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دراسة تحليلية لإنتاج واستهلاك الزيوت النباتية فى مصر

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المستخلص

يهدف البحث بصفة أساسية إلى دراسة الوضع الحالي لإنتاج واستهلاك الزيوت النباتية في مصر، وذلك من خلال دراسة كل من كمية الإنتاج المحلي للمحاصيل الزيتية والزيوت للزيوت النباتية الغذائية وكذلك دراسة كمية الاستهلاك المحلي من الزيوت النباتية الغذائية مع التعرف على حجم الفجوة الغذائية في الزيوت، ثم دراسة أهم العوامل المؤثرة على متوسط نصيب الفرد من الكمية المستهلكة من الزيوت.

وتوصل البحث إلى أن إجمالي إنتاج الزيوت النباتية خلال فترة الدراسة قد تراوح بين حد أدنى بلغ نحو 164.0 ألف طن عام 2015 وحد أقصى بلغ نحو 494.0 ألف طن عام 2020، وبمتوسط سنوي بلغ حوالي221.8 ألف طن خلال الفترة (2005-2020)، وبدراسة الاتجاه الزمنى العام لتطور إنتاج الزيوت النباتية اتضح أن إنتاج الزيوت النباتية إخذ اتجاها عاماً متزايداً بمقدار سنوي معنوي إحصائياً بلغ حوالي8.2 ألف طن، وقد بلغ معامل التحديد (R^2) نحو 0.23 مما يعنى أن 23% من إجمالي التغيرات في إنتاج الزيوت النباتية يرجع إلي المتغيرات التي يعكس أثرها متغير الزمن.

وتبين أن إجمالي نسبة الاكتفاء الذاتي من الزيوت النباتية خلال فترة الدراسة قد تراوح بين حد أدنى بلغ نحو 10.34 % عام 2016 وحد أقصى بلغ نحو 31.71 % عام 2007، وبمتوسط سنوي بلغ حوالي 17.64 % خلال الفترة (2005-2020)، وتبين أن الفجوة من الزيوت النباتية من الزيوت المجمدة آخذت اتجاها عاماً متزايداً بمقدار سنوي معنوي إحصائياً بلغ حوالي 7.6 ألف طن في المرحلة الاولي، ثم اخذت في متناقصاً بنحو 1.2 الف طن ثم اخذت في التزايد في نهاية الدالة 0.05 الف طن، هذا وقد بلغ معامل التحديد (R^2) نحو 0.51 مما يعنى أن 51% من إجمالي التغيرات في أن الفجوة من الزيوت النباتية من الزيوت المجمدة يرجع إلي المتغير التي يعكس أثرها متغير الزمن.

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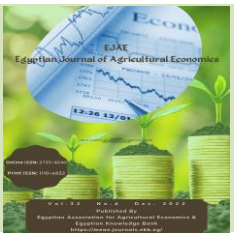

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An analytical study of the production and consumption of vegetable oils in Egypt

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ABSTRACT

The research mainly aims to study the current situation of the production and consumption of vegetable oils in Egypt, through the study of each of the quantity of local production of oil crops and oils for food vegetable oils, as well as the study of the amount of local consumption of food vegetable oils with identification of the size of the gap Nutrition in oils, then studying the most important factors affecting the average per capita consumption of oils. The research found that the total production of vegetable oils during the study period ranged from a minimum of about 164.0 thousand tons in 2015 to a maximum of about 494.0 thousand tons in 2020, with an annual average of about 221.8 thousand tons during the period (2005-2020), and with a study The general temporal trend of the development of vegetable oil production. It has been shown that the production of vegetable oils has taken a general increasing trend by a statistically significant annual amount of about 8.2 thousand tons. The coefficient of determination (R2) has reached about 0.23, which means that 23% of the total changes in the production of vegetable oils is due to the variables whose effect reflects the time variable.

It was found that the total self-sufficiency percentage of vegetable oils during the study period ranged from a minimum of about 10.34% in 2016 to a maximum of about 31.71% in 2007, with an annual average of about 17.64% during the period (2005-2020). Vegetable oils from frozen oils took a general increasing trend by a statistically significant annual amount of about 7.6 thousand tons in the first stage, then it started decreasing by about 1.2 thousand tons, then it started increasing at the end of the function by 0.05 thousand tons. This has reached the coefficient of determination (R2) about 0.51, which means that 51% of the total changes in the gap of vegetable oils from frozen oils is due to the variable whose effect reflects the variable of time.

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Introduction:

Vegetable oils are one of the most food commodities with a nutritional gap in Egypt, and vegetable oils are of great importance as a source of energy, in addition to being the centrepiece of the individual's nutritional needs. There are also many uses and variety of products made from vegetable oils, in addition of being used in a variety of local industries. Egypt suffers from a severe shortage in its needs of edible oils, to the extent that it imports about 76% of its population's needs of edible oils, which represents a burden on the Egyptian agricultural trade balance, in addition to its high prices, and the low rates of self-sufficiency in vegetable oils indicate And the increase in the size of the food gap year after year has exacerbated the deficit in the production of vegetable oils from local sources in Egypt, compared to the increasing domestic consumption. In 2020, the total production of oils in Egypt amounted to about 494 thousand tons, while the total consumption amounted to about 1800 thousand tons, with a self-sufficiency rate of about 27.44%, and the size of the gap is about 1306 thousand tons for the year 2020.

Research Problem:

The oil production sector suffers from a significant decrease in the quantities of local production of food vegetable oils, with a successive increase in the quantities of domestic consumption of food oils and a continuous increase in the size of the oil gap. The rates of self-sufficiency in vegetable oils decreased from 95% in the early sixties to 60% in the early seventies to 30% in the early eighties, and then decreased to 27.44% in 2020. The nutritional problem for vegetable oils has become in the provision of foreign currency to import edible oils from abroad to meet the needs And this matter became a burden on the Egyptian agricultural trade balance and consequently the balance of payments, which in turn was reflected in the problems of agricultural development in Egypt.

Research Aims:

The research aims mainly to study the current situation of production and consumption of vegetable oils in Egypt, through the study of a set of sub-objectives, which is to study each of the quantity of local production of oil crops and oils for food vegetable oils, as well as studying the quantity of local consumption of food vegetable oils with identifying the size of the food gap in oils, then studying the most important factors affecting the average per capita consumption of oils.

Research Method and Data Resources:

The research uses descriptive and quantitative analysis and some statistical analysis methods such as time series, percentage estimates, arithmetic averages, general trend equations, and some statistical models such as multiple regression. Different methods are also used to estimate the expected trends of self-sufficiency rates for the oil crops in question. Statistical data for research, both published and unpublished, are obtained from the Ministry of Agriculture, the Oil Crops Research Institute, the Agricultural Economics Research Institute, the National Planning Institute, the Central Agency for Mobilization and Statistics, and Agricultural Economics Bulletins, www.treadmap.org.

