

Current Situation of Edible Vegetable Oils and Some Propositions to Curb the Oil Gap in Egypt

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Abstract: Egypt's total production of oil crops has been declining, which resulted in lower self-sufficiency rates thus higher imports of edible vegetable oils during the study period 1990-2007. The study aims to explore the possibilities of curbing the food gap in edible oils and identify the efficiency of operation capacities in public and private oil extraction plants. Findings revealed shrinks in the areas of oil crops under study (cottonseeds, sunflower, and soybeans), which represent one of the main reasons for the lower volume of oil crops thus oil production. The study indicated that the main reasons influencing consumption of vegetable oils include vegetable oils imports volume, average per capita consumption of vegetable oils, and the value of domestic support to vegetable oils. The study concludes that public and private sectors' plants have idle capacities estimated at 50% and 19%, respectively. Finally, the study recommends expanding the areas under oil crops to boost the domestic production of vegetable oils, and to cut the volume and value of oil imports in order to reduce the deficit in Egypt's commodity balance of vegetable oils. [Nature and Science 2010;8(12):1-7] (ISSN: 1545-0740).

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1. Introduction:

Egypt's production of edible vegetable oils has been suffering several problems. During the early sixties, Egypt used to be self-sufficient in edible vegetable oils, where self-sufficiency ratio reached 95%. Such ratio followed a declining trend until reaching as low as 31.6% in 2007, which led to increasing volume of oil imports that reached 5.6 thousand tons worth L.E 1.992 billion in 2007. The problem is further complicated by the reliance of the edible oils industry in Egypt on imported raw materials, where private sector's dependency ratio is estimated at 85% (Ahmed Ameen Ismael 2002)⁽¹⁾. As for domestic production of oil crops, the most important of which are cotton, soybean and sunflower, total production of both soybeans and sunflower dropped from 106.7 and 22 thousand tons in 1990 to as low as 25.61 and 1.52 thousand tons in 2007, respectively. As regards cottonseed, maximum production reached 804 thousand tons in 2001, up by 68.9% compared to 1990, thereafter declined by 35.6% in 2007 compared to 2001, resulting in lower production of edible vegetable oils during the same years thus more imports and other negative consequences including the sector's exposure to fluctuations in international commodity prices, exporters' monopoly, and higher production costs resulting from the higher exchange rate per US dollar.

2. Study Problem:

The study investigates the problem of the low self-sufficiency rate in vegetable oils in Egypt, where the food gap in oil reached about 538 thousand tons in 2007, up by 332 thousand tons representing 161% compared to 2002 due to the lower domestic production of oil crops that resulted in failing to meet the needs of domestic consumption.

3. Study Objectives:

The study aims to explore the potentials for reducing the gap in vegetable oil under the currently prevailing production and consumption situations, in addition to examining the efficiency of public and private oil plants' capacity in an attempt to reach proper proposals to curb the oil gap. To achieve that, the study relied on published and unpublished secondary data and information from the Ministry of Agriculture and Land Reclamation (MALR), the Central Agency for Public Mobilization and Statistics (CAPMS), and some related websites on the internet. As regards the methodology, the study applied both descriptive and quantitative statistics.

4. First: Current Situation of Oil Crops Production

Cotton, soybean, sunflower and maize crops are considered the main sources for vegetable oil seeds in Egypt. Although olives, peanuts, sesame, canola, and safflower are also sources of vegetable oils,

Egypt does not currently depend on them for oil production. Cotton crop is one of the dual-purpose crops. It is mainly grown for textile production purposes, whereas the seeds, which is the secondary product, are used to extract vegetable oil. It is worth noting that cotton seeds contribute to Egypt's production of vegetable oils by more than 90% (Ministry of Agriculture 1990-2007) (9)

Studying the area under cotton during the period (1990-2007) has revealed that it declined from 993 thousand feddans in 1990 to 471 thousand feddans in 2007, while seed production increased from 476 thousand tons in 1990 to 518 thousand tons in 2007, up by 8.8% due to the increase in productivity during the same period. It is worth noting that the oil content in cotton seed is estimated at 19% (The Arab league for Nutrition Industries 2007) (10)

As regards soybeans, it is considered of the main sources of vegetable oil at the global level, despite the fact that its oil content represents only 20% of its weight. Studying the area under soybeans during the period (1990-2007) revealed that it has been following a statistically significant declining trend in recent years, where it declined from 99 thousand feddans in 1990 to 18.54 thousand feddans in 2007, down by 81.3% compared to 1990. In addition, total production of soybeans dropped from 106.7 thousand tons in 1990 to as low as 25.61 thousand tons in 2007 representing about 24% of the total production volume of soybean in 1990.

