yet reached the maximum possible levels, other non-Arab countries have exceeded these levels, and the impact of many factors, such as

[1)] Al Saeed Abd El Hamid Al Bassioni Doctor, former reference.

the widespread use of improved irrigation, pesticides, and other different technology patterns, has not been considered.

Table 2 shows that average hectare productivity in Tunisia can be increased by about 25.21 tons/ha as a total of the most important grain producers (studied) in the Arab world, with the projected increase in the production of hectare grains in Tunisia by about 3.07 tons/hectares, and in Syria a maximum of 3.18 tons/hectares, and about 5.54 tons/ha in Iraq, while that productivity can be increased. In Morocco by about 2.43 tons/ha, and to increase the productivity of hectares of grain in Algeria by about 0.60 tons/hectares, and about 2.43 tons/hectares in Sudan, the overall increases in grain production varying from country to country depend on two main factors, the total percentages of differences in his or her hectare yield, as well as the difference between state productivity and its counterpart in Egypt as a leading or relatively advanced grain producer.

The results (Table 2) show that total grain production in the most important Arab producing countries can be increased after integration into grain production from about 42,917.56 tons to about 717,113.45 tons, an increase of about 674,195.89 tons representing about 94.02% of current energy.

Over the past 10 years, some Arab countries have implemented agricultural projects in the Republic of Sudan, where the Sudanese government has allocated large areas of land to Jordan, Syria and the UAE, and Egypt, Saudi Arabia and the UAE have begun to coordinate with the Sudanese government to establish agricultural projects for the production of food commodities in Sudan, especially in the northern regions where there are great opportunities for wheat production, and a number of private companies have implemented similar projects, including the establishment of the necessary infrastructure for these projects, and these developments indicate a trend I have to take advantage of the vast potential of Arab countries to achieve food security.

Most important recommendations

There is no doubt that agricultural policies and legislation vary from Arab country to country, depending on the nature of geographical and climatic composition and according to the available possibilities, but there are some agreed aspects to achieve sustainable agricultural development and achieve food security that meets the basic needs of citizens in the Arab countries, and when developing those policies and legislation, attention must be considered:

1- Scientific research in the field of agriculture and support of agricultural research centers, with interest in institutional reform and development of all institutions related to agriculture, considering a policy of agricultural production that maximizes the economic return of available natural resources, by increasing the productivity of hectares of grain in Tunisia, Syria, Iraq, Morocco, Algeria, and Sudan)to match Egypt's hectare production of grains.

2- Work to increase the self-sufficiency of the Arab countries studied from grains by providing agricultural fertilizers consumed in grain production as well as providing and exchanging seeds and selected seeds and seeds among the Arab countries studied, especially since (Egypt, Algeria) have good experience in this field that has led to significant increases in the productivity of hectares of grain in the last 10 years.

3- Work to provide trained agricultural labour, as well as raise the proportion of learners and the need to exchange experiences in the field of education, agricultural research and means and methods of agricultural extension for farmers and raise the efficiency of the use of machinery and agricultural mechanization represented by harvests and agricultural tractors to Arab countries less efficient in the use of agricultural mechanization.

4- Encourage cooperation between the Arab countries under study to increase agricultural production of grains as well as work to rationalize irrigation water and develop drainage systems and surface irrigation methods used in grain-producing countries in the Arab countries under study.

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Supplements

Table (1) The evolution of factors affecting the function of grain production in the most important producing countries in the Arab world during the period (2007-2013)

