

## Food gap and food security of sugar in Egypt

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### Abstract

The research aims mainly to study food gap and food security of sugar in Egypt through studying of several sub-goals represented in: estimating models of general trends function for some economic indicators of sugar in Egypt during the period (1995- 2012), studying of the most important indicators of food security of sugar, estimating the size of the food gap of sugar and knowledge of the most important factors responsible for, and studying the policies and means to achieve food security of sugar in Egypt. Descriptive and quantitative analysis were used. The study depends on secondary data, which collected from local and foreign sources during the period (1995-2012).

A study models of the general trend function for economic indicators showed that each of the total domestic production of sugar, domestic consumption, and the average per capita consumption, the amount of sugar imports, food gap of sugar, the price of Egyptian imports of sugar and periods of coverage of domestic production and the quantity of imports for consumption daily from sugar, and found that all of these variables has taken a general trend upward morally statistically significant at the level of probability (0.01) with the exception of a variable of coverage period of local production for daily consumption which took a general trend decreasing, and also did not identify the statistical significance of the variables of self-sufficiency rate and the period of coverage of imports for daily consumption , while the annual growth rates differed according to each variable.

The conduct study show that the most important variables specific to the food gap of sugar are all from the local production of sugar, the average real price of Egyptian imports of sugar where it was found that the impact of each of these two variables on sugar gap be negative.

The study showed that the strategic stock for sugar is estimated at 1.45 million tons and the average local consumption of sugar is estimated at about 2.17 million tons during the study period (1995-2012), thus estimated food security of about 0.84 is therefore required to take various actions which lead to increase the size of the strategic stock of sugar enough for half of it needs for domestic consumption even come close to the value of suitable coefficient of sugar food security

The study showed that the policies and means to achieve sugar food security include horizontal agricultural development policy, vertical agricultural development policy, the policy of rationalizing the consumption of sugar, policy of consumer subsidy of sugar, and the policy of diversifying sources of imported sugar.

In the light of the results of the study illustrated by research it has been possible to reach some of the following recommendations:

- 1- It is necessary to intensify efforts to agricultural extension and agricultural research centers in collaboration with factories engineers and agriculture departments and supervisors agricultural awareness of the importance of agriculture resistance to pests and diseases that affect the crop, and help them get on pesticides is harmful to the environment to do so.
- 2- Increasing of sugar production through the expansion of sugar crops, particularly sugar beet to the lack of water needs compared to sugar cane harvest in the new land.
- 3- Increasing of sugar productivity crops through dissemination of sugar varieties of high productivity and to suit every center of administrative centers in Egypt.
- 4- Rationalizing the consumption of sugar during dismiss the size of the loss of sugar.
- 5- to achieve food security has to be the need to develop awareness programs for the application of planning policy breeds where it is one of the most important determinants of the demand for i Egyptian imports of sugar.
- 6- it is important to put a national strategy to increase the self-sufficiency ratio of sugar with the need to import and distribute the amounts of diversification between different sources in order to avoid what might happen from political pressure in favor of the Egyptian economy is in the case of international political conditions change.
- 7- It is necessary to study the reduction commitments of support granted to the production and export in the sugar-exporting countries in order to reduce the negative effects on the Egyptian Savin.

**Key words: Food gap; Food security; Sugar; Egypt**

**- Introduction:**

Sugar considers from one of most important food commodities and basic strategy that follows wheat in consumer important in Egypt as it is one of the commodities relatively cheap source of energy, which impair the attention of Egyptian agricultural policy-makers, has become the food security of major food crops in general and sugar in particular target nationally for its association with aspects of political, economic and social development, especially in light of globalization. Reflected the importance of sugar as a strategy commodity on the movement of international trade and the threat of particular importance to the balance of payments in developing countries, and the production of sugar in the world depends on two main crops, sugar cane and sugar beets, according to figures during the period of study (2010- 2012) the average of amount sugar production in Egypt is about 1.93 million tons, sugar cane crop contributes about 989.16 thousand tons, representing approximately 51.07% of the total sugar production, while sugar beet crop contributes about 947.67 thousand tons, representing approximately 48.93% of the total production, while the total consumption of sugar is about 2.51 million tons , and up the food gap of sugar is about 603.3 thousand million tons, the self-sufficiency rate of about 76.46% and the average per capita consumption of sugar is about 30.13 kg per year (Ministry of Agriculture and land reclamation, Sugar Crops Council, the annual report of crops sugary and sugar production in Egypt, reports 2010-2012 ).