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Research results and recommendations:

First - The Evolution of local production of edible oils:

Evolution of local production of the most important types of vegetable oils:

Table (1) shows that the total vegetable oil production during the study period ranged between a minimum of about 164.0 thousand tons in 2015 and a maximum of about 494.0 thousand tons in 2020, and an annual average of about 221.8 thousand tons during the period (2005-2020). And by studying the general time trend of the development of vegetable oil production, Table (2) showed that the production of vegetable oils took a general increasing trend by an annual statistically significant amount of about 8.2 thousand tons, and the coefficient of determination (R^2) was about 0.23, which means that 23% of the total changes In the production of vegetable oils is due to the variables whose impact reflects the time variable

Evolution of the local production of cottonseed oil:

The study of the data in Table (1) shows that the production of cottonseed oil during the study period ranged between a minimum of about 9.0 thousand tons in 2017 and a maximum of about 75.0 thousand tons in 2005, and an annual average of about 36.3 thousand tons during the period (2005-2020), and by studying the general temporal trend of the development of cottonseed oil production, Table (2) shows the results of the statistical estimation during the period (2005-2020). So it is clear that the production of cottonseed oil took a general decreasing trend by a statistically significant annual amount of about 3.8 thousand tons. The coefficient of determination (R^2) was about 0.73, which means that 73% of the total changes in cottonseed oil production are due to the variables whose impact reflects the time variable.

Evolution of local production of sunflower oil:

The study of the data in Table (1) shows that the production of sunflower oil during the study period ranged between a minimum of about 8.0 thousand tons in 2009 and a maximum of about 32.0 thousand tons in 2012, and an annual average of about 17.6 thousand tons during the period (2005-2020), and by studying the general temporal trend of the development of sunflower oil production, Table (2) shows the results of the statistical estimate during the period (2005-2020). tons, and that there is no suitable mathematical picture of the nature of the data and that the data revolve around its arithmetic mean.

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Table (1): Evolution of the local production of the most important types of vegetable oils, in thousand tons, During the period (2005 - 2020)

Years	Total Vegetable oil	Cottonseed oil	Sunflower oil	Soybean oil	Corn oil	Other oils	Frozen oils
2005	204	75	14	104	11	0	653
2006	207	75	9	102	21	0	825
2007	248	63	12	167	6	0	226
2008	175	62	11	91	6	5	232
2009	176	36	8	116	6	10	224
2010	174	26	21	109	10	8	206
2011	200	32	30	119	10	9	423
2012	176	39	32	84	8	13	608
2013	228	36	19	150	8	15	691
2014	199	21	14	144	9	11	656
2015	164	28	16	105	9	6	274
2016	179	14	11	132	10	12	828
2017	184	9	20	114	10	31	922
2018	259	16	25	178	10	30	774
2019	282	27	29	176	10	40	417
2020	494	22	10	409	10	43	455
Average	221.8	36.3	17.6	143.8	9.6	14.6	525.9
Min	164	9	8	84	6	0	206
Max	494	75	32	409	21	43	922

Source: Compiled and calculated from: Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Central Administration of Agricultural Economy, Annual Bulletin of Food Balance.

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Table (2): The general time trend of local production of the most important types of vegetable oils In thousand tons during the period (2005 - 2020)

S	variable	estimated equation	R^2	F
1	total vegetable oil	Y = 152.5 + 8.2 X (3.9) (2.1)*	0.23	4.3*
2	Cottonseed oil	Y = 68.7 - 3.8 X (11.5) (-6.2)*	0.73	38.3*
3	Sunflower oil	Y = 13.1 + 0.53 X (3.2) (1.3) -	0.10	1.6
4	Soybean oil	Y = 67.5 + 8.9 X (1.9) (2.5)*	0.31	6.32*
5	Corn oil	Y = 10.4 - 0.09 X (5.6) (-0.44)-	0.01	0.20
6	Other oils	Y = 7.2 + 2.6 X (2.01) (6.9)*	0.77	47.8*
7	Frozen oils	Y = 409.5 + 13.7 X (3.1) (1.02) -	0.07	1.04

Where: Y = the estimated value of the local production of the most important types of vegetable oils, in thousand tons

Xi = time variable where i = (1, 2, 3, ..., 16) .

The value in parentheses indicates the calculated (T) value, (R2) the coefficient of determination, (F) the significance of the model as a whole.

(*) indicates the significance of the regression coefficient at the 0.05 level of significance. (-) indicates that the regression coefficient is not significant.

Source: compiled and calculated from the data in Table (1).

Evolution of domestic production of soybean oil:

The study of the data in Table (1) shows that the production of soybean oil during the study period ranged between a minimum of about 84.0 thousand tons in 2012 and a maximum of about 409.0 thousand tons in 2020, and an annual average of about 143.8 thousand tons during the period (2005-2020), and by studying the general time trend of the development of soybean oil production, Table (2) shows the results of the statistical estimate during the period (2005-2020). The coefficient of determination (R^2) was about 0.31, which means that 31% of the total changes in soybean oil production are due to the variable that reflects the effect of the time variable.

Evolution of domestic production of corn oil:

The study of the data in Table (1) shows that the production of corn oil during the study period ranged between a minimum of about 6.0 thousand tons in 2007 and a maximum of about 21.0 thousand tons in 2006, and an annual average of about 9.6 thousand tons during the period (2005- 2020), and by studying the general temporal trend of the development of corn oil production, Table (2) shows the results of the statistical estimate during the period (2005-2020). It proves the significance of any of the mathematical images appropriate to the nature of the data, and that the data for corn oil production revolve around its arithmetic mean.

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Evolution of the local production of other oils:

The study of the data in Table (1) shows that the production of other oils during the study period ranged between a minimum of about 0.0 thousand tons in 2005 and a maximum of about 43.0 thousand tons in 2020, and an annual average of about 14.6 thousand tons during the period (2005- 2020), and by studying the general time trend of the development of the production of other oils, Table (2) shows the results of the statistical estimation during the period (2005-2020), and from it it appears that the production of other oils took a general increasing trend by a statistically significant annual amount of about 2.6 thousand tons. The coefficient of determination (R^2) was about 0.77, which means that 77% of the total changes in the production of other oils are due to the variables whose impact reflects the time variable.

Evolution of local production of frozen oils:

The study of the data in Table (1) shows that the production of frozen oils during the study period ranged between a minimum of about 206.0 thousand tons in 2010 and a maximum of about 922.0 thousand tons in 2017, and an annual average of about 525.9 thousand tons during the period (2005- 2020), and by studying the general time trend of the development of the production of frozen oils, Table (2) shows the results of the statistical estimate during the period (2005-2020), and from it it appears that the production of frozen oils took a general increasing trend with an annual statistically insignificant amount of about 13.7 thousand tons, , The significance of any of the mathematical images appropriate to the nature of the data was not proven, and that the production of frozen oils revolves around its arithmetic mean. It is clear from the above that palm oil is not produced in Egypt because palm oil production trees are not available in Egypt, and it is imported from abroad.

