

Empowerment of Curbing the Grain Crops Gap in the Arab World

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Abstract: Perhaps providing food for man is one of the most serious problems which the world suffers today as it faces several serious challenges. As the Arab world possesses huge potentials in the material energies which dwell inside the earth and its fertile soil and its water and human sources that if correctly and scientifically exploited well, the food crises the world faces could be avoided. In spite of these resources which the Arab world possesses, it suffers from a food gap particularly in grains. It comes among the most grain-imported world nations. The grain average production reached about 53.07 million tons while the grain average gap estimated about 50.37 million tons during the (2004-2008) period. Wheat, barely, maize and rice are considered as main grain crops whose average production represents about 84.78% of the grain total production during the same period. Among the most important problem which the paper deals with is the large volume of grain gap in the Arab world. The paper has relied on the analytical, descriptive and statistical technique of published and unpublished data relevant to the research topic. The study has handled several scenarios to curb the grain crops gap in the Arab world and increase the self-sufficiency rate of the investigated crops (wheat, barley, maize and rice). The study has recommended the necessity of over-generalizing the cultivation of high-productivity grain crops in the countries where they are cultivated while exploiting the uncultivated areas in some Arab countries to cultivate grain crops. It has also recommended the necessity of applying the specialization method in production as each country should be specialized in producing the crops of which it has good production. Subsequently, it exports the surplus to the other Arab countries.

Key words: grains- wheat- barley- maize- rice- food gap- self-sufficiency- imports.

Introduction

Perhaps providing food for man is one of the most serious problems which the world suffers today as it faces several serious challenges. Food problem is not only a challenge to the economic system but for all social, political and security systems as well. There is no stability or safety in a world threatened by starvation and exhausted by malnutrition diseases. The problem worsens because of the high over populations particularly in the developing countries of which the Arab world is classified. The Arab world population increased from about 311.067 million to about 343.772 million in 2008 as compared to 2004. The increase rate estimated about 10.51%.

As the Arab world possesses huge potentials embodied in the material energies which widely dwell inside the earth and its fertile soil and its water and human sources that if correctly and scientifically exploited well, the food crises prevail in the world could be avoided. The Arab world possesses abundant water resources either surface or underground. The statistics confirms that the lack of irrigated land area is not attributed to the lack and scarcity of water but to its ill-exploitation. It is, moreover, attributed to the human power possessed by the Arab world and forms an important productive power if they are economically exploited.

In spite of these resources that the Arab world possesses, it suffers from a food gap particularly grains. The Arab world is counted as one of the most world nations importing grains. The grains gap average reached about 50.37 million tons during the period 2004-2008. Wheat, barley, maize and rice are considered as the main grain crops. The average production of these crops represents about 84.78% of the grains total production during the same period. Because of the food importance of the grains, the Arab world has turned into the first unable zone to secure its food requirements of these goods particularly for Egypt, Algeria, Saudi Arabia, Morocco and Iraq. The West countries or the exporting countries which provide aids to the Arab countries have become in control of the food, economic and political fate of the Arab countries.

Research Problem:

The Arab world is distinguished with several natural resources (land and water), human resources in addition to the capital. In spite of this, it suffers from food security problem in certain goods of which grains come on top. The self-sufficiency rate reached about 50.65% in the 2004-2008 period and the Arab grains

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imports estimated about 53.853 million tons valued about US \$ 12.842 billion representing almost 33.47 of the total Arab imports of the food goods.

Aim of the Research:

The potentiality of curbing the Arab grains imports while increasing the self-sufficiency rate under the recent political circumstance appeared in the Arab world. This entails the study of the grains current status in the Arab world, the grains foreign trade, drawing a number of scenarios that contribute towards lessening the grains food gap.

Research Method and Data Collection:

The research has relied on the descriptive statistical technique and a group of indicators to achieve its objectives. The study has relied on data, secondary available information whether published or unpublished in the Arab Organization for Agricultural Development and some relevant electronic websites.

Discussion of the Results:

Grains play an important role in the lives of people particularly those of the third world. Grains and their derivatives are considered as the main food for these people and still have a prominent position in the food of man and animal. Some types such as wheat have a strategic role in the policies of certain countries that laid pressures on other wheat non-producing countries. Therefore, these countries are trying to secure their self-sufficiency of wheat.

The popularity of these crops and their cultivation expansion in most world countries are attributed to the following:

1. Their dire need as food for all people.
2. Most grains crops are able to adapt with different environments. For example, wheat can be successfully cultivated in the European and African continents.
3. The small size of their seeds and the humidity lack of their contents (about 15%) make it easier for their transportation and storage without damage.
4. The grains crops are used in manufacturing several products.

The grains current position in the Arab world:

Introduction:

The Arab world possesses several fundamentals which may not be available for the existing economic blocs that can produce a strong economic entity. The Arab world consists of 22 countries with an area estimated about 14 million square kilometers, i.e. 1.4 billion hectares. These countries vary as well in their geographic and climate characteristics and economic positions. The Arab world produces about 53.07 million tons of grains representing a cultivated area estimated about 31.74 million hectares as an average period of (2004-2008). Wheat, barley and maize and rice are considered as the most important crops of grains with an average production estimated about 44.993 million tons representing almost 84.78% of the grains total production in the Arab world at the same period; of which wheat represents about 47.5%. Meanwhile corn, barley and rice represent almost 14.39%, 13.49%, and 9.4% out of the grains total production respectively during the same period.

As for the grains total consumption in the Arab world, it reached about 103.44 million tons as an average period of (2004-2008). Wheat represents almost 48.4% of the grains total consumption estimated about 50.09 million tons. Meanwhile the consumption of maize, barley and rice represent about 20%, 14% and 0.4% respectively of the grains total consumption during the same period. Thus, there is a gap in grains production estimated about 53 million tons.