The research problem is that despite the increase achieved in the production of sugar crops in Egypt from the development and modernization of farming methods, however there are still a gap between sugar production and consumption was estimated at 603 thousand tons during the previous period, and the amount of sugar imported about 1.15 million tons with value of about 762 million dollars during the previous period (Ministry of Agriculture and land reclamation, sugar Crops Council, the annual report of crops sugary and sugar production in Egypt, reports (2010-2012).Due to limited farmland and water resources in Egypt at a time of increasing aggregate demand on sugar as a result of the increase in population and increasing level of income which would entail an increase of the food gap of sugar, which is the inability of the domestic production of sugar to meet the needs of local consumer of it, and are covered by this sugar gap through sugar imports, which negatively affects the Egyptian agricultural trade balance and then Egyptian balance of payments.

**- Research objectives:**

The main objective of this research is studying of the food gap and the food security of sugar in Egypt, this objective can achieve by achieving the following objectives :

- 1- Estimating models of general trends functions for some economic indicators of sugar in Egypt during the period (1995-2012) .
- 2- Estimating the size of the food gap of sugar and knowledge of the most important factors responsible on it .
- 3- Studying of the most important indicators of food security for sugar in Egypt .
- 4- Studying of policies and means to achieve food security of sugar in Egypt.

**- Research methodology and sources of data:**

The research based on each of the stylistic descriptive and quantitative analysis represented in the estimation of some models directivity of economic variables in question in its linear models and a semi logarithmic in the dependent variable for calculating the annual growth rates of these variables, as well as the method was used multiple regression analysis to determine the most important factors responsible for the size of the sugar gap, the use of certain economic indicators to measure the impact of factors affecting the coefficient of food security of sugar in Egypt.

The research depends on secondary data published in different bulletin of agricultural economy issued by the Ministry of Agriculture and land reclamation, and the annual reports of the various sugar production for the Sugar Crops Council, and the Central Agency for Public Mobilization and Statistics, as well as bulletins of the United Nations Food and Agriculture Organization (FAO) were used, also some research and scientific communications and some foreign references associated with the subject of the search, as well as the use of the Internet to get the international information related to the search.

## - Research results and discussion

### - First: The statistical analysis of some economic indicators of sugar in Egypt during the period (1995-2012):

A study models of the general trend function for economic indicators showed that each of the total domestic production of sugar, domestic consumption, and the average per capita consumption, the amount of sugar imports, food gap of sugar, the price of Egyptian imports of sugar and periods of coverage of domestic production and the quantity of imports for consumption daily from sugar, and found that all of these variables has taken a general trend upward morally statistically significant at the level of probability (0.01) with the exception of a variable of coverage period of local production for daily consumption which took a general trend decreasing, and also did not identify the statistical significance of the variables of self-sufficiency rate and the period of coverage of imports for daily consumption , while the annual growth rates differed according to each variable (table I). The following review of the results of these models :

**1- Evolution of sugar production:** Sugar production in Egypt includes both sugar cane and sugar beet, and sugar production fluctuated from a minimum of approximately 1125 thousand tons in 1996 and a maximum of around 1996 thousand tons in 2008 with an annual average rate of about 1510 thousand tons during the study period (1995-2012), and the production of sugar took a general trend statistically significant at 1% and the amount of the annual increase amounted to about 54.66 thousand tons, and the annual growth rate of about 3.64% .

**2- Evolution of domestic consumption of sugar:** It is not surprising that domestic consumption of sugar takes a general trend upward morally statistically significant at the potential level (0.01), where the annual average growth rate of about 4.62% with an annual average rate of approximately 2168 thousand tons, and if coupled with the passage of time to grow steady in the population, this will lead to a steady increase in the consumption needs of sugar in various forms .

**3- Evolution of per capita consumption of sugar:** Per capita consumption of sugar in Egypt ranged between a minimum of approximately 23.9 kg per capita in 2007 and a maximum of around 33.9 kg per capita in 2009 with an annual average rate of about 28.24 kg per capita during the study period (1995 to 2012 ), and the annual average per capita consumption of sugar takes a general trend statistically significant at 1% and the amount of the annual increase amounted to about 0.36 kg per capita, and the annual average growth rate of about 1.23% .