Second- The evolution of total imports of edible vegetable oils:

A- Evolution of the total amount of vegetable oil imports:

The evolution of the total amount of vegetable oil imports: The study of the data in Table (3) shows that the total amount of vegetable oil imports during the study period ranged between a minimum of about 449.0 thousand tons in 2009, and a maximum of about 1800.0 thousand tons in 2020, with an annual average of About 1174.8 thousand tons during the period (2005-2020), and by studying the general temporal trend of the development of the total amount of vegetable oil imports, Table (4) shows the results of the statistical assessment during the period (2005-2020), where it appears that the total amount of vegetable oil imports took a trend An increasing year by a statistically significant annual amount of 72.2 thousand tons, and the coefficient of determination (R^2) was about 0.53, which means that 53% of the total changes in the total quantity of vegetable oil imports are due to the variables whose impact reflects the time change.

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Table (3): Evolution of the quantity, value and price of total imports of the most important types of edible vegetable oils in thousand tons during the period (2005 - 2020) (Quantity: thousand tons, value: million dollars, price, dollars/ton)

Years	Total imports of oils			Palm oil			Soybean oil		
	Quantity	value	Import Price	Quantity	value	Import Price	Quantity	value	Import Price
2005	1044.0	451.7	432.7	754.5	267.4	354.4	88.2	50.0	566.5
2006	1203.0	479.6	398.7	957.3	332.7	347.5	45.2	24.4	540.4
2007	539.0	357.1	662.6	260.7	131.4	504.2	95.9	69.7	727.2
2008	671.0	1494.4	2227.1	269.2	653.4	2426.9	224.6	446.2	1986.3
2009	449.0	895.1	1993.6	256.1	452.7	1767.3	38.1	69.7	1830.3
2010	606.0	1023.7	1689.3	253.3	526.2	2077.0	34.1	126.9	3726.2
2011	1174.0	2052.1	1747.9	509.1	860.4	1690.2	350.1	533.3	1523.2
2012	1177.0	1627.5	1382.7	326.8	445.8	1364.4	29.0	37.6	1296.8
2013	1474.0	1620.8	1099.6	707.1	624.8	883.6	130.5	216.1	1656.0
2014	1292.0	1113.6	861.9	466.1	428.0	918.2	99.7	107.4	1076.4
2015	624.0	744.0	1192.3	138.2	103.3	747.6	229.0	310.1	1354.0
2016	1619.0	1464.2	904.4	851.2	567.4	666.6	541.5	431.8	797.5
2017	1613.0	1403.3	870.0	940.3	745.9	793.2	209.3	171.7	820.4
2018	1778.0	1373.6	772.5	1036.7	687.1	662.7	158.8	125.5	790.6
2019	1733.0	1224.2	1080.5	1105.0	655.8	593.5	226.9	160.7	708.3
2020	1800.0	978.1	543.4	807.1	732.5	907.5	35.4	27.4	773.0
Average	1174.8	1143.9	1116.2	602.4	513.4	1044.1	158.5	181.8	1260.8
Min	449.0	357.1	398.7	138.2	103.3	347.5	29.0	24.4	540.4
Max	1800.0	2052.1	2227.1	1105.0	860.4	2426.9	541.5	533.3	3726.2

Source: www.treadmap.org

B - Evolution of the total value of vegetable oil imports:

A study of the data in Table (3) shows that the total value of vegetable oil imports during the study period ranged between a minimum of about 357.1 million dollars in 2007 and a maximum of about 2051.1 million dollars in 2011, and an annual average of about 1143.9 million dollars during the period (2005-2020), and by studying the general temporal trend of the development of the total value of vegetable oil imports, Table (4) shows the results of the statistical assessment during the period (2005-2020), and from it appears that the total value of vegetable oil imports took a general increasing trend by an annual statistically insignificant amount of about 40 $7 million, and that there is no suitable mathematical picture of the nature of the data, and that the data revolve around its arithmetic mean.

C - Evolution of the total imported vegetable oil price:

A study of the data in Table (3) shows that the price of imports for total vegetable oils during the study period ranged between a minimum of about $398.7 tons in 2006 and a maximum of about $2227.1 tons in 2008, and an annual average of about $1116.2 tons during the period (2005-2020), and by studying the general temporal trend of the development of the import price of total vegetable oils, Table (4) shows the results of the statistical estimate during the period (2005-2020), and from it appears that the price of imports of total vegetable oils took a general decreasing trend by an annual statistically insignificant amount of about

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19 .2 dollars a ton and that there is no suitable mathematical picture of the nature of the data and the data revolve around its arithmetic average.

Table (3): The evolution of the quantity, value and price of imports for the most important types of edible vegetable oils during the period (2005 - 2020) (Quantity in thousand tons, value in million dollars, price in dollars per ton)

Years	Sun flower oil			Other oils		
	Quantity	value	Import Price	Quantity	value	Import Price
2005	124.5	84.7	680.7	76.8	49.6	645.8
2006	132.9	83.9	631.0	67.5	38.6	571.9
2007	153.0	113.1	739.0	29.4	42.8	1455.4
2008	139.0	247.8	1782.1	37.9	146.6	3869.1
2009	124.6	252.2	2023.6	30.1	120.2	4001.0
2010	149.4	253.7	1698.1	169.1	116.7	690.0
2011	262.8	482.0	1834.4	52.0	176.2	3388.1
2012	674.7	983.7	1457.9	146.5	160.4	1094.8
2013	446.6	638.2	1429.0	189.8	141.7	746.4
2014	427.7	429.7	1004.8	298.5	148.5	497.6
2015	89.6	184.2	2055.9	167.1	146.4	875.6
2016	169.2	276.7	1635.3	57.0	188.2	3298.2
2017	403.2	327.3	811.6	60.1	158.3	2634.8
2018	501.6	393.9	785.2	81.0	167.1	2064.2
2019	355.2	255.8	720.2	46.0	151.9	3304.7
2020	81.1	81.9	1009.5	876.3	136.3	155.5
Average	264.7	318.0	1268.6	149.1	130.6	1830.8
Min	81.1	81.9	631.0	29.4	38.6	155.5
Max	674.7	983.7	2055.9	876.3	188.2	4001.0

Source: www.treadmap.org

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Table (4): General trends in the quantity, value and price of the most important types of oils, Dietary vegetarian during the period (2005 - 2020)

Type of Oil	Variable	Estimated Equation	R^2	F
Total imports of oils	Quantity	Y = 558.9 + 72.5 X (3.1) (3.9)*	0.53	15.6*
	value	Y = 797.7 + 40.7 X (3.4) (1.7)-	0.16	2.7
	Import Price	Y = 1285.3 - 19.2 X (4.3) (-0.6)-	0.03	0.42
Palm oil	Quantity	Y = 338.3 + 31.07 X (2.1) (1.9) -	0.20	3.6
	value	Y = 317.3 + 23.08 X (3.1) (2.2)*	0.25	4.4*
	Import Price	Y = 1276.7 - 27.4 X (3.8) (-0.8)-	0.04	0.62
Soybean oil	Quantity	Y = 83.6 + 8.8 X (1.2) (1.2) -	0.09	1.4
	value	Y = 157.7 + 2.8 X (1.8) (0.3) -	0.007	0.097
	Import Price	Y = 1568.2 - 36.2 X (3.7) (-0.8)-	0.05	0.68
Sun flower oil	Quantity	Y = 155.6 + 12.8 X (1.7) (1.4) -	0.12	1.8
	value	Y = 251.6 + 7.8 X (1.9) (0.6) -	0.03	0.36
	Import Price	Y = 1338.4 - 8.2 X (4.7) (-0.3)-	0.006	0.08
Other oils	Quantity	Y = 18.9 + 19.77 X (0.2) (1.90) -	0.21	3.62
	value	Y = 70.9 + 7.01 X (3.99) (3.81)*	0.51	14.51*
	Import Price	Y = 1696.5 + 15.8 X (2.3) (0.21) -	0.003	0.04

Where: Y = the estimated value of the quantity, value and import price of the most important types of vegetable oils

Xi = time variable where i (1, 2, 3, ..., 16) .