Development of Grains Production and Consumption:

Because of the grains importance in the Arab world which is considered as a main food, it is necessary to identify the range of its production and consumption development. Thus, a comparison has been done of its total production, consumption and the gap of grains. A study was separately done on wheat, barley, maize and rice during the period of (2004-2008) and compared to the period of (1999-2003). The comparison shows an increase of the grains total production in the second period (2004-2008) as compared to the first period by about 16%, however the grains gap increased by 12%. This means that the production increase could not decrease the grains gap because of the increased consumption by about 14% during the same period. The table shows as well

the total production of wheat, maize, barley and rice increased by 18.03%, 6.67%, and 14.4% successively in the second period than their rates in the first period. The consumption increased in the second period as compared to the first period by about 17.06%, 11%, 17.86% and 16.15% for each crop respectively. Consequently the food gap of these crops increased as well in the second period as compared to the first period by about 16.1%, 13.69%, 27.45% and 21.26% for wheat, maize, barley and rice respectively. Because of the grains gap increase of these crops, it is necessary to lessen this gap in order to increase the self-sufficiency rate in the Arab world.

Table 1: Total production, consumption and gap of the grains crops in the two periods of (1999-2003), (2004-2008) Amount in million tons.

Items	1999-2003				2004-2008			
	production	consumption	gap	Self-sufficiency %	production	consumption	gap	Self-sufficiency %
Total grains	45.833	90.855	45.02	50.45	53.07	103.44	50.37	51.30
Wheat	21.359	42.789	21.43	49.92	25.044	50.087	25.043	50.00
Barley	4.835	12.23	7.395	39.53	4.990	14.415	9.425	34.62
maize	7.157	18.534	11.377	38.61	7.635	20.57	12.935	37.12
Rice	6.257	8.402	2.145	74.47	7.158	9.759	2.601	73.35

Source: Arab organization for agricultural development, annual statistics book, different editions.

Relative Importance of the Grains Producing Countries:

The production of grains in the Arab world is affected by several elements. The mostly important of these elements include the natural conditions, climate changes, level of cultivation technology and the availability of production inputs in addition to drought waves, the instability of rainfall rate recently in several developing countries which expected to continue the shortage of these food goods displayed particularly grains under the current and changeable developments. In addition, the continued high rising of grains prices in the recent years due to the successive unseasoned drought waves in some mainly producing areas of wheat like the United States. In addition, some great countries producing wheat tend to the vital fuel production out of these crops. The developing countries should work on providing their needs of grains without relying of these countries under this actual reality.

The production of wheat in the Arab world concentrated mainly in 6 countries producing about 46.17 million tons representing almost 87% of the grains total production in the Arab world estimated about 53 million tons (2004-2008) as shown in table (2). Egypt comes first in grains production by about 42.61% of the total production of the Arab world followed by Morocco, Sudan, Syria, Algeria and Iraq by rate estimated about 11.27%, 10.77%, 9.44%, 6.55% and 6.32% successively. Table (2) shows as well that Sudan comes first in the grains cultivated area in the Arab world by a rate estimated about 31% of the total cultivated areas in the Arab world estimated about 31.74 million hectares as an average period of (2004-2008) followed by Morocco, Syria, Iraq, Egypt and Algeria by rates estimated about 17.15%, 10.09%, 9.79%, 9.43% and 8.58% successively. This indicates that although Egypt comes first in the grains total production, it comes fifth in the cultivated area. This indicates that the rising of grains productivity which estimated about 7.5 ton/hectare. This could be attributed to the suitable climate conditions of grains production. In addition, the cultivation of high productivity sorts and the adoption of modern agriculture techniques. The following part of the study will handle separately the production of grains crops as its main topic in the most important producing Arab countries.

1. Wheat:

Wheat is considered as one of the most important food grains crops in the Arab world. It is a winter-seasoned crop whose cultivation is revolved around the Mediterranean basin. Its cultivation relies on the rainfall as in Morocco, Syria and Iraq or on the Nile River water as in Egypt and Sudan. Egypt, Syria, Morocco, Saudi Arabia, Algeria, Iraq is considered as the most important Arab countries producing wheat. Their production accounts for about 90.46% of the total wheat production in the Arab world; estimated almost 25.21 million tons as the average period of (2004-2008). Egypt, whose production amounts for 31%, comes first in wheat production in the Arab world as shown in table (3).

It is followed Syria, Morocco, Saudi Arabia, Algeria, Iraq, whose production account for 16.01%, 16.07%, 10.79%, 9.07%, 7.62% respectively. The total wheat cultivated area in the Arab world during the same period estimated about 11.34 million hectares. Morocco comes first by representing about 25.68% of the total Arab wheat cultivated area, followed by Algeria, Syria, Iraq, Egypt estimating about 15.91%, 15.3%, 15.18% , 10.58%, respectively. As for productivity, table (4) shows Egypt comes first in producing the wheat with the estimation of about 6.49 tons/ hectares, followed by Saudi Arabia, UAE, Oman, Lebanon, whose productivity amounted to about 5.62, 3.29, 3.08, 2.92 tons/ hectares, respectively.

Table 2: Cultivated area, production and productivity of grains in the (2004-2008) period.