As for oil sunflower crop, which was introduced in Egypt in 1987, the oil content ranges between 39-46% (10). Total area and production of sunflower crop have been deteriorating over the study period (1990-2007), where they dropped from 25 thousand feddans and 22 thousand tons in 1990 to 1.47 thousand feddans and 1.518 thousand tons in 2007, respectively, down by 94.12% and 93% compared to 1990 (Ministry of Agriculture 1990-2007) (8).

Corn on the other hand is primarily grown for human food in rural areas, and is also used as animal feed, especially for poultry. It is also a source of vegetable oil and starch. Such uses, however, are considered secondary and insignificant as the oil content in a corn grain does not exceed 3%. Therefore, using corn as a source of vegetable oil is currently considered secondary, despite the fact that corn oil matches the preference of Egyptian consumers. Studying the total area and production of

corn revealed that both followed increasing trends during the study period, where they rose from 1.547 million feddans and 28.93 million aradebs in 1990 to about 1.782 million feddans and 43.86 million aradebs in 2007, up by 15.18% and 51.64% compared to 1990, respectively (Ministry of Agriculture 1990-2007) (8).

As for peanuts, it is not a reliable source of vegetable oil due to the fact that it does not match the taste of Egyptian consumer. In addition, peanuts have a diversity of alternative uses and export significance Food and Agriculture Organization (7). Sesame crop, the seeds of which contain 24% of oil, is mainly used in processing tahina, halawa, and some other sweets. Olives are of the crops that are rich in vegetable oil, where the oil content in its seeds is as high as 40%. However, the cost of extracting olive oil is high compared to the cost of extracting other oils, leading to higher prices of olive oil compared to other vegetable oils. In addition, it is not suitable for cooking purposes in Egypt.

From what preceded, it is clear that total area under oil crops as well as their total production followed declining trends during the study period (1990-2007).

5. Second: Consumption of Vegetable Oils in Egypt:

Vegetable oils in Egypt are consumed in different forms, these are liquid, hydrogenated, artificial ghee, or frozen at room temperature. Studying the consumption of vegetable oils in Egypt during the period (1990-2007) revealed the following findings.

Data in Table (1) indicate fluctuations in the quantity consumed and average per capita consumption of vegetable oils during the study period, where they reached a maximum of 1389 thousand tons and 19.3 kg per year in 2006, up by 181.7% and 121.8%, respectively, compared to 1990. In addition, the overall size of the oil gap during the same period reached a minimum of 206 thousand tons in 2002 and a maximum of 1182 thousand tons in 2006, resulting in fluctuations in self-sufficiency rate during the same period.

Table (1): Total Domestic Production, Consumption, Per Capita Consumption, Gap, and Self-Sufficiency Rate of Vegetable Oils in Egypt During The Period 1990-2007

Year	Total Production (000 tons)	Total Consumption (000 tons)	Oil Gap (000 tons)	Per Capita Consumption Kg/Year	Self-Sufficiency Rate (%)
1990	78	493	415	8.7	16.9
1991	84	376	292	6.9	22.3
1992	71	610	539	10.9	11.6
1993	134	478	344	8.3	28
1994	120	484	364	8.3	24.8
1995	84	849	765	14.2	9.9
1996	138	943	805	15.9	14.6
1997	129	947	818	15.6	13.6
1998	114	813	699	13.3	14
1999	125	782	657	12.5	16
2000	115	781	666	12.2	14.7
2001	220	575	355	8.8	38.3
2002	290	496	206	7.3	58.5
2003	135	508	373	7.5	26.6
2004	141	1007	866	14.5	14
2005	204	1248	1044	17.7	16.3
2006	207	1389	1182	19.3	14.9
2007	248	786	538	10.7	31.6

Source: Ministry of Agriculture and Land Reclamation, The Central Administration of Agricultural Economics, Food Balance Sheet, Different Issues 1990-2007.(9)