**4- Evolution of the amount of Egyptian sugar imports:** The problem of increasing Egyptian sugar imports considers from the fundamental problems facing the Egyptian economy because of its negative effects on Egyptian agricultural trade balance and then Egyptian balance of payments, especially in light of increased prices of imports of sugar in the world market, it which requires expansion in the cultivation of sugar crops in Egypt, but that the policy of horizontal development facing several difficulties, most notably the great competition between the area of sugar crops and the rest of other agricultural crops on the farmland, and sugar cane crops needs more water resources per feddan<sup>1</sup> reached about (13,000 - 15,000) m<sup>3</sup> of irrigation water. The Egyptian sugar imports have an important role to cover the gap between domestic production and the consumer needs of sugar. Table (1) shows that the sugar imports ranged from a minimum of approximately 355 thousand tons in 2002 to a maximum of approximately 1229 thousand tons in 2012 with an annual average rate of about 713.89 thousand tons during the study period, and the Egyptian imports of sugar took trend years statistically significant at 1% and the amount of the annual increase amounted to about 42.78 thousand tons, and the annual growth rate of about 3% .

**5- Evolution of Egyptian price imports of sugar:** Egyptian price imports of sugar is particularly important as the increasing negative impact on Egyptian agricultural trade balance and then Egyptian balance of payments, and review the data in table (II) shows that the Egyptian price imports of sugar ranged between a low of about 217 dollars per ton in 2004 and a maximum of around 768 dollars per ton in 2012 with an average annual rate of about 356.7 dollars per ton, and the Egyptian price imports of sugar took a general trend morally statistically significant at 1% and total amount of the annual increase of about 16.09 dollars per ton, and the average annual growth rate of about 3.32.%

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<sup>1</sup> Feddann = 0.42 hectare

**Table (I): Evolution of imports, coverage periods of local production and imports daily consumption of sugar in Egypt during the period (1995 – 2012)**

Year	Production (10 <sup>3</sup> tons)	Imports (10 <sup>3</sup> tons)	Consumption (10 <sup>3</sup> tons)	Coverage period / day			Total period (2+3)	Capita consumption kg
				Daily local consumption (1)	Local production for consumption (2)	Imports for consumption (3)		
1995	1132	392	1586	4345.2	260.5	90.21	350.7	26.3
1996	1125	646	1574	4312.3	260.9	149.8	410.7	25.6
1997	1131	750	1570	4301.4	262.9	173.4	437.3	26.1
1998	1167	375	1698	4652.1	250.9	81.5	332.4	25.0
1999	1243	400	1787	4895.9	253.9	81.7	335.6	26.1
2000	1394	385	1800	4931.5	282.7	80.1	362.8	27.5
2001	1406	504	1832	5019.2	280.1	100.4	380.5	27.0
2002	1373	355	1837	5032.9	272.8	70.5	343.3	29.3
2003	1285	827	1624	4449.3	288.8	185.9	474.7	30.2
2004	1470	631	1750	4794.5	306.6	131.6	348.2	31.1
2005	1509	555	2064	8684.8	266.9	98.1	365.0	31.0
2006	1716	975	2100	5753.4	298.3	169.5	436.4	31.9
2007	1820	791	2239	6134.2	296.7	128.9	425.6	23.9
2008	1996	1162	3275	8972.6	222.5	129.5	352.0	33.8
2009	1611	654	2912	7978.1	201.9	82	283.9	33.9
2010	1992	1075	3209	8791.8	226.6	122.3	348.9	33.4
2011	1898	1144	3018	8268.5	229.5	138.4	367.9	27.7
2012	1920	1229	3149	8627.4	222.5	142.5	365.0	29.3
<b>Annual average</b>	1510	713.89	2168	6108.06	260.28	119.80	373.38	28.84
<b>Min. limit</b>	1996	1229	3275	8972.6	306.6	185.9	474.7	33.9
<b>Maxi. limit</b>	1125	355	1570	4301.4	201.9	70.5	283.9	23.9
<b>Amount of change</b>	<b>**54.66</b>	<b>**42.78</b>	<b>**104.75</b>	<b>**296.4</b>	<b>*2.29 –</b>	<b>Non significant</b>	<b>Non significant</b>	<b>**0.36</b>
<b>Rate of change %</b>	<b>3.64</b>	<b>3.00</b>	<b>4.62</b>	<b>4.75</b>	<b>0.98 –</b>	<b>Non significant</b>	<b>Non significant</b>	<b>1.23</b>

(1) Daily domestic consumption = domestic consumption / number of days per year.