Country	Area thousand hectares	%	Production thousand tons	%	Productivity Ton/hectare
Jordan	56.594	0.18	63.662	0.12	1.125
UAE	1.402	0.004	17.572	0.03	12.533
Tunisia	1531.272	4.82	1858.158	3.5	1.213
Algeria	2724.676	8.58	3476.390	6.55	1.276
Saudi Arabia	597.464	1.88	2939.468	5.54	4.920
Sudan	9863.112	31.07	5718.400	10.77	0.580
Syria	3202.858	10.09	5009.904	9.44	1.564
Somalia	778.000	2.45	451.900	0.85	0.581
Iraq	3107	9.79	3355.8	6.32	1.080
Oman	4.204	0.01	13.158	0.02	3.130
Palestine	33.114	0.10	68.748	0.13	2.076
Qatar	0.64	0.002	3.5	0.01	5.469
Kuwait	1.994	0.006	21.090	0.04	10.577
Lebanon	63.472	0.20	173.900	0.33	2.740
Libya	354.400	1.12	299.522	0.56	0.845
Egypt	2995.120	9.43	22620.522	42.61	7.552
Morocco	5445.708	17.15	5980.462	11.27	1.098
Mauritania	228.524	0.72	135.182	0.25	0.591
Yemen	756.404	2.38	873.006	1.64	1.154
Total	31745.958	100	52780.348	100	

Source: Arab organization for agricultural development, annual statistics book, different editions.

Table 3: Area and production of grains crops in the Arab world during the (2004-2008) period Area in thousand hectares Production in thousand tons.

Country	Wheat		Barley		maize		Rice	
	area	production	area	Production	Area	Production	area	Production
Jordan	20.032	19.752	35.142	19.112	0.722	7.148	-	-
UAE	0.01	0.074	-	-	-	-	-	-
Tunisia	956.264	1392.206	556.862	445.19	-	-	-	-
Algeria	1804.606	2286.204	842.286	1010.81	0.205	1.392	-	-
Saudi Arabia	451.176	2719.676	6.176	39.548	22.64	113.61	-	-
Sudan	266.364	542.4	-	-	43.176	67.4	6.804	23.2
Syria	1735.14	4063.714	1344.132	708.442	54.764	202.94	-	-
Somalia	2.652	0.994	-	-	263.00	122.02	2.84	17.2
Iraq	1721.6	1920.8	1097.8	726	160.15	377.6	105.95	312.6
Oman	0.316	0.992	1.17	3.434	-	-	-	-
Palestine	21.516	41.032	10.762	16.696	0.876	11.02	-	-
Qatar	0.01	0.026	0.546	2.052	0.074	1.172	-	-
Kuwait	0.182	1.746	0.982	1.99	0.264	7.112	-	-
Lebanon	49.604	144.26	14.118	27.96	0.83	3.38	-	-
Libya	90.8	80.96	199.264	97	1.428	3.282	-	-
Egypt	1200.39	7789.84	77.946	162.108	802.7	6496.5	675.6	6672.58
Morocco	2913.218	4052.258	1780.86	1702.65	236.02	157.44	5.32	48.78
Mauritania	0.262	0.71	0.522	1.098	20.25	10.898	18.21	84.51
Yemen	106.046	151.274	37.348	26.422	43.176	52.096	-	-
Total	11340.18	25208.91	6005.92	4990.51	1650.27	7635.02	814.72	7158.86

Source: Arab organization for agricultural development, annual statistics book, different editions.

2. Barley:

Barley is considered as one of the most important crops of grains on which it is mainly relied in feeding animals. Barley production in the Arab world constitutes almost 11.31% of the total grain production as an average period of (2004-2008). Morocco comes first in the total production and the barley cultivated area with the estimation of about 1.7 million tons and 1.8 million hectares. Each other represents about 34.12% and 29.65% of the total production and the cultivated area in the Arab world reached about 4.99 million tons and 6.00 million hectares respectively during the same period. Morocco, in terms of total production, is followed by Algeria, Iraq, Syria and Tunisia by the rates estimated about 20.25%, 14.55%, 14.19% and 8.92% of the total barley production in the Arab world. In terms of cultivated area, it is followed by Syria, Iraq, Algeria and Tunisia successively by rates estimated almost 22.38%, 18.28%, 14.02% and 9.27% of the total barley cultivated area in the Arab world during the same period. In terms of productivity, Saudi Arabia comes first followed by Qatar and Oman with rates estimated almost 6.31, 2.995 and 2.943 tons/hectares successively as shown in table (4).

3. Maize:

The importance of maize is due to being used in bread making by mixing it with wheat flour. It is also used as an oil crop by extracting corn oil which is used in cooking. In addition, it is used as fodder for animals. Maize production represents about 14.38% of the total grain production in the Arab world. Egypt comes first in terms of the cultivated area and total production estimated about 48.64% and 85.09% respectively of total land and total production of the maize which estimated about 1.650 million hectares and 7.635 million tons as an average period of (2004-2008). In terms of cultivated area, Egypt is followed by Somalia, Morocco, Iraq and Syria with estimation of about 15.94%, 14.3%, 9.7% and 3.32% of the total maize cultivated area in the Arab world in the same period.

In terms of production, it is followed by Iraq, Syria, Morocco and Somalia by rates of about 4.94%, 2.66%, 2.06% and 1.6% out of the total production respectively during the same period. The countries order differs in terms of the cultivated area and production due to the different productivity in these countries. Table (4) shows Kuwait comes first with the rate of 19.02 ton/hectare followed by Jordan, Qatar, Palestine and Egypt with the rates of about 16.28, 16.03, 12.42 and 8.9 ton/hectare as an average period of (2004-2008). Therefore, the reasons behind productivity rise in some countries than the others should be investigated in order to increase it in the other countries of the Arab world.

Table 4: Productivity of grains crops in the Arab world during the (2004-2008) period.