The value in parentheses indicates the calculated (T) value, (R2) the coefficient of determination, (F) the significance of the model as a whole.

(*) indicates the significance of the regression coefficient at the 0.05 level of significance. (-) indicates that the regression coefficient is not significant.

Source: collected and calculated from the data in Table (4).

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Third - The evolution of total palm oil imports.

A - Evolution of the total amount of palm oil imports:

The study of the data in Table (3) shows that the total amount of palm oil imports during the study period ranged between a minimum of about 138.2 thousand tons in 2015 and a maximum of about 1105.0 thousand tons in 2019, and an annual average of about 602.4 thousand tons during the period (2005-2020), and by studying the general temporal trend of the development of the total amount of palm oil imports, Table (4) shows the results of the statistical estimate during the period (2005-2020), and from it appears that the total amount of palm oil imports took a general increasing trend by an insignificant annual amount Statistically, it amounted to about 31.07 thousand tons, and that there is no suitable mathematical picture for the nature of the data, and that the data revolve around its arithmetic average.

B - Evolution of the total value of palm oil imports:

A study of the data in Table (3) shows that the total value of palm oil imports during the study period ranged between a minimum of about 103.3 million dollars in 2015 and a maximum of about 860.4 million dollars in 2011, and an annual average of about 1044.1 million dollars during the period. (2005-2020), and by studying the general time trend of the development of the total value of palm oil imports, Table (4) shows the results of the statistical assessment during the period (2005-2020), from which it appears that the total value of palm oil imports took a general increasing trend by a statistically significant annual amount This amounted to about $23.08 million, and the coefficient of determination (R^2) was about 0.25, which means that 25% of the total changes in the total value of palm oil imports are due to the variable that reflects the time-changing effect.

C - Evolution of the total price of palm oil imports:

A study of the data in Table (3) shows that the price of imports for the total palm oil during the study period ranged between a minimum of about 347.5 tons in 2006 and a maximum of about 2426.9 tons in 2008, and an annual average of about 1044.1 tons during the period (2005-2020), and by studying the general temporal trend of the development of the price of imports for total palm oil, Table (4) shows the results of the statistical estimation during the period (2005-2020). Statistically, it amounted to about $27.4 tons, and that there is no suitable mathematical picture of the nature of the data, and that the data revolve around its arithmetic average.

Fourth - Evolution of Total Imports of Soybean Oil:

A - Evolution of the total amount of soybean oil imports:

A study of the data in Table (3) shows that the total amount of soybean oil imports during the study period ranged between a minimum of about 29.0 thousand tons in 2012 and a maximum of about 541.5 thousand tons in 2016, and an annual average of about 158.5 thousand tons during The period (2005-2020), and by studying the general time trend of the development of the total amount of soybean oil imports, Table (4) shows the results of the statistical assessment during the period (2005-2020), and from it appears that the total amount of soybean oil imports took a general increasing trend by The annual statistically insignificant amounted to about 8.8 thousand tons and that there is no suitable mathematical picture for the nature of the data and that the data revolve around its arithmetic average.

B - Evolution of the total value of imports of soybean oil:

A study of the data in Table (3) shows that the total value of soybean oil imports during the study period ranged between a minimum of about $24.4 million in 2006 and a

maximum of about $533.3 million in 2011, and an annual average of about $181.8 million during The period (2005-2020), and by studying the general temporal trend of the development of the total value of soybean oil imports, Table (4) shows the results of the statistical assessment during the period (2005-2020), and from it appears that the total value of soybean oil imports took a general increasing trend by An annual statistically insignificant amount of about $2.8 million, and that there is no suitable mathematical picture of the nature of the data, and that the data revolve around its arithmetic average.

C - Evolution of the total import price of soybean oil:

A study of the data in Table (3) shows that the total price of soybean oil imports during the study period ranged between a minimum of about $540.4 tons in 2006 and a maximum of about $3726.2 tons in 2010, and an annual average of about $1260.8 tons during The period (2005-2020), and by studying the general temporal trend of the development of the price of imports of total soybean oil, table (4) shows the results of the statistical assessment during the period (2005-2020), and from it appears that the price of total imports of soybean oil took a general decreasing trend by An annual statistically insignificant amount of about $36.2 tons, and that there is no suitable mathematical picture of the nature of the data, and that the data revolve around its arithmetic average.

Fifth - Evolution of total sunflower oil imports:

A - Evolution of the total amount of sunflower oil imports:

It is clear from the data of Table (3) that the total amount of imports of sunflower oil during the study period ranged between a minimum of about 81.1 thousand tons in 2020 and a maximum of about 674.7 thousand tons in 2012, and an annual average of about 264.7 thousand tons during the period (2005-2020), and by studying the general temporal trend of the development of the total amount of imports of sunflower oil, Table (4) shows the results of the statistical assessment during the period (2005-2020), from which it appears that the total amount of imports of sunflower oil took a general trend increasing by an annual amount Statistically significant, it amounted to about 12.8 thousand tons, and that there is no suitable mathematical picture for the nature of the data, and that the data revolve around its arithmetic average

B - Evolution of the total value of imports of sunflower oil:

The study of the data in Table (3) shows that the total value of imports of sunflower oil during the study period ranged between a minimum of about 81.9 million dollars in 2020 and a maximum of about 983.7 million dollars in 2012, and an annual average of about 318.0 million dollars during The period (2005-2020), and by studying the general temporal trend of the development of the total value of imports of sunflower oil, Table (4) shows the results of the statistical assessment during the period (2005-2020), and from it appears that the total value of imports of sunflower oil took a general increasing trend by An annual statistically insignificant amount of about $7.8 million, and that there is no suitable mathematical picture of the nature of the data, and that the data revolve around its arithmetic average.

C - Evolution of the total import price of sunflower oil:

It is evident from the study of the data in Table (3) that the total price of imports of sunflower oil during the study period ranged between a minimum of about 631.0 dollars tons in 2006 and a maximum of about 2055.9 dollars tons in 2015, and an annual average of about 1268.6 tons during The period (2005-2020), and by studying the general temporal trend of the development of the price of imports of sunflower oil, Table (4) shows the results of the statistical assessment during the period (2005-2020), and from it appears that the total price of imports of sunflower oil took a general trend decreasing by an annual amount Statistically

insignificant, amounting to about $8.2 tons, and that there is no suitable mathematical picture of the nature of the data, and that the data revolve around its arithmetic mean.