(2) The period of coverage of local production to daily consumption = domestic production / daily domestic consumption.

(3) The import coverage daily consumption = quantity of imports / domestic consumption daily.

\*\* : Significant at 0.01

**Source:** Compiled and calculated from (1) The Central Agency for Public Mobilization and Statistics [www.capmas.gov.eg](http://www.capmas.gov.eg).

(2) Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, central administration agricultural economy, food balance Egypt, different volumes.

(3) [www.faostat.org](http://www.faostat.org)

**6- Development of the sugar food gap in Egypt:** With respect to sugar gap, the beginning of the sugar gap in Egypt began with the beginning of the open door policy in 1974 and the subsequent increase in income level classes of Egyptian people and this policy characterized as a consumer policy. The sugar food gap in the inability of the domestic production of sugar to cover the consumer needs it, for that gap, it is considered from the most important problems faced by Egyptian planners and policy economic makers because sugar is one of the strategic commodities in the world market, especially after the direction to be used in the production of biofuels, and for this it must identify how the possibility of achieving self-

sufficiency ratio of sugar to study the size of sugar gap and the factors influencing them to determine the extent of the possibility of reducing the sugar gap in the future period. Table (II) shows that the Egyptian sugar food gap ranged between a minimum of approximately 288 thousand tons in 2004 to a maximum of approximately 1301 thousand tons in 2009 with an annual average rate of about 658 thousand tons, and took the price gap Egyptian sugar general trend morally statistically when 1% annual increase amounted to about 54.66 thousand tons, and the annual growth rate of about 3.64%.

**- Second: Determinants of Egyptian sugar food gap :**

The sugar food gap determines by production and domestic consumption which covers much of the imports par with it, and assumed that the change in production will Aikunlh negative impact reverse direction on the amount of imports from the country, while the effect of the change in consumption will have a positive effect in the same direction, as can be theoretically, the variable of Egyptian price imports of sugar as one of the determinants of that gap and is supposed to be a negative impact on that gap.

**- Standard estimation for the most important variables specific to the sugar food gap :** to study and measure the impact of some of the variables specific to the sugar food gap was estimated relationship between the amount of the gap of sugar (thousand tons) as the dependent variable, and all of the domestic production of sugar ( $X_1$ ) (thousand tons), and the annual average per capita consumption of sugar ( $X_2$ ) (kg) and the average real price of Egyptian imports of sugar ( $X_3$ ) (\$ / ton) during the study period (1995-2012) and found that the best mathematical model reflects that relationship is the following equation:

$$Y = - 582.35 - 0.58 X_1 - 1.03 X_3$$

$$(- 2.03) \quad (-2.63) \quad (-2.31)$$

$$F = 13.02 \quad R^2 = 0.64$$

It is clear from the above equation that the impact of each of  $X_1$ ,  $X_3$  on sugar gap be negative as the change in the amount of domestic production of sugar by 1% will lead to a change rate of 5.8% in the amount of that gap in the opposite direction, and the change in the average real price imports of sugar by 1% leads to a change by 10.3% in the amount of that gap in the opposite direction.

**- Third- Egyptian food security of sugar :**

Growing interest in the topic of food security in most parts of the world is necessary which suffers from a gap between production and consumption of major food commodities that may be caused by variables such as the continued increase in the number of population and increasing individual income levels, and the inability of the agricultural resources in those countries on the production enough of those commodities. to meet these numbers of the population, in addition to the increase in food prices in the world markets, leading to higher prices in local markets have imported .

It should be noted that the concentration of agricultural production surplus, food has a limited number of developed countries in North America, Europe, and the direction of those countries to be regarded as surplus food a strategic nuclear weapons to impose political trends for these countries to other importing countries it makes the problem of providing food a major factor in achieving the national security of those importing the largest countries amount of food, which means that provides the ability to buy food from the world surplus does not necessarily mean access it easily, and therefore, food security has become a key component of national security .