To identify the main factors believed to have effects on vegetable oils consumption, a correlation matrix was built to reveal the factors affecting the quantity consumed of vegetable oils during the study period (1990-2007). Results obtained revealed that the most important factors include average per capita income, consumer price of vegetable oil, value of domestic support to vegetable oils, price of imported oils, total production, average per capita consumption of vegetable oils, and oil imports volume^(7,8,9). The estimated regression equation is indicated as follows:

$$\hat{Y}_t = 74.004 + 0.360 X_{1t} + 43.594 X_{2t} + 0.864 X_{3t} \quad (4.289) \quad (7.581) \quad (4.839)$$

$$R^2 = 0.99$$

$$F = 483.81$$

Where:

\hat{Y}_t is the estimated volume of total consumption of vegetable oils in thousand tons

X_{1t} is the vegetable-oil imports quantity in thousand tons

X_{2t} is the average per capita consumption of vegetable oils in kg/year

X_{3t} is the value of domestic support to vegetable oils in L.E million

T is the time in years 1, 2,18

The figure between brackets is the calculated t value

The estimated results indicate that the main factors affecting the quantity consumed of vegetable oils during the study period include oil imports quantity, average per capita consumption of oils, and the value of domestic support to vegetable oils. It has been found that a one ton increase in oil imports quantity results in increasing total consumption of oil by 360 tons, one kilogram increase in average per capita consumption per year leads to the increasing the total consumption of oil by 43.59 thousand tons, and one million Egyptian pounds increase in domestic support to vegetable oils leads to increasing the total consumption by 864 tons. It is therefore clear that consumers should be persuaded to rationalize their consumption of vegetable oils to reduce the total consumption thus size of the oil gap.

6. The Edible Oil Industry in Egypt:

Production of oil crops is used either directly as human food, or indirectly as seeds or in the edible oil industry to extract vegetable oil. Byproducts of the edible oil extraction industry are used as animal feed. The edible oil production industry ranks first in terms of the multiple uses of oilseeds in Egypt. Studying oilseeds consumption in Egypt during the period (1990-2007) revealed that total consumption increased from 624 to 1.839 thousand tons during the study period, up by 194%. Distribution of oil

consumption over various purposes (human, industrial, and seeds) revealed that industrial consumption ranked first, where it accounted for 33.7% and 86.5% of the total oil consumption during the years 1990 and 2007, respectively. Human consumption ranked second, where it accounted for 18.7% and 11.4% during the same years, respectively. Consumption of oil crops in the form of seeds ranked last, where it accounted for 7.5% and 2.1% during two years, respectively. such findings indicate increases in the quantity consumed of oil crops for industrial purposes, and reductions in the quantities used for human consumption and seeds during the study period The Arab league for Nutrition Industries (10).

Nevertheless, production from the edible oils extraction industry does not meet the needs of human consumption. In the following section, the study will discuss the possibility of increasing oil production in Egypt through increased production of seeds and increased operation efficiency of the oil extraction plants.

Maximum and Actual Production Capacities of Oil Production Plants in Egypt

Egypt's domestic market offers a variety of vegetable oils, including domestically refined oils and imported oils. Domestic oils are concentrated in the blended cottonseed-safflower oil produced by public cotton factories, in addition to (Olin) oil, which is a

blend of soybean oil, palm oil, and sunflower oil, the price of which is relatively low. There are also sunflower and corn oils. As regards all of the imported refined oils, they mainly include corn oil plus small quantities of sunflower oil The Arab league for Nutrition Industries⁽¹⁰⁾. Table (2), which shows the maximum and actual capacities of vegetable oils production in Egypt, indicates that the quantity of cottonseed and sunflower currently available for processing after deducting the quantity used as seeds does not exceed 293.2 thousand tons, representing about 95% of the total maximum capacity of the public sector industry, whereas the maximum operation capacity in the private sector absorbs around 144.8 thousand tons, representing 74.3% of the maximum capacity. However, the two sectors together can absorb 504 thousand tons approximately to operate at full capacity.

