



دراسة اقتصادية تحليلية للعوامل المؤثرة على مستقبل إنتاج القطن المصري

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بيانات البحث	المستخلص
استلام 2023 / 3 / 15	يهدف البحث إلي دراسة أهم العوامل المؤثرة علي محصول القطن ، بغرض إلقاء الضوء علي أهم المعوقات والمشاكل التي تؤثر علي إنتاج هذا المحصول، والتي أدت إلي انخفاض كل من المساحة المزروعة والإنتاج الكلي ، للتعرف علي أهم المتغيرات المؤثرة علي إنتاج محصول القطن وتبين أن صادرات مصر قدرت بحوالي 474.4 مليون دولار كمتوسط خلال الفترة (2015-2019) ، تبين أن تركيا جاءت في المرتبة الأولى من حيث متوسط قيمة واردات مصر والتي قدرت بحوالي 124.8 مليون دولار وبأهمية نسبية بلغت حوالي 26.31% خلال نفس الفترة ، في حين جاءت ايطاليا ، الهند في المرتبة الثانية والثالثة بمتوسط قيمة واردات من مصر بلغ نحو 93.6، 60.3 مليون دولار بأهمية نسبية بلغت نحو 19.72 % ، 12.70% على الترتيب خلال نفس الفترة، وجاءت باكستان ، تونس في المرتبة الرابعة والخامسة بمتوسط قيمة بلغ نحو 26.3 ، 22.1 مليون دولار وبأهمية نسبية بلغت نحو 5.54% ، 4.67% على الترتيب ، متوسط صافي العائد للقطن بلغ حوالي 3411.8 جنية للفدان خلال فترة الدراسة ، بينما بلغ متوسط صافي العائد لمحصول السمسم خلال فترة الدراسة حوالي 2224.4 جنية للفدان ، وبلغ المتوسط لمحصول الفول الصويا خلال فترة الدراسة حوالي 1439.9 جنية للفدان ، كما بلغ المتوسط لمحصول عباد الشمس علي مستوي الجمهورية خلال فترة الدراسة حوالي 4884.9 جنية للفدان ، وبلغ المتوسط لمحصول الذرة الشامية علي حوالي 2178.8 جنية للفدان وذلك خلال الفترة (2000-2019) .

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An Economic Study of the Determinants of Cotton Production in Egypt

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ABSTRACT

The research aims to study the main factors affecting the cotton crop, in order to shed light on the obstacles and problems affecting the production of this crop. The time trend equation indicates that the amount of Egypt imports of the cotton crop took an increasing trend during the period 1985-2019 by a statistically significant annual rate of about 2.62 thousand tons. Egyptian exports of cotton went through major changes during recent history. Cotton was a major source of foreign exchange in the sixties and seventies but it became a minor export crop starting from the mid 1980s until now. Egypt exports of cotton were estimated at about \$474.4 million on average during the period (2015-2019). Turkey comes first as the most important importer of Egyptian cotton, with an average value of about 124.8 million dollars which constitute about 26.31% of all Egyptian cotton exports. The cultivated area of the cotton crop assumed a downward trend by a statistically significant annual rate of about 27.62 thousand feddans during the study period. At the same time the cotton yield tends to be stagnant in recent years. In fact the land cotton productivity took an upward trend by a statistically insignificant annual rate during the study period.

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Introduction

The importance of the cotton crop is due to its pivotal role in several local industries such as the ginning industry, spinning and weaving, the edible oil industry, and the animal feed industry. In fact the cotton-based industries provide employment to large segment of the population and it generates hard currency through exportation to international markets. The Egyptian cotton surpasses other cotton brands in terms of quality, spinning characteristics, and staple length. But unfortunately, the Egyptian cotton has witnessed a significant decline in its production, marketing and exportation in recent years. The current study will attempt to shed light on the factors that are contributing to the decline of the cotton crop.