(%)	(%)	(ton)	(No.)	1000	1000 hectares	A thousand tons.	Year	State
Fresh water for agriculture	Percentage of learners	Agricultural fertilizers	Number of agricultural machineries	Agricultural employment	Area	Production		
88.86	28.93	1943963.40	104670.00	6231.00	2964.82	23207.42	2007	Egypt
88.62	28.45	1875420.60	106349.00	6372.00	2950.22	22927.72	2008	
88.38	29.52	1806877.80	114073.00	6550.00	2942.91	21213.86	2009	
88.14	29.91	1738335.00	117562.00	6728.00	2935.61	19499.99	2010	
88.24	29.78	1669792.20	120262.53	7042.33	2921.01	19088.62	2011	
88.35	29.99	1601249.40	124017.16	7240.48	2913.71	18529.22	2012	
88.45	30.19	1532706.60	127771.79	7438.62	2906.40	13877.91	2013	
88.22	11.31	474460.00	47200.00	4626.00	5206.55	9226.59	2007	Morocco
87.98	12.29	433412.00	51432.00	4168.00	5320.68	8321.51	2008	
87.91	12.88	330149.00	55664.00	4167.00	5434.80	7866.14	2009	
87.85	13.01	294717.00	60845.00	4015.00	5506.10	6825.10	2010	
86.98	13.34	260368.07	60345.00	4004.39	5695.35	6144.88	2011	
86.24	13.69	213996.18	63068.00	3873.99	5895.39	5378.89	2012	
85.11	14.04	167624.30	65791.00	3743.60	6088.23	4110.49	2013	
98.51	12.77	183510.00	28456.33	6000.00	12528.66	6557.00	2007	Sudan
98.44	13.70	174210.00	29262.00	6201.80	12786.10	5534.00	2008	
98.16	14.64	158470.00	31559.00	6358.71	13043.54	3563.00	2009	
97.96	15.57	152848.00	31619.00	6510.00	13300.98	2631.00	2010	
97.52	16.50	175068.00	33170.33	6666.14	13558.42	1134.00	2011	
97.32	17.43	198678.00	34348.83	6821.54	14774.15	1040.90	2012	
97.11	18.36	222288.00	35527.33	6976.94	15989.88	1012.02	2013	
88.00	18.03	456945.89	114270.00	947.00	3154.27	6336.75	2007	Syria
88.34	18.10	411784.33	115559.00	814.00	3070.71	5711.75	2008	
88.58	18.16	345997.33	116924.00	758.00	2832.55	4766.16	2009	
87.91	18.23	314871.37	118289.00	721.00	2697.46	3946.76	2010	
87.53	18.30	283745.40	118559.40	670.93	2536.60	3048.39	2011	
86.66	18.36	260544.91	119642.80	617.96	2375.74	2259.45	2012	
86.52	18.43	237344.43	120726.20	564.99	2214.88	1425.28	2013	
79.75	26.26	118380.87	131954.48	2220.12	3056.91	6392.63	2007	Algeria
83.70	28.10	108779.29	117179.00	2244.06	3984.97	5805.05	2008	
87.65	30.62	99177.71	118507.00	2358.34	4021.44	5253.15	2009	
91.60	31.11	95196.00	137578.27	2551.30	4057.91	4558.57	2010	
95.55	33.29	72481.40	156649.53	2744.26	4984.97	4078.01	2011	
99.50	35.47	68499.69	181344.59	2948.74	4998.99	3454.76	2012	
103.45	37.65	64517.97	206039.65	3153.22	5013.02	2867.19	2013	
74.89	16.48	315473.00	81141.00	1343.00	2648.50	3785.00	2007	Al Iraq
74.33	17.16	315702.00	81078.50	1443.00	2022.25	3205.00	2008	
73.78	17.85	264588.00	81016.00	1452.00	1163.00	2625.00	2009	
73.22	18.53	180370.00	80042.00	1467.00	1117.86	1726.67	2010	
72.66	19.22	182318.60	79068.00	1534.07	1072.73	1146.67	2011	
72.10	19.90	123439.20	78094.00	1578.32	1027.59	1051.57	2012	
71.55	20.59	79991.94	77120.00	1622.58	1015.40	1010.64	2013	
68.49	31.58	74113.00	43877.00	787.00	1255.86	2025.52	2007	Tunisia
64.30	33.70	97457.00	44796.00	791.00	1222.13	2294.69	2008	
60.11	33.90	120801.00	45715.00	795.00	1188.41	2563.86	2009	
58.73	34.11	144145.00	47071.70	798.80	1154.69	2726.52	2010	
53.82	34.97	167489.00	48428.40	802.60	1120.97	2795.69	2011	
50.10	35.77	190833.00	49785.10	806.40	1087.24	2864.86	2012	
46.39	36.47	214177.00	51141.80	810.20	1053.52	2926.52	2013	

Source: World Bank Data.

Table No. (2) Possibilities of increase in the production of grain crops in the Arab world through Arab agricultural integration

((8-1)/1) *100	2*7=8	3+6=7	3*5=6	5					4					3	2	1	Statement
Increase in production after integration. (1,000 tons)	Total projected productionn (1,000 tons)	Average productivity expected after integration. (ton/hectare)	Expected increase in hectare yield because of integration	Total positive differences in hectare yield	Percentagee of learners (%)	Agricultural fertilizers (ton)	Number of agricultural machineries' s (Unit)	Agricultura l employment (1,000 workers)	Productivityy differences	Percentagee of learners (%)	Agricultural fertilizers (ton)	Number of agricultural machineries s (Unit)	Agricultura l employment (1,000 worker)	Productivity (ton/hectare)	Area (1,000 hectare)	Productionn A thousand tons.	
					Percentage of difference and causes of difference												
119.21	4556.53	3.07	1.67	1.19	0.283	0.471	0.284	0.154	0.82	18.53	208840	84419	1491	1.40	1482	2079	Tunisia
118.19	8569.92	3.18	1.72	1.18	0.280	0.467	0.281	0.153	0.81	18.23	311341	117440	728	1.46	2697	3928	Syria
90.51	4952.68	5.54	2.63	0.91	0.215	0.358	0.216	0.117	0.62	34.36	93967	47108	799	2.91	893	2600	Iraq
122.62	15225.47	2.72	1.50	1.23	0.291	0.485	0.292	0.159	0.84	12.94	310675	57159	4128	1.22	5592	6839	Morocco
141.17	7397.57	0.60	0.35	1.41	0.335	0.558	0.336	0.183	0.97	15.57	149296	31034	6505	0.25	12343	3067	Algeria
125.42	10436.67	2.43	1.35	1.25	0.297	0.496	0.299	0.162	0.86	31.04	76501	131530	2575	1.08	4303	4630	Sudan
—	—	—	—	—	—	—	—	—	—	29.54	1638332	116387	6843	7.67	2579	19775	Egypt**

Source: Collected and calculated using model 3 estimates, form 2 transactions, table number (1) in supplements.

* Negative differences have been excluded, which means that the state in question increases the share of the component or factor of production in question, so this difference has been excluded from the total percentage of differences, and only positive differences have been calculated.

**** Egypt:** The State of Comparison.