Countries	Wheat ton/hectare	Barley ton/hectare	Maize ton/hectare	Rice ton/hectare
Jordan	670.9	0.56	16.28	-
UAE	3.286	-	-	-
Tunisia	1.444	0.801	-	-
Algeria	1.267	1.19	5.397	-
Saudi Arabia	5.624	6.312	4.910	-
Sudan	2.234	-	2.024	3.421
Syria	2.311	0.533	3.68	-
Somalia	0.375	-	0.464	6.062
Iraq	1.144	0.686	2.362	2.941
Oman	3.083	2.943	-	-
Palestine	1.914	1.545	12.417	-
Qatar	2.321	2.995	16.031	-
Kuwait	2.08	2.001	19.02	-
Lebanon	2.919	1.978	4.22	-
Libya	1.113	0.486	2.295	-
Egypt	6.491	2.17	8.095	9.882
Morocco	1.361	0.671	0.661	6.922
Mauritania	2.567	2.106	0.671	4.68
Yemen	1.369	0.702	1.263	-

Source: Arab organization for agricultural development, annual statistics book, different editions.

4. Rice:

Many people rely on rice as a daily food for man because of its food importance as it contains a high rate of carbohydrates. Rice cultivation requires huge amounts of water, thus, its cultivation is not common in the Arab world. Rice is only cultivated in six countries in the Arab world with total area of about 814.72 thousand hectares covering about 7158.86 thousand tons as an average period of (2004-2008). Egypt comes first in terms of the cultivated area by 82.9% followed by Iraq and Mauritania with an estimation of about 13% and 2.23% of the total cultivated area. Egypt comes first as well in the total production by 93.2% followed by Iraq and Mauritania by about 4.37% and 1.18% successively. Table (4) shows the rice crop productivity in the Arab world as Egypt comes first by about 9.876 ton/hectare, followed by Morocco and Somalia by about 6.92 and 6.06 ton/hectare successively as an average in the same period.

Grains Foreign Trade:

It is self-evident; therefore, that there are two gaps in grains production and consumption in the Arab world. Thus grains are imported from abroad. The next section handles the volume and value of the foreign trade of the investigated grains and crops for each country of the Arab world countries during the two study periods (1999-2003) and (2003-2008). Table 5 shows the increase of the amount and value of grains imports in the (2004-2008) period by about 17.547% and 37.83% successively as compared to the (1999-2003) period. Meanwhile the amount and value of grains exports increase by almost 11.85% and 58.40% in the Arab world during the (2004-2008) period.

Table 5: Amount and value of grains imports and exports in the Arab world during the (2004-2008) period Amount in thousand tons - Value in million dollars.

Country	Grains imports				Grains exports			
	Amount Thousand tons	%	Value Million dollars	%	Amount Thousand tons	%	Value Million dollars	%
Jordan	2285.082	4.24	575.508	4.48	10.468	0.35	3.516	0.5
UAE	2283.986	4.24	717.516	5.59	427.698	14.49	86.266	12.16
Bahrain	77.742	0.14	48.3	0.38	1.57	0.05	3.666	0.52
Tunisia	5665.072	10.52	668.724	5.21	95.42	3.23	34.236	4.83
Algeria	7706.176	14.31	288.67	2.25	9.764	0.33	3.302	0.47
Djibouti	99.946	0.18	23.798	0.18	-	-	-	-
Saudi Arabia	9060.738	16.82	1868.184	14.55	50.53	1.71	15.074	2.12
Sudan	1751.448	3.25	393.586	3.06	60.75	2.06	11.284	1.59
Syria	2284.916	4.24	449.006	3.5	921.976	31.24	151.376	21.56
Somalia	554.428	1.03	142.848	1.11	-	-	-	-
Iraq	2989.712	5.55	650.498	5.06	-	-	-	-
Oman	5708.658	10.6	269.746	2.1	116.9	3.96	29.086	4.1
Palestine	310.898	0.58	79.172	0.62	-	-	-	-
Qatar	241.262	0.45	91.376	0.71	0.538	0.02	0.244	0.3
Kuwait	720.938	1.34	204.672	1.59	8.14	0.28	2.13	0.3
Lebanon	860.212	1.6	209.788	1.63	34.276	1.16	8.616	1.21
Libya	2022.952	3.76	712.748	5.55	-	-	-	-
Egypt	9621.236	17.86	1876.972	14.61	1044.25	35.38	318.014	44.84
Morocco	5005.55	9.29	1127.192	8.78	117.466	3.98	29.144	4.11
Mauritania	409.25	0.76	63.24	0.49	-	-	-	-
Yemen	2331.074	4.33	643.804	5.01	51.464	1.74	13.254	1.87
Total	53853.276	100	12842.358	100	2951.21	100	709.208	100

Source: Arab organization for agricultural development, annual statistics book, different editions.

The Relative Importance of Grains Importing and Exporting Countries:

The study of the Arab countries imports of grains as shown in table (6), Egypt is one of the most grains importing countries. Its imports volume amounted to about 9.621 million tons representing almost 17.86% out of the total grains imports in the Arab world during the (2004-4008) period followed by Saudi Arabia, Algeria, Oman, Tunisia and Morocco with the estimation of about 16.82%, 14.31%, 10.6%, 10.52 and 9.29% successively out of the total grains imports during the same period.