The interest of food security issues was increased after the application and implementation of the WTO agreements, especially the Agreement on Agriculture and the related cancellation subsidy producers and consumers of food, as well as the elimination of export subsidies of food and convert all quantitative restrictions in trade restrictions which has led to an increase the value of imports for a large number of food commodities .

**Table (II): Development of production, consumption, sugar gap and Egyptian price import during the period (1995 – 2012)**

Year	Production (10 <sup>3</sup> tons)	Consumption (10 <sup>3</sup> tons)	Gap (10 <sup>3</sup> tons)	Price imports (\$/ton)
1995	1132	1586	454	367
1996	1125	1574	449	323
1997	1131	1570	439	351
1998	1167	1698	531	302
1999	1243	1787	544	300
2000	1394	1800	406	289
2001	1406	1832	426	278
2002	1373	1837	464	245
2003	1285	1624	339	224
2004	1470	1750	288	217
2005	1509	2064	555	250
2006	1716	2100	384	350
2007	1820	2239	419	270
2008	1996	3275	1279	298
2009	1611	2912	1301	385
2010	1992	3209	1217	503
2011	1898	3018	1120	701
2012	1920	3149	1229	768
<b>Annual average</b>	<b>1510</b>	<b>2168</b>	<b>658</b>	<b>356.72</b>
<b>Max. limit</b>	<b>1996</b>	<b>3275</b>	<b>1301</b>	<b>768</b>
<b>Min.. limit</b>	<b>1125</b>	<b>1570</b>	<b>288</b>	<b>217</b>
<b>Amount of change</b>	<b>**54.66</b>	<b>**104.75</b>	<b>**50.09</b>	<b>**16.09</b>
<b>Rate of change %</b>	<b>3.64</b>	<b>4.62</b>	<b>6.35</b>	<b>3.32</b>

**Source:** Compiled and calculated from: (1) Central Agency for Public Mobilization and Statistics

[www.capmas.gov.eg](http://www.capmas.gov.eg)

(2) Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, central administration agricultural economy, food balance Egypt, different volumes.

(3) [www.faostat.org](http://www.faostat.org)

This section deals with an overview of the most important indicators of sugar food security in Egypt. This is done through the review and analysis of the period of coverage of all domestic production of Egyptian and Egyptian imports annually for national consumption of sugar, as well as to estimate the coefficient of food security for the period covered by statistical analysis research (1995-2012), and then a review of some aspects of the policies and the means to achieve the Egyptian food security of sugar as a top priority for its association with the lives of all Egyptians, because the most important one of the main sources for cheap energy .

#### **- The most important indicators of Egyptian food security of sugar:**

This part of the study deals the most important indicators of food security for sugar in Egypt during the study period (1995-2012) to calculate the coefficient of food security for sugar commodity, which is represented in each of the Egyptian production of sugar, which is about 1.92 million tons in 2012, domestic consumption of approximately 3.15 million tons in 2012, and leads to the fact that the average per capita consumption of sugar approximately 29.3 kg a year, and the consequences of that the sugar gap is nearly 1.23 million tons in 2012 .

The length of the period of cover production and decrease the period of coverage of imports for the national consumption which consider good step indicate the direction to achieve food security somewhat, and that indicates a reduced reliance on imports from abroad .

**1- Egyptian daily consumption of sugar:** Table (I) showed the Egyptian daily consumption of sugar during the period (1995-2012) that ranges from a minimum of about 4.30 thousand tons in 1997 and a maximum of about 8.97 thousand tons in 2008 with an annual average rate of nearly 6.11 thousand tons during the study

period and the Egyptian daily consumption of sugar took a general trend upward statistically significant at the 1% which estimated at 296.4 tons, representing about 2.22% of the annual average of the Egyptian daily consumption of sugar and the annual average growth rate of about 4.75%.

**2- The period of cover Egyptian production to daily consumption of sugar:** This period knows as a period which can be covered by the Egyptian production of sugar for the needs of daily food for the population, and can be seen reviewing a period during the years (1995-2012) it ranges from a minimum of about 201.9 days in 2009 and a maximum of about 306.6 days in 2004 with an annual average rate of about 260.8 days table (I). The period of cover the Egyptian production for domestic consumption of sugar take a decreasing general trend during the period referred to statistically significant at the 5% estimated 2.29 day and the annual growth rate was about 0.98%. The decrease is due to cover the period of Egyptian production of sugar for your daily consumption of it that the rate of annual growth in national consumption of sugar (4.62%) more than the annual growth rate in the domestic production of sugar (3.64%) during the study period .