Sixth - Evolution of total imports of other types of oils:

A - Evolution of the total quantity of imports of other types of oils:

A study of the data in Table (3) shows that the total amount of imports of other types of oils during the study period ranged between a minimum of about 29.4 thousand tons in 2007 and a maximum of about 876.3 thousand tons in 2020, and an annual average of about 149.1 thousand tons during The period (2005-2020), and by studying the general time trends of the development of the total amount of imports of other types of oils, table (4) shows the results of the statistical assessment during the period (2005-2020), from which it appears that the total amount of imports of other types of oils took a general increasing trend by A statistically significant annual amounted to about 19.77 thousand tons, and that there is no suitable mathematical picture of the nature of the data, and that the data revolve around its arithmetic average.

B - Evolution of the total value of imports of other types of oils:

A study of the data in Table (3) shows that the total value of imports of other types of oils during the study period ranged between a minimum of about 38.6 million dollars in 2006 and a maximum of about 188.2 million dollars in 2016, and an annual average of about 130.6 million dollars during The period (2005-2020), and by studying the general time trends of the development of the total value of imports of other types of oils, table (4) shows the results of the statistical assessment during the period (2005-2020), and from it appears that the total value of imports of other types of oils took a general increasing trend by An annual statistically insignificant amount of about $7.01 million, and that there is no suitable mathematical picture of the nature of the data, and that the data revolve around its arithmetic average.

C- Evolution of the total import price of other types of oils:

A study of the data in Table (3) shows that the total price of imports of other types of oils during the study period ranged between a minimum of about 155.5 tons in 2020 and a maximum of about 4001.0 tons in 2009, and an annual average of about 1830.8 tons during The period (2005-2020), and by studying the general temporal trend of the development of the price of imports of other types of oils, table (4) shows the results of the statistical assessment during the period (2005-2020), and from it appears that the total price of imports of other types of oils took a general trend increasing by an annual amount Statistically insignificant, amounting to about $15.8 tons, and that there is no suitable mathematical picture for the nature of the data, and the data revolves around its arithmetic mean.

Seventh - Evolution of the gross domestic consumption of edible oils in Egypt during the period (2005-2020):

The Evolution of local consumption of the most important types of vegetable oils:

It is evident from the data of Table (5) that the total consumption of vegetable oils during the study period ranged between a minimum of about 692.0 thousand tons in 2010 and a maximum of about 2032.0 thousand tons in 2020, and an annual average of about 1285,3 thousand tons during the period (2005- 2020), and by studying the general temporal trend of the development of vegetable oil consumption, Table (6) shows the results of the statistical estimate during the period (2005-2020). The coefficient of determination (R^2) is about 0.38, which means that 38% of the total changes in the consumption of vegetable oils are due to the variable whose impact reflects the time variable.

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The evolution of domestic consumption of soybean oil:

It is evident from the data of Table (5) that the consumption of soybean oil during the study period ranged between a minimum of about 70.0 thousand tons in 2012 and a maximum of about 637.0 thousand tons in 2016, and an annual average of about 295.1 thousand tons during the period (2005- 2020), and by studying the general time trends of the development of soybean oil consumption, Table (6) shows the results of the statistical estimate during the period (2005-2020), from which it appears that soybean oil consumption took a general increasing trend with a statistically significant annual amount of about 15.3 thousand tons. The coefficient of determination (R^2) was about 0.23, which means that 23% of the total changes in soybean oil consumption are due to the variable that reflects the effect of the time change.

Evolution of domestic consumption of cottonseed oil:

It is evident from the data of Table (5) that the consumption of cottonseed oil during the study period ranged between a minimum of about 9.0 thousand tons in 2017 and a maximum of about 80.0 thousand tons in 2006, and an annual average of about 37.4 thousand tons during the period (2005- 2020), and by studying the general time trends of the development of cottonseed oil consumption, Table (6) shows the results of the statistical estimation during the period (2005-2020). The coefficient of determination (R^2) was about 0.72, which means that 72% of the total changes in the consumption of cottonseed oil are due to the variable that reflects the effect of the time variable.

Table: (5): Evolution of the local consumption of the most important types of food vegetable oils in thousand tons during the period (2005 - 2020)

Years	Total Vegetable Oil	Soybean Oil	Cottonseed Oil	Sunflower Oil	Corn Oil	Palm Oil	Frozen Oils
2005	1242	188	78	129	48	787	659
2006	1384	142	80	128	36	994	830
2007	782	260	69	158	22	272	230
2008	759	297	62	112	6	279	209
2009	714	247	36	130	27	270	224
2010	692	246	26	147	12	251	188
2011	1286	443	32	237	46	517	413
2012	1263	70	39	472	56	617	561
2013	1614	298	36	518	33	716	618
2014	1373	165	21	449	38	687	636
2015	720	301	28	59	40	281	248
2016	1731	637	14	154	54	849	789
2017	1752	242	9	480	43	945	884
2018	1947	310	19	500	40	1063	768
2019	1273	268	27	217	50	683	411
2020	2032	608	22	237	36	1083	428
Average	1285.3	295.1	37.4	257.9	36.7	643.4	506.0
Min	692	70	9	59	6	251	188
Max	2032	637	80	518	56	1083	884

Source: Compiled and calculated from: Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Central Administration of Agricultural Economy, Annual Bulletin of Food Balance.

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Evolution of local consumption of sunflower oil:

It is evident from the data of Table (5) that the consumption of sunflower oil during the study period ranged between a minimum of about 59.0 thousand tons in 2015 and a maximum of about 518.0 thousand tons in 2013, and an annual average of about 257.9 thousand tons during the period (2005- 2020), and by studying the general temporal trends of the development of sunflower oil consumption, Table (6) shows the results of the statistical estimate during the period (2005-2020), and from it appears that the consumption of sunflower oil took a general increasing trend with an annual statistically insignificant amount of about 15.1 thousand tons And that there is no suitable mathematical picture of the nature of the data, and that the data revolve around its arithmetic mean.

Table (6): The general time trend of local consumption of the most important types of edible vegetable oils in thousand tons during the period (2005-2020)

S	variable	Estimated Equation	R^2	F
1	Total vegetable oil	Y = 784.9 + 58.9 X (4.1) (2.9)*	0.38	*8.7
2	Soybean oil	Y = 165.2 + 15.3 X (2.3) (2.03)*	0.23	*4.2
3	Cottonseed oil	Y = 71.6 - 4.02 X (11.1) (-6.02)*	0.72	*36.3
4	Sunflower oil	Y = 129.7 + 15.1 X (1.6) (1.8) -	0.19	3.3
5	Corn oil	Y = 26.5 + 1.2 X (3.8) (1.6) -	0.16	2.7
6	Palm oil	Y = 394.6 + 29.3 X (2.7) (1.9) -	0.21	3.8
7	Frozen oils	$Y = 1114.9 - 395.1 X + 55.2 X^2 - 2.1 X^3$ (4.6) (-3.3) (3.4) (-3.3)	0.52	4.4

Where: Y = the estimated value of the local consumption of the most important types of vegetable oils, in thousand tons

Xi = time variable where i (1, 2, 3, ..., 16) .