As for the exports of the Arab countries, table (7) shows as well that Egypt comes first with a rate of 35.38% of the total grains exports in the Arab world during the (2004-2008) period, followed by Syria, UAE, Morocco, Oman and Tunisia with the estimation of about 31.24%, 14.49%, 3.98%, 3.96% and 3.23% successively out of the total grains exports during the same period. Remarkably, the total exports of both Egypt and Syria represent about 66%. This means that these countries export certain crops more than other types of crops. At the same time they import other crops with high rates. Tables (6) and (7) show Egypt comes first in importing wheat and maize with the estimation of almost 22.28% and 30.59% respectively out of the total wheat and maize imports in the Arab world as their average reached about 24.860 and 13.025 million tons during the (2004-2008) period. Meanwhile Egypt comes first in exporting rice as its exports amounted to about 310.47 thousand tons; representing almost 92.85% of the total rice exports in the Arab world estimated almost 334.378 thousand tons as an average at the same period. Saudi Arabia comes first in importing barley and rice in the Arab world by about 64.76% and 26.28% respectively out of the total barley and rice imports in the Arab world estimated about 9.264 and 3.760 million tons respectively during the same period. Syria comes first in terms of wheat and barley exports as its exports estimated about 87.2% and 81.4% out of the total wheat and barley exports in the Arab world estimated almost 912.948 and 48.278 thousand tons successively during the same period. Therefore, it is necessary to achieve cooperation among the Arab world countries to establish the Arab common market so as to realize self-sufficiency among these countries. As such they will not be forced to seek help from the foreign countries to meet their needs of grains crops.

Scenarios to Curb the Grains Gap in the Arab world:

1. The First Scenario:

First: the wheat crop imports represent about 51% out of the investigated total grains imports during the (2004-2008) period. Therefore, it is necessary to work together to curb them through studying the most important grain-producing countries in order to increase productivity. This can be done through the increase of the cultivated areas or the cultivation of high-productivity types so as to increase the total production.

Table 6: Imports amount of the grains crops of the Arab countries during the (2004-2008) period. Amount in thousand tons.

Country	wheat	%	barley	%	maize	%	rice	%
Jordan	806.98	3.25	752.626	8.12	462.486	3.55	139.578	3.71
UAE	1197.814	4.82	211.982	2.29	156.952	1.2	724.122	19.25
Bahrain	21.63	0.09	0.794	0.09	0.312	0.00	44.906	1.19
Tunisia	1351.806	5.44	554.06	5.98	682.78	5.24	17.246	0.46
Algeria	5305.04	21.34	134.648	1.45	2157.946	16.57	72.488	1.93
Djibouti	27.384	0.11	-	-	0.894	0.01	27.67	0.73
Saudi Arabia	2.454	0.01	6000.542	64.76	1399.408	10.74	988.574	26.28
Sudan	1472.938	5.92	-	-	1.754	0.01	30.08	0.8
Syria	112.242	0.45	626.826	6.76	1218.256	9.35	256.526	6.82
Somalia	96.00	0.39	-	-	25.394	0.19	108.00	2.87
Iraq	2493.654	10.03	-	-	-	-	433.5	11.53
Oman	204.382	0.82	31.742	0.34	77.39	0.59	172.158	4.58
Palestine	87.598	0.35	61.098	0.66	55.594	0.43	56.3	1.5
Qatar	70.702	0.28	25.282	0.27	12.15	0.09	63.22	1.68
Kuwait	289.058	1.16	100.062	1.08	126.722	0.97	167.344	4.45
Lebanon	419.224	1.69	58.196	0.63	295.22	2.27	43.14	1.15
Libya	359.938	1.45	112.598	1.21	424.684	3.26	113.524	3.02
Egypt	5538.318	22.28	3.568	0.04	3984.706	30.59	5.308	0.14
Morocco	3057.37	12.3	589.75	6.36	1650.814	12.67	5.802	0.15
Mauritania	259.134	1.04	1.006	0.01	5.336	0.04	25.544	0.68
Yemen	1686.562	6.78	0.744	0.01	286.45	2.2	258.738	6.88
Total	24860.228	100	9264.532	100	13025.192	100	3760.97	100

Source: Arab organization for agricultural development, annual statistics book, different editions

As such it is self-evident that Egypt is among the most countries producing wheat estimated about 31% out of the total wheat production in the Arab world in spite of its reduced area. This is due to the cultivation of high-production types whose productivity estimated almost 6.5 tons per hectare. Therefore, the wheat total production can be increased by about 40211.69 thousand tons.

Table 7: Exports amount of the grains crops of the Arab countries during the (2004-2008) period. Amount in thousand tons.

Country	Wheat	%	Barley	%	sorghum	%	rice	%
Jordan	0.576	0.06	-	-	-	-	1.60	0.15
UAE	74.708	8.1	4.492	0.3	5.21	13.5	19.119	1.81
Bahrain	0.1	0.01	-	-	-	-	0.36	0.03
Tunisia	2.3	0.25	0.264	0.55	19.064	47.7	-	-
Algeria	-	--	-	-	-	-	-	-
Djibouti	-	--	-	-	-	-	-	-
Saudi Arabia	0.102	0.01	3.646	7.55	0.748	1.87	17.19	1.63
Sudan	-	-	-	-	1.61	4.03	-	-
Syria	803.602	87.2	39.292	81.4	1.374	3.44	0.08	0.01
Somalia	-	-	-	-	-	-	-	-
Iraq	-	-	-	-	-	-	-	-
Oman	11.648	1.26	0.102	0.21	0.222	0.56	1.038	0.1
Palestine	-	-	-	-	-	-	-	-
Qatar	0.088	0.01	-	-	0.042	0.1	0.094	0.01
Kuwait	-	-	-	-	-	-	0.3	0.03
Lebanon	11.996	1.3	-	-	1.122	2.81	1.59	0.15
Libya	-	-	-	-	-	-	-	-
Egypt	3.152	0.34	0.292	0.6	3.182	7.97	1012.896	95.9
Morocco	0.06	0.01	-	-	0.142	0.36	-	-
Mauritania	-	-	-	-	-	-	-	-
Yemen	13.668	1.48	0.19	0.39	7.216	18.07	2.048	0.19
Total	921.984	100	48.278	100	39.932	100	1056.33	100

Source: Arab organization for agricultural development, annual statistics book, different editions

Table 8: The first scenario to increase wheat production in the Arab world.