**3- The period of cover of Egyptian imports for daily consumption of sugar:** This period knows as the period which can cover the annual import of sugar to daily nutritional needs of the population, which can be seen during the review period (1995-2012), they range from a minimum of about 58.4 days in 2004 and a maximum of about 163 days in 2009 with an annual average rate of approximately 104.7 days during the study period and shows lack of moral equation of the general trend for the time period covering the Egyptian imports for daily consumption of sugar -Table (I).

**- Fourth - Determination of Egyptian strategic stock from sugar :**

The strategic stock for a commodity knows that the quantities held by the government and the private sector to meet the expected demand for domestic and export on this item during a future period of time. It is estimated that the strategic stock during a certain time period that the outcome of the entire surplus directed to the development of the strategic stock in some years and the amount of the deficit, which is withdrawn from inventory during the other years, which shows the deficit in domestic consumption. That is maintaining a strategic stock of sugar of the most important considerations of Egyptian national food security. Strategic stock is configured through domestic production or through imports or both. It turns review the amount of Egyptian strategic stock from sugar during the period (1995-2012) that up to approximately 1.43 million tons, and this is sufficient for the consumption of about 233.78 days, or about 7.79 months, which necessitates the need to increase the size of the stock at about 771.69 thousand tons of sugar to enough for domestic consumption for 12 months or about 385.85 for 6 months conformable to Egyptian national food security considerations - (Table III).

**1- Surplus and deficit in the consumption of sugar allocated for the Egyptian national during the study period (1995-2012):** Reviewing a surplus and the deficit in the Egyptian national consumption of sugar allocated during the study period (1995-2012), through calculated by the following equation (the sum of two terms insufficient production and imports - 365) \* daily consumption) and therefore no surplus through for the years of 1996, 1997, 2001, 2003, 2004, 2006, 2007, 2011. It turns reviewing a surplus in the sugar allocated for the Egyptian national consumption during the study period that ranges from a minimum of about 23 980 tons in 2011 and a maximum of about 489.09 thousand tons in 2003, a total of around 2.23 million tons enough for the consumption of about 365.37 days, or about 12.18 a month, and this surplus directed to the development of the strategic stock in some years, which shows where the deficit, which is withdrawn from the stock during the other years 1995, 1998, 1999, 2000, 2002, 2008, 2009, 2010, and the deficit of sugar allocated for the Egyptian national consumption of the during the period. The study estimated at 100.5 thousand tons, or about 16.49 days, or about 0.55 a month, and this deficit will be covered during the years of deficit either by drawing from strategic reserves or import sugar from abroad - Table (III).

**2- Coefficient of food security for sugar in Egypt during the study period (1995-2012):** The value of coefficient of food security for sugar in Egypt fluctuates between zero and one, and the closer the value of zero indicates that the decline in the rate of food security and the closer the value of one, the higher the achievement rate food security for sugar, and calculated coefficient of food security as the ratio of strategic stock to the national consumption of sugar, and as the strategic stock of sugar is estimated at 1.45 million tons and the average national consumption of sugar is estimated at 2.17 million tons during the study period (1995-2012) with an annual average during that period , therefore, coefficient of sugar food security estimated at about 0.84, therefore it requires to take various actions that would lead to increase the size of the sugar strategic stock to enough half of it needs for domestic consumption even come close to the value of coefficient of food security, from suitable position - (Table III).

**Table (III) - Period of the adequacy of the surplus and the deficit of sugar allocated for Egyptian daily domestic consumption during the period (1995-2012)**