The value in parentheses indicates the calculated (T) value, (R^2) the coefficient of determination, (F) the significance of the model as a whole.

(*) indicates the significance of the regression coefficient at the 0.05 level of significance. (-) indicates that the regression coefficient is not significant.

Source: compiled and calculated from the data in Table (5).

The evolution of domestic consumption of corn oil:

It is evident from the data of Table (5) that the consumption of corn oil during the study period ranged between a minimum of about 6.0 thousand tons in 2008 and a maximum of about 56.0 thousand tons in 2012, and an annual average of about 36.7 thousand tons during the period (2005-2020), and by studying the general time trends of the development of corn oil consumption, Table (6) shows the results of the statistical assessment during the period (2005-2020), and from it appears that the corn oil consumption took a general increasing trend with an annual statistically insignificant amount of about 1.2 thousand tons,

and that it does not There is an appropriate mathematical picture of the nature of the data and that the data revolve around its arithmetic mean.

The evolution of domestic consumption of palm oil:

It is evident from the data of Table (5) that the consumption of palm oil during the study period ranged between a minimum of about 251.0 thousand tons in 2010 and a maximum of about 1083.0 thousand tons in 2020, and an annual average of about 643.4 thousand tons during the period (2005-2020), and by studying the general temporal trends of the development of palm oil consumption, Table (6) shows the results of the statistical assessment during the period (2005-2020), from which it appears that the consumption of palm oil took a general increasing trend with a statistically significant annual amount of about 29.3 thousand tons, and that there are no An appropriate mathematical picture of the nature of the data and that the data revolve around its arithmetic mean.

Evolution of local consumption of frozen oils:

It is evident from the data of Table (5) that the consumption of frozen oils during the study period ranged between a minimum of about 188.0 thousand tons in 2010 and a maximum of about 884.0 thousand tons in 2017, and an annual average of about 506.0 thousand tons during the period (2005-2020). By studying the general time trends of the development of the consumption of frozen oils, Table (6) shows the results of the statistical estimation during the period (2005-2020) that the cubic picture is the best mathematical picture, and from it it appears that the consumption of frozen oils took a general decreasing trend by a statistically significant annual amount of about 395.1 thousand tons in the first stage, then it started to increase by about 55.2 thousand tons, then it started decreasing at the end of the function by about 2.1 thousand tons. It refers to the variable whose effect reflects the time variable.

Eighth- The oil gap of liquid food oils in Egypt during the period (2005-2020)

It appears from the data of Table (7) that the total gap of vegetable oils during the study period ranged between a minimum of about 518.0 thousand tons in 2010 and a maximum of about 1688.0 thousand tons in 2018, with an annual average of about 1063.0 thousand tons during the period (2005- 2020), and by examining the general temporal trend of the evolution of the gap of vegetable oils, table (8) shows the results of the statistical estimate during the period (2005-2020), and from it it is clear that the gap of vegetable oils has taken a general increasing trend by a statistically significant annual amount of about 50.7 thousand tons, this The coefficient of determination (R2) was about 0.34, which means that 34% of the total changes in the total gap of vegetable oils is due to the variable whose effect reflects the variable of time. And by examining the general temporal trend of the evolution of the gap of vegetable oils from soybean oil, table (8) shows the results of the statistical estimate during the period (2005-2020). 6.21 thousand tons

By examining the general temporal trend of the evolution of the gap of vegetable oils from cottonseed oil, Table (8) shows the results of statistical estimation during the period (2005-2020) that the cubic image is the best mathematical image, and from it it is clear that the gap of vegetable oils from cottonseed oil took a general trend decreasing by a statistically significant annual amount, amounting to about 1.9 thousand tons in the first stage, then it increased by about 0.17 thousand tons, then it began decreasing at the end of the function by 0.005 thousand tons, and this determination coefficient (R2) reached about 0.52, which means that 52% of the total Changes in that gap of vegetable oil from cottonseed oil

By examining the general temporal trend of the evolution of the gap of vegetable oils from sunflower oil, Table (8) shows the results of the statistical estimate during the period (2005-2020), and from it it is clear that the gap of vegetable oils from sunflower oil took a general increasing trend by an annual non-statistically significant amount of About 14.6 thousand tons

By examining the general temporal trend of the evolution of the gap of vegetable oils from corn oil, Table (8) shows the results of the statistical estimate during the period (2005-2020), and from it it is clear that the gap of vegetable oils from corn oil took a general increasing trend by an annual non-significant statistical amount of about 1.3 thousand tons

By examining the general temporal trend of the evolution of the gap of vegetable oils from palm oil, Table (8) shows the results of statistical estimation during the period (2005-2020) that the cubic image is the best mathematical image, and from it it is clear that the gap of vegetable oils from palm oil took a general decreasing trend by Statistically significant annual amounted to about 335.8 thousand tons in the first stage, then it started to increase by about 41.5 thousand tons, then it started decreasing at the end of the function 1.3 thousand tons, and this determination coefficient (R2) reached about 0.56, which means that 56% of the total changes in That gap of vegetable oil from palm oil

Table (7): The evolution of the gap for the most important types of food vegetable oils, in thousand tons, during the period (2005 - 2020)

years	Total Vegetable oils	Soybean oil	Cottonseed oil	Sun Flower oil	Corn oil	Palm oil	Other oils	Frozen oils
2005	1038	84	3	115	37	787	12	6
2006	1177	40	5	119	15	994	4	5
2007	534	93	6	146	16	272	1	4
2008	584	206	0	101	0	279	-2	-23
2009	538	131	0	122	21	270	-6	0
2010	518	137	0	126	2	251	2	-18
2011	1086	324	0	207	36	517	2	-10
2012	1087	-14	0	440	48	617	-4	-47
2013	1386	148	0	499	25	716	-2	-73
2014	1174	21	0	435	29	687	2	-20
2015	556	196	0	43	31	281	5	-26
2016	1552	505	0	143	44	849	11	-39
2017	1568	128	0	460	33	945	2	-38
2018	1688	132	3	475	30	1063	-15	-6
2019	991	92	0	188	40	683	-12	-6
2020	1538	199	0	227	26	1083	3	-27
average	**1063**	**151**	**1**	**240**	**27**	**643**	**1.1**	**-20**
minimum	**518**	**-14**	**3**	**43**	**2**	**251**	**-15**	**-73**
maximum	**1688**	**505**	**6**	**499**	**48**	**1083**	**12**	**6**

Source: Collected and calculated from: Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Central Administration of Agricultural Economy, Annual Bulletin of Food Balance, various issues.