Country	Actual area	Current production	Expected production	Expected increase
Morocco	2913.218	4052.258	18935.917	14883.659
Syria	1735.14	4063.714	11278.41	7214.696
Iraq	1721.6	1920.8	11190.4	9269.6
Algeria	1804.606	2886.204	11729.939	8843.735
Total				40211.69

Calculated and computed based on table no. (3)

Based on the first scenario, this increase will decrease the grains imports amount by about 74.67%.

2. The second scenario:

The imports of maize come second as estimated about 24.7% out of the total investigated grains crops. Lessening this amount, high-productivity types can be cultivated like that cultivated in Jordan which represents about 16.28 tons/hectare in the countries which cultivate a large area but with low productivity as in Somalia, Morocco, Iraq, and Syria in order to increase the total production of maize. Cultivation of this type can lead to the cultivation of other high-productivity types that will lead to increasing production by almost 10.745 tons of maize and thus reduce grains imports by 19.952%.

Table 9: Second scenario to increase maize production.

Country	Actual area	Actual production	Expected production	Expected increase
Somalia	263.002	122.024	4281.672	4159.648
Morocco	236.018	157.458	3842.373	3666.915
Iraq	160.15	377.6	2607.242	2229.642
Syria	54.764	202.936	891.558	688.622
Total				10744.827

Calculated and computed based on table no. (3)

3. The Third Scenario:

Barley imports represent about 17.55% out of the total investigated grains. Morocco is among the most countries producing barley either in terms of area or total production in spite of the decrease of its cultivated area. Should the same areas are exploited by cultivating high-productivity types as in Egypt which produce about 2.2 tons/hectare, production will increase. Barley can be cultivated as well in a country like Saudi Arabia as it comes first in importing barley and its climate condition resemble Qatar whose productivity estimated about 3.76 tons/hectare. Productivity per hectare estimated about 6.312 tons. Thus, the cultivated area can increase by 1000 hectare in order to achieve total production of about 6400 thousand tons equivalent to what Saudi Arabia imports of barley.

Table 10: The third scenario to increase barley production.

Country	Actual area	Actual production	Expected production	Expected increase in production
Morocco	1780.86	1709.626	11397.504	9687.878
Mauritania	0.522	1.096	3.341	2.245
Egypt	77.946	162.128	498.854	336.726
Qatar	0.546	2.053	3.494	1.441
Kuwait	0.982	1.99	6.285	4.295
Total				10032.585

Calculated and computed based on table no. (3)

Should the cultivation of this type is implemented; the barley total production will increase by about 10.368 million tons.

This production increase represents about 19.252% out of the grains imported amount. Therefore, grains imports in the Arab world can be reduced by that rate due to the cultivation of high-productivity types of barley in the most important producing countries. At the same time, we can stop importing barley and there will be a surplus estimated 1103.29 thousand tons that can be exported overseas.

4. The Fourth Scenario:

The scenario focuses on the rice crop as it is one of the crops need certain climate conditions differ from the previous crops. In addition, it needs large amount of water irrigation which is not available in most of the Arab world countries. Egypt comes first in rice production followed by Morocco and Somalia. Rice production can be increased in the Arab world by increasing the cultivated area in these countries with ant-drought types which bear salinity and need not large amounts of water irrigation. These types should be of high-productivity as they are cultivated in Egypt and recently discovered such as the two types of Orabi 1 and Orabi 2. These two types need half of the water amount needed by the cultivated traditional types and their productivity exceeds other types and bears high salinity and drought. Furthermore, modern cultivation methods can be implemented to lessen the amount of water irrigation such as the method of cultivation in categories. Production can be increased as well by cultivating high-productivity types estimated about 9.882 in Somalia and Sudan to reduce rice imports volume by about 789.299 thousand tons representing about 1.47% of the grains imports in the Arab world.

The increase of grains production that can be achieved by cultivating modern and high-productivity types will cover the grains imports volume. Therefore, the Arab world can achieve self-sufficiency and the surplus estimated by almost 8260.363 thousand tons will be exported abroad.

Table 11: The fourth scenario to increase rice production.

Country	Actual area	Actual production	Expected production	Expected Increase in production
Sudan	6.804	23.2	67.237	44.037
Somalia	2.84	17.2	28.065	10.865
Iraq	105.95	312.6	1046.997	734.397
Total				769.299

Calculated and computed based on table no. (3)

Table 12: Scenarios for increasing production of grains crops Amount in thousand tons.

Country	Actual area	Current production	Expected production	Expected increase	Rate of covering imports
Wheat					
Morocco	2913.218	4052.258	18935.917	14883.659	59.869
Syria	1735.14	4063.714	11278.41	7214.696	29.02
Iraq	1721.6	1920.8	11190.4	9269.6	37.29
Algeria	1804.606	2886.204	11729.939	8843.735	35.57
Total		12922.98		40211.69	
Maize					
Somalia	263.002	122.024	4281.672	4159.648	31.93
Morocco	236.018	157.458	3842.373	3666.915	28.15
Iraq	160.15	377.6	2607.242	2229.642	17.12
Syria	54.764	202.936	891.558	688.622	5.29
Total		860.02		10744.827	
Barley					
Morocco	1780.86	1709.626	11397.504	9687.878	104.57
Mauritania	0.522	1.096	3.341	2.245	0.02
Egypt	77.946	162.128	498.854	336.726	3.634
Qatar	0.546	2.053	3.494	1.441	0.015
Kuwait	0.982	1.99	6.285	4.295	0.05
Total		1876.893		10032.585	
Rice					
Sudan	6.804	23.2	67.237	44.037	1.171
Somalia	2.84	17.2	28.065	10.865	0.289
Iraq	105.95	312.6	1046.997	734.397	19.527
Total		353		789.299	

Calculated and computed based on table no. (3) (4)

Therefore, it is self-evident that it is possible to curb the grains gap size should the early-mentioned scenarios are implemented. This can be done through generalizing the cultivation of high-productivity types which lead to the increase of the total production volume of grains crops by about 40.212, 10.032, 0.789 and 61.778 million tons representing almost 20.48%, 0.88%, 3.89% and 4.29% respectively of the agricultural imports value. That is, it lessens the agricultural imports value by about 31.51% as shown in table (13).