Table (2) also indicates an idle capacity estimated at 30.81%. The actual capacities of soybean production in public and private sectors represent 40% and 100% of the maximum capacity, respectively. It is also clear that the total idle capacities in the public and private oil processing sectors represent 50% and 19% of the maximum capacity, respectively. Therefore, efforts should be exerted to boost the operation of public sector plants to operate at a relatively higher capacity in order to curb the oil gap in Egypt, which can be realized by increasing the production of oil crops and directing the increase to oil extraction plants.

Table (2): Maximum and Actual Production Capacities of Edible Oils Production in Egypt as Average of the Period (1997-2007)

	<i>Sector</i>	<i>Maximum Capacity 000 tons</i>	<i>Actual Capacity 000 tons</i>	<i>Idle Capacity %</i>
<i>Cottonseed</i>	<i>Public</i>	309	293.2	5.11
<i>Sunflower</i>	<i>Private</i>	195	144.8	25.7
<i>Soybeans</i>	<i>Public</i>	5	2	60
	<i>Private</i>	9	9	0
<i>Corn Oil</i>	<i>Public</i>	2	1	50
	<i>Private</i>	32	30	6.25
<i>Palm Oil</i>	<i>Public</i>	0	0	0
	<i>Private</i>	106	78	26.4
<i>Total</i>	<i>Public</i>	318	158	50.31
<i>Oils</i>	<i>Private</i>	323	261	19.19

Source: The Central Agency for Public Mobilization and Statistics (CAPMAS), A Study On Vegetable Oils Industry In Egypt, Different Issues 1990-2007(3).

One study reveals that the main problems facing the edible oil industry in Egypt include heavy reliance on imported inputs, where private sector's reliance on imported inputs is estimated at 85% (Ameen Ismael Abdo 2002)⁽¹⁾, as well as the low operation rates of available production capacities, and

the unfair competition between public and private sectors, where the private sector does not comply with the quality standards regarding oil production, either in terms of processing or hygiene, rather, the plants of the private sector settle for refining the imported oils without caring to perform the costly

operations. Moreover, the deteriorating production of the domestically produced basic raw materials due to the year-over-year shrinks in the areas under oil crops threatens the development of the domestic oil production industry and raises its reliance on imported raw materials despite the domestic support to producer price, estimated at 100 pounds/ton⁽¹⁾ over the prices of imported oilseeds, which can be attributed to the fact that the procurement price is not encouraging enough for producers due to the successively increasing production costs. In addition, the high exchange rate of the US dollar resulted in one major negative impact represented in the lower international prices of raw materials compared to the prices of domestic product, which resulted in tight domestic production of oils.

7. Potentials of Curbing the Size of Egypt's Food Gap in Oil:

Production of edible oils in Egypt depends on certain oil crops, these are cotton, soybeans and sunflower. Oil extracted from these crops accounted for 97% of the total production of vegetable oils in Egypt in 2007. Therefore, the study concentrated on these crops when exploring the potentials for increasing their production. In order to increase Egypt's production of vegetable oil, production of

oilseeds must be increased, which can be realized by increasing either their planted area, their productivity (yield per feddan), or both. By assuming that yield remains the same as that of 2007, and recommending expansions in the area under the studied oil crops, it was possible to reach the propositions listed in Table (3) to increase oilseeds total production. To increase the quantity produced of cotton crop, cotton planted area should be increased by 1027 thousand feddans, which is the average area under cotton during the period (1985-1989), in order to raise total production to reach 1130 tons of cottonseed, which can yield 215 thousand tons of oil, up by 117 thousand tons compared to 2007. Such increase is expected to reduce the gap in vegetable oils by 21.7%, thus the value of oil imports by US\$ 78.816 million (based on the import price in 2007).

As for sunflower crop, increasing the area planted to reach the same area cultivated during the previous period (1985-1989), i.e., by 13.67 thousand feddans, and assuming the yield is the same as that of 2007 (1.033 tons/feddan), total production of sunflower seed is expected to reach about 14.12 thousand tons yielding about 6.35 tons of oil, up by 5.67 thousand tons compared to 2007, thus the value of imports can be reduced by US\$ 4200 thousand based on the prices of 2007, as shown in Table (3)