The Study Problem:

Cotton farmers are faced with so many risks and uncertainties mainly because of the difficulty to predict the marketing possibilities of the crop due to changes in government policies and the inadequacy of price and non-price incentives. Recent years have witnessed skyrocketing input costs while the cotton farm prices are not keeping in pace. In particular the labor costs for this labor-intensive crop are contributing to the overall excessive costs of production. At the same time the textile industry prefers to rely on cheap imported cotton rather than depending on the Egyptian cotton. And the international markets are leaning towards synthetic fibers and short staple cotton rather than long stable and finer quality cottons. All of these factors are seemingly contributing to the shortfall of the Egyptian cotton.

The Research Objectives:

The research aims at identifying the most important factors affecting cotton production in Egypt and exploring the causes of the substantial deterioration of the cotton crop after years of cotton dominance in the Egyptian agriculture. The study will attempt to come up with recommendations in order to reverse the trend of cotton decline.

Methods and Data Sources:

In order to achieve the objectives of the research, descriptive and quantitative methods of analysis were utilized. The research is based on published and unpublished secondary data issued by the Ministry of Agriculture and Land Reclamation, the Central Agency for Public Mobilization and Statistics, and the UN Food and Agriculture Organization.

Egypt Cotton Import:

Table (1) shows that Egypt's average annual imports of the cotton crop during the period 1985-2019 amounted to about 43.79 thousand tons. Those imports reached

their lowest level of about 500 tons in year 1998 and reached their highest level of 239.48 thousand tons in year 2019. The time trend equation in table 3 indicates that the amount of Egypt imports of the cotton crop took an increasing trend during the period 1985-2019 by a statistically significant annual rate of about 2.62 thousand tons.

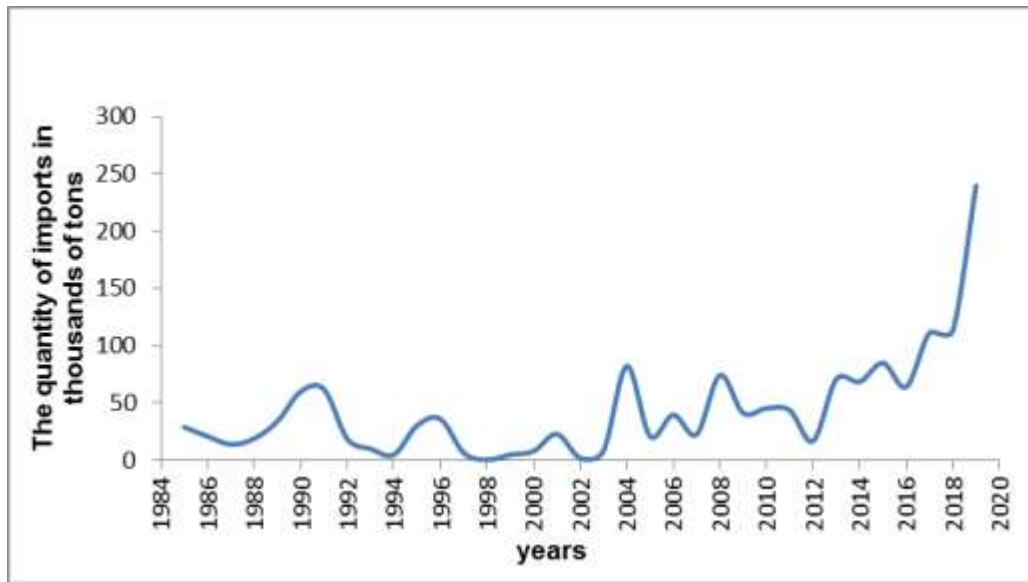
Table (1) shows that the value of Egypt imports of the cotton crop during the period 1985-2019 amounted to about 283.14 million U.S. dollars. It is clear from the table that the value of Egypt's imports of the cotton crop during the same period reached its lowest level of 550 thousand dollars in year 1998. While it reached its highest level of \$913.02 million in year 2018. The time trend equation in table 3 indicates that the value of Egypt imports of the cotton crop took an increasing trend during the period 1985-2019 by a statistically significant annual rate of about \$27.29 million. This trend is illustrated in figure 1.