Table 13: Expected increase in the total production of the grains crops and its impact on imports Amount in the thousand tons- Value in million dollars.

Crop	Current production	Expected increase in production	Increase value of expected production	Total imports amount	Total imports value	% of agricultural imports
Wheat	12922.98	40211.69	9574.00	24860.23	5918.85	20.48
Barley	1876.89	10032.58	410.76	9264.53	1679.21	0.88
Maize	860.02	10744.83	1818.51	13025.19	2431.04	3.89
Rice	353	789.299	2005.41	3760.97	1956.75	4.29
Total grains	53080.74	61778.40	14732.29	53853.28	12842.36	31.51

Calculated and computed based on table no. (6) (12)

The Fifth Scenario:

Production increase by cultivating the uncultivated areas in the Arab world:

Uncultivated areas are defined as arable lands and have not been cultivated in certain season whether because of the unavailability of the necessary production elements or to restore their fertility once again. The area of uncultivated lands in the Arab world estimated about 17.688 million hectares in 2008 distributed over the Arab world countries.

It is possible as well to exploit the uncultivated areas in each country by cultivating the crops which are suitably good cultivated in such areas. Thus, the total production can be increase of the grains crops in the Arab world and their self-sufficiency rate. The uncultivated areas in the kingdom of Morocco estimate about 1997 thousand hectares which when cultivated with high-productivity types of barley will increase barley production by about 12.780 million tons. This production will cover the barley imports in the Arab world and the surplus can be exported outside the Arab world as shown in table (14). It is potential as well to exploit the uncultivated

areas in each country by cultivating the crops which each country produces. In the case of barley cultivation in the uncultivated lands in a similar way to the types cultivated in Morocco, its production will reach about 8862.9 thousand tons represent about 95.7% of the barley imported amount in the Arab world.

As for the maize and the realization of its self-sufficiency, the uncultivated areas in Sudan, where water and labors are available, can be cultivated with high-productivity types (8 tons). This will achieve production estimated almost 16974.8 thousand tons representing about 130.32% of the maize total production during the duration of the study. However, if it is cultivated with the traditional types cultivated in Sudan, it will achieve production estimated about 3310.9 thousand tons representing almost 25.41% of the maize imports volume during the same period. As for wheat, the uncultivated areas can be cultivated with high-productivity types of Morocco and Algeria. It will achieve production estimated about 52.21% and 93.17% of wheat imports volume. Should the traditional types are cultivated, it will achieve production estimated about 39.28% of the total wheat imports successively during the same period and thus reduces the wheat imports volume by about 50.45%.

Finally, the uncultivated areas in Sudan, Somalia and Iraq can be cultivated to achieve self-sufficiency of rice and export the surplus of consumption to the world countries. it is possible to produce about 7235.51 thousand tons in Sudan by cultivating the traditional types and about 20694.3 thousand tons by cultivating the-productivity types to achieve self-sufficiency estimated about 192.38% and 552.89% of the rice imports volume in the Arab world successively during the duration of the study. This indicates the importance of exploiting the uncultivated areas in each country to achieve self-sufficiency of the grains crops. This can be done through cooperation among the Arab countries, experience exchange, and modern technological methods. A future plan should be worked out for the Arab countries to observe the natural and human resources in them in order to achieve best exploitation of them in cultivating the strategic crops that will curb the grains food gap in the Arab world. Therefore, it is necessary to coordinate among the Arab countries in terms of production specialization according to the economic situations in each country. Therefore, it is self-evident that mass media should be effective to bring in the foreign investments into the Arab countries in order to exploit their resources. The current Arab mass media are but advertising institutions which only show the positive aspects of their operations and promote for activities which the country needs regardless of their usefulness in attracting the foreign investors.

Table 14: The actual and expected production for grains crops resulted from the cultivation of the uncultivated areas in the Arab world Area in thousand hectares- production in thousand tons.

Crops	The uncultivated area	The expected production (1)	The expected production (2)	Productivity (3)	Productivity (4)
Wheat					
Tunisia	939.58	1443.195	1443.195	1.536	1.536
Algeria	3563.3	5473.229	4514.701	1.536	1.267
Morocco	1997.0	3067.392	2777.827	1.536	1.391
Syria	10555.67	2472.379	2472.37	2.342	2.342
Iraq	3149.75	7376.714	3515.121	2.342	1.116
Barley					
Morocco	1997.00	4153.76	1917.12	2.08	0.96
Tunisia	939.58	1954.326	751.664	2.08	0.8
Algeria	3563.3	7411664	4275.96	2.08	1.2
Syria	1055.67	3093.113	559.505	2.93	0.53
Iraq	3149.75	9228.767	2110.332	2.93	0.67
Sorghum					
Somalia	328	511.68	150.88	1.56	0.46
Sudan	2121.85	3310.09	3310.09	1.56	1.56
Morocco	1997	3115.32	1337.99	8.09	0.67
Syria	1055.67	3916.536	3916.536	3.71	3.71
Iraq	3149.75	11685.57	7433.41	3.71	2.36
Rice					
Sudan	2121.85	20961.76	7235.51	9.879	3.41
Somalia	328.00	3240.312	1986.368	9.879	6.056
Iraq	3149.75	31116.38	9291.762	9.879	2.95
Morocco	1997.00	19728.363	18310.493	9.879	9.169