Year	Surplus		Deficit		Strategic stock 10 <sup>3</sup> ton	Coefficient of food security
	Quantity (10 <sup>3</sup> ton)	Period adequacy surplus in daily domestic consumption	Quantity (10 <sup>3</sup> ton)	Period deficit in sugar allocated for daily domestic consumption		
1995	-	-	62.13	14.3	62.13 -	0.04 -
1996	197.07	45.7	-	-	197.07	0.13
1997	311.00	72.3	-	-	311.00	0.20
1998	-	-	151.66	32.6	151.56 -	0.09 -
1999	-	-	143.94	29.4	143.94 -	0.08 -
2000	-	-	14.79	2.2	14.79 -	0.01 -
2001	77.80	15.5	-	-	77.80	0.04
2002	-	-	109.2	21.8	109.2 -	0.06 -
2003	489.09	109.7	-	-	489.09	0.27
2004	350.96	73.2	-	-	350.96	0.22
2005	-	-	-	-	-	-
2006	410.79	71.4	-	-	410.79	0.20
2007	371.73	60.6	-	-	371.73	0.17
2008	-	-	116.64	13.0	116.64 -	0.05 -
2009	-	-	64.02	81.1	64.02 -	0.02 -
2010	-	-	141.55	16.1	141.55 -	0.05 -
2011	23.98	2.9	-	-	23.98	0.01
2012	-	-	-	-	-	-
<b>Total</b>	<b>2232.4</b>	<b>451.2</b>	<b>803.92</b>	<b>210.4</b>	<b>1428.40</b>	<b>0.84</b>

Surplus = (sum of two terms insufficient production and imports -365) \* daily consumption.

Deficit = (365 - sum of two terms insufficient production and imports) \* daily consumption.

**Source:** collected and calculated from table (I).

#### **- Fifth - Policies and means to achieve sugar food security in Egypt:**

During the past decades, many attempts to achieve an appropriate rate for agricultural development in Egypt, which included inventory and Reclamation then farming new land and decide what grants to them from field crops and horticulture, as well as follow the identification of ways to service the occasion, and the provision of strains of high-yield resistance to climatic conditions in various regions of Egypt. It was the establishment of irrigation systems of high efficiency reaches a total length of 40 thousand kilometers, stretching from Lake Nasser in front of the High Dam to the fields of the valley and delta of the total floor area of about 8.3 million feddans of the crop of about 15 million feddans, and in spite of all these efforts, it has exacerbated the problem declined Egyptian food security in general as the inability of GDP to meet the needs of a growing population year after year, and was a major import foodstuffs including wheat, beans, oil, sugar, maize, animal feed Levantine quantities exceeded 50% of total consumption. The following is a review can be the most important means to achieve food security policies of Egyptian sugar as one of the most important problems of food security in Egypt is related to the daily consumption of each population. This can be achieved food security of the Egyptian sugar through the following policies:

**1- Horizontal agricultural development policy:** It includes direction of the new areas for the cultivation of sugar crops by reclaiming arable land with the provision of water resources additional necessary in order to

achieve food security, especially in the land under the reform like the land-Salam Canal, which has an area of about 620 thousand feddans, of which 400 thousand feddans in the Sinai, a large part of them fit for cultivation immediately, as well as the territory of North Coast, which can exploit the rainy season in the winter, except for the month of April, as well as the land area of about 540 thousand feddans in Toshka, as well as another area in east Owaynat of about 250 thousand acres, in addition to the approximately 400 feddans of arable in Aswan as well as about 500 feddans are planted in Egypt annually pulp any that can be added about two million feddans of the patch can be allocated, including part of the cultivation of sugar crops and thus could approach the great eye of the sufficiency from Egyptian needs from that strategy commodity with an annual average consumption of which about 2.17 million tons during the period (1995-2012).

**2- Vertical agricultural development policy:** This is done by continuing to devise new varieties of early sugar crops in maturity and resistance to diseases and other pests and resistant to stress environmental characterized by an increase of the yield per feddan compare with old varieties to be replaced, to be accompanied by the provision of production inputs at appropriate times, like most of the good seed of improved varieties developed especially for fertilizers, especially nitrogenous taking into account the direct agricultural extension of the farmers on how to use it with suitable prices for these inputs.

It should be noted that it could be reconsidered in the compositions cropping current to increase the acreage under sugar crops without affecting other crops through the development of early maturing varieties able to punish the cultivation of another crop after sugar crops, as well as the establishment of agricultural extension in turn encourage and educate farmers attention to agriculture, including achieve higher production and motivate them using the methods of modern technology of irrigation systems and methods of service and care for the crops to maintain high productivity. The role of agricultural extension in vertical agricultural development by educating farmers on the use of modern technological methods as well as the use of deep plowing instead of plowing the traditional because it helps to distribute the water in a way to help increase the percentage of germination and the style of the traditional irrigation became big in the amount of water because the sugar cane crop needs a large amount of water in the cultivation and therefore must be the direction of sprinkler irrigation and thus increases the amount of output diabetes.