Table (3): Proposals for Increasing the Areas under the study Oil Crops

<i>Crop</i>	<i>Period</i>	<i>Area</i> (000 fed)	<i>Yield</i> (Ton/fed)	<i>Total Production</i> (000 tons)	<i>Production Quantity</i> (000 tons)	<i>Quantity Increase</i> (000 tons)	<i>Import Rate</i>
<i>Cottonseed</i>	1989-1985	1027	0.545	560	106		
	2007	471	1.1	518	98		2.2
	Proposed	1027	1.1	1130	215	117	114.8-
<i>Sunflower</i>	1989-1985	13.67	0.8	11.00	4.95		
	2007	1.47	1.033	1.518	0.683		150.803
	Proposed	13.67	1.033	14.12	6.35	5.667	145.136
<i>Soybeans</i>	1989-1985	110.2	1.25	137.75	27.55		
	2007	18.53	1.38	25.57	5.114		95.885
	Proposed	110.2	1.38	152.08	30.42	25.31	70.587

Source: Calculated from:

1. Ministry of Agriculture and Land Reclamation, The Central Administration of Agricultural Economics, Bulletin of Agricultural Economics.(1990-2007)(8)
2. The Central Agency for Public Mobilization and Statistics (CAPMAS), Internet Website.(1990—2007)(3)

The same is applied can be soybeans. Increasing the area planted to reach the average planted area during the previous period (1985-1989), which is 110.2 thousand feddans, and assuming that yield is the same as in 2007 (1.38 tons/feddan), total production of soybean seeds is expected to increase up to 152.08 thousand tons, yielding about 30.42

thousand tons of oil, up by 25.298 thousand tons of oil compared to 2007, which can help reduce the oil imports value by US\$ 18.429 million.

From what proceeded, it is clear that expanding the areas of oil crops under study and targeting the increase of the edible oil processing industry can help reduce the value of oil imports by approximately

US\$ 101.446 million, which can help reduce the deficit in the balance of oil and fat trade by 8%.

Table (4) indicates that Egypt's imports of sunflower and soybean oils can be reduced by 5.7 and 25.3 thousand tons, respectively, representing about 3.8% and 26.4% of Egypt's total oil imports. Such reductions are expected to reduce the imports value of the two types of oil by US\$ 4.2 and 18.4 million, respectively. The proposed increase in cottonseed production volume, estimated at 117 thousand tons, shall cover domestic consumption of cottonseed oil

by 2.2 thousand tons, which is Egypt's imports volume of cottonseed oil, and the surplus, estimated at 114.8 thousand tons can be directed to cover the deficit in other oils by 8 %, which would result in reducing the value of deficit in Egypt's commodity balance by some US\$ 100 million. In addition, the proposed increase can be benefited from in operating the idle capacities in public plants, estimated at 160 thousand tons, where it is expected to help operate 71.8% of the total idle capacities.

Table (4): Propositions for Curbing the Food Gap in Oil and Reducing the Value of Vegetable Oil Imports

Crop	Oil Production in 2007 (000 tons)	Proposed Oil Prod. (000 tons)	Proposed Increase In Oil Prod. (000 tons)	2007 Import Price (US\$/ton)	2007 Imports Quantity (000 tons)	Change In Imports Quantity	Value of Change
Cottonseed	98	215	117	673.64	2.2	114.8-	77333.870
Sunflower	0.683	6.35	5.667	741.28	150.8	145.13	107581.97
Soybean	5.122	30.42	25.298	728.48	95.86	70.49	51350.56
Total	103.805	251.77	147.965	-	248.86	100.82	81598.66

Source: Calculated from:

1. Ministry of Agriculture and Land Reclamation, The Central Administration of Agricultural Economics, Bulletin of Agricultural Economics.
2. The Central Agency for Public Mobilization and Statistics (CAPMAS), Internet Website.

8. Recommendations:

The study emphasizes the need to expand the areas under oil crops through encouraging farmers by offering them input subsidies and raising the procurement prices of crops delivered to oil processing plants. The study also recommends promoting reliance on domestically produced raw materials, promoting the edible oil industry, devoting more attention to the public sector plants, and reducing the taxes levied from the oil processing plants. In addition, the study recommends protecting the domestic oil industry by stopping to rely on refining imported oils, as the case in private sector plants, and tightening control over these plants to ensure complying to the quality standards of the produced oils in order to protect consumers' health. Finally, the study recommends rationalizing the consumption of vegetable oils through educating consumers about the health hazards resulting from increased consumption of oils.

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