Calculated and computed based on table no. (3) (4) (6)

Where:

1. The actual production of cultivating the high productivity types.
2. The expected production of cultivating the types normally cultivated in each country.
3. Productivity of high productivity types.
4. Productivity of current cultivated types

In several Arab countries there is no incentive policy, support or activation for the agricultural sector. In the Arab world, there is no notional economic integration as each country plans and implements its projects and separately exploits its powers away from the other countries. Therefore, the inter-Arab trade is weak compared with their trade with the foreign countries. The realization of grains self-sufficiency is one of the major challenges in the Arab world under the outstanding economic blocs.

Summary:

Perhaps providing food for man is one of the most serious problems which the world suffers today as it faces several serious challenges. As the Arab world possesses huge potentials in the material energies which dwell inside the earth and its fertile soil and its water and human sources that if correctly and scientifically exploited well, the food crises the world faces could be avoided. In spite of these resources which the Arab world possesses, it suffers from a food gap particularly in grains. It comes among the most grain-imported world nations. The grain average production reached about 53.07 million tons while the grain average gap estimated about 50.37 million tons during the (2004-2008) period. Wheat, barely, sorghum and rice are considered as main grain crops whose average production represents about 84.78% of the grain total production during the same period. One of the most important problems that the research has dealt with is the huge size of the grains gap in the Arab world because of partition and separation whose countries live in and due to the irregular distribution of its population. This has negative effect on food production. There is no Arab economic integration as each country plans, implements its projects and separately exploits its powers away from the other countries. Therefore, study aims to examine the current situation of grains in the Arab world. The main grains crops (wheat, barley, maize and rice) have been chosen. In addition, the volume of each country foreign trade of each crop has been examined in the Arab world. The study has attempted as well to devise certain solutions and suggestions to curb the grains gap and increase their self-sufficiency. The paper has relied on the analytical, descriptive and statistical technique of published and unpublished data relevant to the research topic. The study has handled several scenarios to curb the grain crops gap in the Arab world and increase the self-sufficiency rate of the investigated crops (wheat, barley, maize and rice). The study has taken into considerations concerning these scenarios the quite similarity among some Arab countries in the climate conditions, applied irrigation methods in each country, the availability of natural and human resources to increase the production of grains crops. The first scenario indicates that Egypt is the largest country producing wheat by about 31% out of the total wheat production in the Arab world in spite of its reduced cultivated area because of the cultivation of high-productivity types by almost 6.5 tons/hectares. Consequently, the total wheat production can be increased by about 40211.69 thousand hectares should Morocco, Syria, Iraq and Algeria cultivate the same type cultivated in Egypt instead of the types they currently cultivate. The second scenario recommends the cultivation of maize types cultivated in Jordan due to their high-productivity estimated about 28.16 tons/hectares in Somalia, Morocco, Iraq and Syria. Thus, production can increase by almost 10.745 million tons and hence reduce the grains imports volume by about 19.952%. Meanwhile, the third scenario recommends the cultivation barley types cultivated in Egypt because of their high productivity by about 2.2 tons/hectares to be cultivated in Jordan instead of the currently cultivated type in same area in which it is currently cultivated. Barley can be cultivated in Saudi Arabia base on the type cultivated in Qatar. About 1000 hectares can be cultivated with barley to realize a production estimated about 6400 thousand tons which is equal to Saudi Arabia's imports of barley. This type can be cultivated in the most barley producing countries (Morocco, Mauritania, Egypt, Qatar and Kuwait). Production will increase by almost 10.368 million tons representing about 19.252% of grains imports. Thus, barley self-sufficiency can be achieved while exporting the surplus overseas.

The fourth scenario recommends the cultivation of high-productivity rice types cultivated in Egypt by about 789.299 thousand tons representing almost 1.47% of the grains imports in the Arab world to achieve self-sufficiency and export the surplus overseas.

The fifth scenario has focused on the exploitation of uncultivated areas in some Arab countries to cultivate grains crops being cultivated in these countries whether the same currently-cultivated types or cultivating the high-productivity types and comparing the production in both cases. Therefore, self-sufficiency of the investigated grains crops can be achieved and export the surplus outside the Arab world.

The study has recommended the necessity of over-generalizing the cultivation of high-productivity grain crops in the countries where they are cultivated while exploiting the uncultivated areas in some Arab countries to cultivate grain crops. It has also recommended the necessity of applying the specialization method in production as each country should be specialized in producing the crops of which it has good production. Subsequently, it exports the surplus to the other Arab countries.

Suggestions and recommendations:

- Over-generalizing the cultivation of high-productivity grain crops in the countries where they are cultivated.

- Exchanging the agricultural expertise among the Arab countries to activate the international technological cooperation among them and provide the countries which lack expertise like Somalia and Sudan due to the weak economic potentiality that enable them to use technology in agriculture.
- Advising the Arab countries to apply the specialization method in production as each countries specializes in cultivating their distinguished crops to need the domestic consumption need and export the surplus to the other countries in order to achieve the self-sufficiency of these crops without seeking the imports of the foreign countries.
- Exploiting the uncultivated areas to cultivated the strategic crops in each country to achieve self-sufficiency through cooperation among the Arab countries and help the other countries in their cultivation by providing them with the necessary production elements such as human resources and technological means through common projects among the Arab countries.

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