Table (1) Egypt Cotton Imports (1985-2019)

Year	Quantity in thousands tons	Value in million dollars	Year	Quantity in thousands tons	Value in million dollars
1985	29	43.64	2004	82.18	112.75
1986	21	35	2005	21.12	97.84
1987	14	25	2006	39.78	138.68
1988	19	36.35	2007	22.74	142.22
1989	34	60	2008	74.16	688.49
1990	60	120	2009	41.26	689.76
1991	62	108.79	2010	45.42	740.55
1992	18.81	30.56	2011	43.65	775.75
1993	10.1	15.06	2012	16.92	631.46
1994	5	8	2013	70.87	687.34
1995	30.56	37.64	2014	68.5	679.41
1996	36.08	46.15	2015	84.97	691.46
1997	6.5	7.23	2016	64.15	632.28
1998	0.5	0.55	2017	111.22	726.76
1999	4.9	6.35	2018	113.22	913.02
2000	8.06	8.35	2019	239.48	890.07
2001	22.99	42.7	Average	43.79	283.14
2002	2.07	11.58	Minimum	0.5	0.55
2003	8.3	29.12	Maximum	239.48	913.02

Source: <https://www.fao.org/faostat/en/#data/TCL>

Figure (1) Quantity of Egypt Cotton Imports (1985-2019)



Egypt Cotton Export:

Egyptian exports of cotton went through major changes during recent history. Cotton was a major source of foreign exchange in the sixties and seventies but it became a minor export crop starting from the mid 1980s until now. Therefore we study the evolution of Egypt cotton exports during two distinctive time periods. The first period is 1961-1984 and the second period is 1985-2019.

Table (2) shows that the average annual Egyptian exports of the cotton crop during the period 1961-1984 amounted to about 239.43 tons where it reached its lowest level in year 1978 and its maximum level in year 1966 with about 347.58 thousand tons. The time trend equation in table 3 indicates that the quantity of Egypt exports of the cotton crop took a decreasing trend during the period 1961-1984 by a statistically significant annual rate of about 7.26 thousand tons. This trend is illustrated in figure 2.

Table (2) shows that the average value of Egypt exports of the cotton crop during the period (1961-1984) amounted to about 383.27 million dollars. It is also evident from the table that the value of Egypt exports of the cotton crop during the same period reached its lowest level in year 1962 and reached its highest level in 1974 with about 712.85 million dollars.

The time trend equation in table 3 indicates that the value of Egypt exports of the cotton crop took an increasing trend during the period 1961-1984 by a statistically significant annual rate of about 9.46 million dollars.

Table (2) Quantity and Value of Egypt Cotton Exports (1961-2019)

Years	export amount	Export value	Years	export amount	Export value
1961	295.26	300.44	1985	143.83	427.25
1962	250.49	207.88	1986	145.64	440.76
1963	289.67	278.25	1987	129.91	388.87
1964	291.09	268.14	1988	79.92	287.04
1965	329.73	336.29	1989	58.41	274.5
1966	347.58	329.81	1990	39.44	186.09
1967	296.42	279.59	1991	12.99	60.69
1968	264.03	276.19	1992	15.54	52.55
1969	252.75	300.67	1993	18.39	43.59
1970	285.25	340.1	1994	113.16	232.9
1971	333.39	402.47	1995	67.42	152.22
1972	294.98	372.51	1996	23.29	91.83
1973	284.78	483.56	1997	41.79	110.22
1974	232.24	712.85	1998	66.26	158.17
1975	185.1	513.84	1999	111.54	238.16
1976	165.18	395.55	2000	63.22	132.27
1977	143.9	465.88	2001	81.61	344.84
1978	132.95	336.17	2002	161.12	464.15
1979	146.58	381.82	2003	196.82	514.17
1980	164.07	423.41	2004	183.73	610.02
1981	177.56	457.09	2005	96.75	293.91
1982	200.13	408.72	2006	55.19	242.99
1983	208.89	441.24	2007	128.34	275.47
1984	174.32	485.95	2008	97.17	363.91
Average	239.43	383.27	2009	15.44	266.95
Minimum	132.95	207.88	2010	54.64	608.21
Maximum	347.58	712.85	2011	61.22	644.94
			2012	57.73	526.76
			2013	42.03	535.09
			2014	24.76	474.2
			2015	37.09	476.05
			2016	30.91	468.83
			2017	27.88	473.08
			2018	36.63	482.6
			2019	70.78	471.63
			Average	74.02	337.57
			Minimum	12.99	43.59
			Maximum	196.82	644.94