**3- Policy of rationalizing the consumption of sugar:** The Egyptian policy of rationalizing the consumption of sugar and organization, provided that appropriate of the most important policies that are consistent with international standards of health, which may result in a decrease in the size of the Egyptian consumer of sugar gap because the per capita consumption of the most important factors influencing the sugar gap, and requires directing a great deal of awareness and guidance of government directed the Egyptian people to raise the level of per capita consumption in order to reduce the average consumption of sugar and work to address the ignorance of food found in Egyptian society to improve per capita consumption of sugar.

**4- Policy of consumer subsidy of sugar:** The consumer subsidy of sugar considers from the most important factors that have a positive impact in the increase in the average per capita consumption of sugar may be due to an increase in the amount of the total demand for subsidized goods to lower their price and cheap source of energy, something that would increase the consumption of sugar (4.75 %) at rates greater than the increase in the local production of it (3.64%) and thus increase the amount of sugar imports to cover this sugar gap, which adversely affects the Egyptian balance of trade and then balance of payments which led to follow the Egyptian government's policy of deficit financing and increase the amount of the total payment methods which not commensurate with the total increase in the gross national product which resulted in increased inflation problem as a result of an increase in aggregate demand at a rate faster than the increase in total supply.

**5- Policy of diversification of sugar imports sources:** It includes all the arrangements followed by the state which needed to control and regulate imported annually to achieve the provision of sugar commodity and achieve the national food security, which have an impact on the overall development and increased investment in the fields of agricultural, industrial and tourism which lead in turn, to increase the national income and the strengthening of the national economy and achieve of raise the standard living for all Egyptian people. The statistics data show that Egypt was self-sufficient of sugar until 1973, but as a result of environmental conditions unsuitable happened deficit in domestic production of sugar has been unable to meet the particular needs of consumer and then resort to sugar imports to solve this deficit which Athrip upon the existence of a deficit in Egyptian agricultural trade balance and then a deficit in the Egyptian balance of payments where bears Egypt most of the value paid in the import process in foreign currency (American dollar and Euro), in addition to targeted subsidies annually for sugar to the category of low-income people, which represents a large proportion of members of the Egyptian people through ration cards, and getting this problem difficult in light of the trend increasing world sugar prices due to the entry of sugar in the production of biofuels from sugar crops, which negatively affects staffed offered sugar that go into the food

industry, which leads to the increase in the price of sugar imports and the consequent of a deficit in the Egyptian balance of payments.

It should be noted that it is expected that a significant increase in the quantity of sugar imports in the coming years - if it is not the expansion of sugar production in Egypt - and because the system import of sugar in Egypt is subject to the phenomenon of geographical focus as Egypt depends on imports of sugar cane and sugar beet on six countries mainly are Brazil, Australia, Cuba, India, France and Germany and those countries controlled most of the international market for sugar and thus on prices and routes to export, in addition to the implementation of the convention and the establishment of the World Trade Organization is expected to result in a future increase in the prices of most food commodities, including sugar, which requires the development of a national strategy to increase the self-sufficiency ratio of sugar with the need to distribute the amounts of import and diversification among various sources in order to avoid what might happen from political pressure not to be in favor of the Egyptian economy in the event of changed circumstances the international political; this is because the dependence on these markets in the provision of sugar consumer needs makes it susceptible to numerous global risks that occur in the world food markets or those related to potential climate change at the world level or local. It also requires the need to study the obligations of reduction of subsidies granted to the production and export in the countries exporting sugar in order to reduce the negative effects on Egyptian economy, and studying the application of the free policy to import sugar through studying the prices of exported in different countries, which might be characterized as heterogeneous as a result of differing results of reduction of subsidies in each of them, and to increase sugar production through the expansion of sugar crops, particularly sugar beet for the lack of its needs of water compared to harvest sugar cane in new lands and raise the productivity of sugar crops circulating through the varieties of high productivity and to suit every center of administrative centers in Egypt, and rationalizing the consumption of sugar through dismiss size wastage of sugar, and to achieve food security has to be awareness programs need to prepare for the application of planning policy breeds where it is one of the most important determinants of the demand for Egyptian sugar imports.

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