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By examining the general temporal trend of the evolution of the gap of vegetable oils from other oils, Table (8) shows the results of the statistical estimate during the period (2005-2020) that the cubic image is the best mathematical form, and from it it is clear that the gap of vegetable oils from other oils took a general decreasing trend by Statistically significant annual amounted to about 6.4 thousand tons in the first stage, then it began to increase by about 0.8 thousand tons, then it began to decrease at the end of the function 0.03 thousand tons. The gap of vegetable oils from other oils is due to the variable whose effect reflects the variable of time

By examining the general temporal trend of the evolution of the gap between vegetable oils and frozen oils, Table (8) shows the results of the statistical estimate during the period (2005-2020) that the cubic image is the best mathematical image, and from it it is clear that the gap between vegetable oils and frozen oils took a general decreasing trend. by a statistically significant annual amount that amounted to about 3.4 thousand tons in the first stage, then it increased by about 0.5 thousand tons, then it began to decrease at the end of the function 0.02 thousand tons, and this determination coefficient (R2) reached about 0.54, which means that 54% of the total changes In that the gap of vegetable oils from frozen oils is due to the variable whose effect reflects the variable of time

Table (8): The general time trend of the gap of vegetable oils for the most important types of food vegetable oils, in thousand tons, during the period (2005-2020**).**

s	Dependent Variable	Estimated Equation	R^2	F
1	Total vegetable oils	Y = 632.4 + 50.7 X (3.4) (2.7)*	0.34	*7.2
2	Soybean oil	Y = 98.7.+6. 29. (1.5) (0.9) -	6.0	0.88
3	Cottonseed oil	Y = 6.8 - 1.9 X+ 0.17 X^2 -0.005 X^3 (3.4) (-1.9) (1.3) (-0.9)	0.52	*4.4
4	Sun flower oil	Y = 116.6 + 14.6 X (1.5) (1.8) -	0.19	3.2
5	corn oil	Y = 16.1 + 1.3 X (2.4) (1.9) -	0.20	3.5
6	Palm oil	Y = 1162.3 - 335.8 X+ 41.5 X^2 -1.3 X^3 (4.04) (-2.4) (2.2) (-1.8)	0.56	* 5.15
7	Other oils	Y = 15.4 - 6.48 X+ 0.8 X^2 -0.03 X^3 (4.09) (-3.4) (3.2) (-3.04)	0.50	4.06
8	Frozen oils	Y = 9.3 - 3.4 X+ 0.5 X^2 -0.02 X^3 (3.8) (-2.9) (3.2) (-3.3)	0.54	4.77

Where: Y = Gap of food vegetable oils, thousand tons

Xi = time variable where i = (1, 2, 3, ..., 16).

The value in brackets indicates the calculated (T) value, (R2) the coefficient of determination, and (F) the significance of the model as a whole.

(*) indicates the significance of the regression coefficient at the significance level of 0.05.

(-)indicates that the regression coefficient is not significant.

Source: Calculated from the data of Table (7).

By studying the general temporal trend of the evolution of the gap of vegetable oils from other oils during the period (2005-2020), the cubic volume is the best mathematical image, and from it it is clear that the gap of vegetable oils from other oils took a general decreasing trend by a statistically significant annual amount of about 6.4 thousand tons in The first stage, then increased by about 0.8 thousand tons, then began to decrease at the end of the function by 0.03 thousand tons, and this coefficient of determination ((R2) reached about 0.50, which means that 50% of the total changes in the gap of vegetable oils from other oils is due To the variable whose effect reflects the variable of time

By examining the general temporal trend of the evolution of the gap between vegetable oils and frozen oils, Table (8) shows the results of the statistical estimate during the period (2005-2020) that the cubic image is the best mathematical image, and from it it is clear that the gap between vegetable oils and frozen oils took a general decreasing trend. by a statistically significant annual amount that amounted to about 3.4 thousand tons in the first stage, then it increased by about 0.5 thousand tons, then it began to decrease at the end of the function 0.02 thousand tons, and this determination coefficient (R2) reached about 0.54, which means that 54% of the total changes In that the gap of vegetable oils from frozen oils is due to the variable whose effect reflects the variable of time

Third: The evolution of the total self-sufficiency rate of liquid edible oils in Egypt during the period (2005-2020:(

A study of the indicators of table (9) shows that the total self-sufficiency percentage of vegetable oils during the study period ranged from a minimum of about 10.34% in 2016 to a maximum of about 31.71% in 2007, with an annual average of about 17.64% during the period (2005- 2020), and by examining the general temporal trend of the development of the self-sufficiency rate of vegetable oils, Table (10) shows the results of the statistical estimate during the period (2005-2020) that the cubic form is the best mathematical form, and from it it is clear that the gap of vegetable oils from that of frozen oils took a trend year, increasing by a statistically significant annual amount of about 7.6 thousand tons in the first stage, then decreasing by about 1.2 thousand tons and then increasing at the end of the function by 0.05 thousand tons. This has reached the coefficient of determination (R2) about 0.51, which means that 51% of The total changes in the gap of vegetable oils from frozen oils are due to the variable whose effect reflects the variable of time

By examining the general temporal trend of the development of the self-sufficiency rate of vegetable oils, Table (10) shows the results of the statistical estimate during the period (2005-2020) that the cubic image is the best mathematical form, and from it it is clear that the gap of vegetable oils from frozen oils took a general trend increasing by Statistically significant annual amounted to about 7.6 thousand tons in the first stage, then it started decreasing by about 1.2 thousand tons, then it started increasing at the end of the function by 0.05 thousand tons, and this determination coefficient (R2) reached about 0.51, which means that 51% of the total changes in that Divide vegetable oils from frozen oils

By examining the general time trend of the development of the self-sufficiency percentage of vegetable oils from soybean oil, Table (10) shows the results of the statistical estimate during the period (2005-2020), and from it it is clear that the self-sufficiency percentage of vegetable oils from soybean oil took a general trend decreasing by an annual rate Statistically insignificant amounted to about 0.08%

By examining the general temporal trend of the development of the self-sufficiency percentage of vegetable oils from cottonseed oil, Table (10) shows the results of the statistical estimate during the period (2005-2020). Statistically insignificant amounted to about 0.09%

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By examining the general temporal trend of the development of the self-sufficiency percentage of vegetable oils from sunflower oil, Table (10) shows the results of the statistical estimate during the period (2005-2020). Statistically insignificant amounted to about 0.08%

By examining the general time trend of the development of the self-sufficiency percentage of vegetable oils from soybean oil, Table (10) shows the results of the statistical estimate during the period (2005-2020), and from it it is clear that the self-sufficiency percentage of vegetable oils from soybean oil took a general trend decreasing by an annual rate Statistically insignificant amounted to about 0.08%

By examining the general temporal trend of the development of the self-sufficiency percentage of vegetable oils from cottonseed oil, Table (10) shows the results of the statistical estimate during the period (2005-2020). Statistically insignificant amounted to about 0.09%

By examining the general time trend of the development of the self-sufficiency percentage of vegetable oils from soybean oil, Table (10) shows the results of the statistical estimate during the period (2005-2020), and from it it is clear that the self-sufficiency percentage of vegetable oils from soybean oil took a general trend decreasing by an annual rate Statistically insignificant amounted to about 0.08%

Table (9): Evolution of the self-sufficiency rate for the most important types of food vegetable oils during the period (2005 – 2020)

years	Total Vegetable oils	Soybean oil	Cottonseed oil	Sun Flower oil	Corn oil	Palm oil	Other oils	Frozen oils
2005	**16.43**	**55.32**	**96.15**	**10.85**	**22.92**	**0.00**	**0.00**	**99.09**
2006	**14.96**	**71.83**	**93.75**	**7.03**	**58.33**	**0.00**	**0.00**	**99.40**
2007	**31.71**	**64.23**	**91.30**	**7.59**	**27.27**	**0.00**	**0.00**	**98.26**
2008	**23.06**	**30.64**	**100.00**	**9.82**	**100.00**	**0.00**	**166.67**	**111.00**
2009	**24.65**	**46.96**	**100.00**	**6.15**	**22.22**	**0.00**	**250.00**	**100.00**
2010	**25.14**	**44.31**	**100.00**	**14.29**	**83.33**	**0.00**	**80.00**	**109.57**
2011	**15.55**	**26.86**	**100.00**	**12.66**	**21.74**	**0.00**	**81.82**	**102.42**
2012	**13.94**	**120.00**	**100.00**	**6.78**	**14.29**	**0.00**	**144.44**	**108.38**
2013	**14.13**	**50.34**	**100.00**	**3.67**	**24.24**	**0.00**	**115.38**	**111.81**
2014	**14.49**	**87.27**	**100.00**	**3.12**	**23.68**	**0.00**	**84.62**	**103.14**
2015	**22.78**	**34.88**	**100.00**	**27.12**	**22.50**	**0.00**	**54.55**	**110.48**
2016	**10.34**	**20.72**	**100.00**	**7.14**	**18.52**	**0.00**	**52.17**	**104.94**
2017	**10.50**	**47.11**	**100.00**	**4.17**	**23.26**	**0.00**	**93.94**	**104.30**
2018	**13.30**	**57.42**	**84.21**	**5.00**	**25.00**	**0.00**	**200.00**	**100.78**
2019	**22.15**	**65.67**	**100.00**	**13.36**	**20.00**	**0.00**	**142.86**	**101.46**
2020	**24.31**	**67.27**	**100.00**	**4.22**	**27.78**	**0.00**	**93.48**	**106.31**
average	**17.64**	**50.84**	**97.73**	**7.55**	**28.22**	**0.00**	**97.50**	**104.36**
minimum	**10.34**	**20.72**	**84.21**	**3.12**	**14.29**	**0.00**	**0.00**	**98.26**
maximum	**31.71**	**120.00**	**100.00**	**27.12**	**100.00**	**0.00**	**250.00**	**111.81**

Source: Collected and calculated from: Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Central Administration of Agricultural Economy, Annual Bulletin of Food Balance, various issues.

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Table (10): The General Time Trend Of Self-Sufficiency In Vegetable Oils For The Most (Important Types Of Food Vegetable Oils During The Period (2005-2020

s	Dependent Variable	Estimated Equation	R^2	F
1	Total vegetable oils	$Y = 9.9 + 7.6 X - 1.2 X^2 + 0.05 X^3$ (1.6) (2.4) (-2.9) (3.1)	0.51	4.09
2	Soybean oil	$Y = 55.01 + 0.08 X$ (4.1) (0.06) -	0.001	0.003
3	Cottonseed oil	$Y = 97.1 + 0.09 X$ (39.9) (0.4) -	0.009	0.13
4	Sun flower oil	$Y = 9.7 - 0.08 X$ (2.9) (-0.25)-	0.004	0.06
5	corn oil	$Y = 51.6 - 2.1 X$ (4.2) (-1.7)-	0.17	2.8
6	Other oils	$Y = 56.6 + 4.8 X$ (1.5) (1.3) -	0.10	1.6
7	Frozen oils	$Y = 102.6 + 0.22 X$ (42.03) (0.9) -	0.16	2.7

Where: Y = self-sufficiency rate of food vegetable oils %
Xi = time variable where i (1, 2, 3, ..., 16).
The value in brackets indicates the calculated (T) value, (R2) the coefficient of determination, and (F) the significance of the model as a whole.
(*) indicates the significance of the regression coefficient at the significance level of 0.05.
(-) indicates that the regression coefficient is not significant.
Source: Calculated from the data of Table (9)

Recommendations:

1) Work on revitalizing contract farming with the aim of expanding the area and production of oil crops under study.
2) The necessity of activating the Agricultural Insurance Law in order to mitigate the risks to which farmers of seed crops are exposed.
3) Working to spread the cultivation of oil crops that are suitable for cultivation in desert lands.
4) Work to rationalize the consumption of food oils and find suitable alternatives for consumption.
5) Increasing investments in the expansion of establishing and establishing oil production factories.

References:

1- **FAO (2014).** News of Agricultural Affairs in the Near East,.
2- **Gamal Hassan Shedid (2002).** "An Economic Study of Food Oils in Egypt", Diploma of the National Planning Institute, Agricultural Planning Center, National Planning Institute.
3- **Hafsa Abdel-Aty Ali Morsi (2004).** "An Analytical Study of Medicine on Vegetable Oils in Egypt", Master's Thesis, Department of Agricultural Economics, Faculty of Agriculture, Ain Shams University.
4- **Jamil Abdel Hamid Gaballah & Khairy Hamed Al-Ashmawy (1997).** The Impact of Economic Liberalization Policy on the Economics of Production of the Most

10.21608/MEAE.2023.174131.1121

Important Agricultural Crops in Egypt, Sixth Conference on Economics and Development in Egypt and the Arab Countries, Department of Agricultural Economics, Faculty of Agriculture, Mansoura University, Volume (2) October.

5- **Khairy Hamed El-Ashmawy & Ahmed Labib Negm (2006).** National Research Center, Department of Agricultural Economics, Economic Possibilities to Narrow the Gap of Vegetable Oils in Egypt, Journal of Science in Mansoura, Volume (31), Issue (1), pp. 249, 257.

6- **Ministry of Agriculture and Land Reclamation (2020).** Economic Affairs Sector, General Administration of Economic Resources, Food Balance Bulletin.

7- **Samia Abdel Hamid Abdullah (1996).** A proposed policy to reduce the consumption gap of food vegetable oils, The Egyptian Journal of Agricultural Economics, Volume VI, Issue (2), September.

8- **Somaya Mostafa Ismail & Ali Assem Zaki (1993).** Possibilities of Improving Self-Sufficiency in Oil Production in Egypt, International Conference on Technological Methods for Handling Agricultural Products, Faculty of Agriculture, Cairo University, April.

9- **Soraya Sadiq Farid (2004).** "An economic study of edible vegetable oils in Egypt", The Egyptian Journal of Agricultural Economics, Volume (14), Issue (2), June.