Source: <https://www.fao.org/faostat/en/#data/TCL>

Figure (2) Quantity of Egypt Cotton Exports (1961-1984)

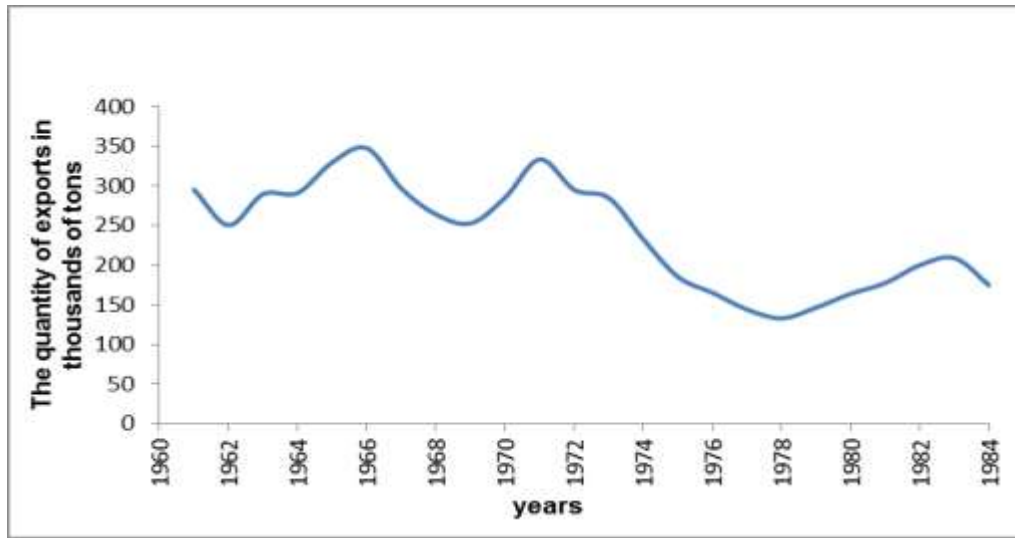


Table (2) shows that the average Egyptian exports of the cotton crop during the period (1985-2019) amounted to about 70.02 tons where it reached its lowest level in year 1991 and its maximum level of 196.82 thousand tons in year 2003. The time trend equation in table 3 indicates that the quantity of Egypt exports of the cotton crop took a decreasing trend during the period 1985-2019 by a statistically insignificant annual rate of about 1.7 thousand tons. This trend is illustrated in figure 3.

Table (2) shows that the average value of Egypt exports of the cotton crop during the period (1985-2019) amounted to about \$337.57 million. It also appears from the table that the value of Egypt exports of the cotton crop during the same period reached its lowest level in the year 1993 and it reached its highest level in 2011 with about 644.94 million dollars.

The time trend equation in table 3 indicates that the value of Egypt exports of the cotton crop took an increasing trend during the period 1985-2019 by a statistically insignificant annual rate of about 4.12 million dollars.

Figure (3): Quantity of Egypt Cotton Exports (1985-2019)

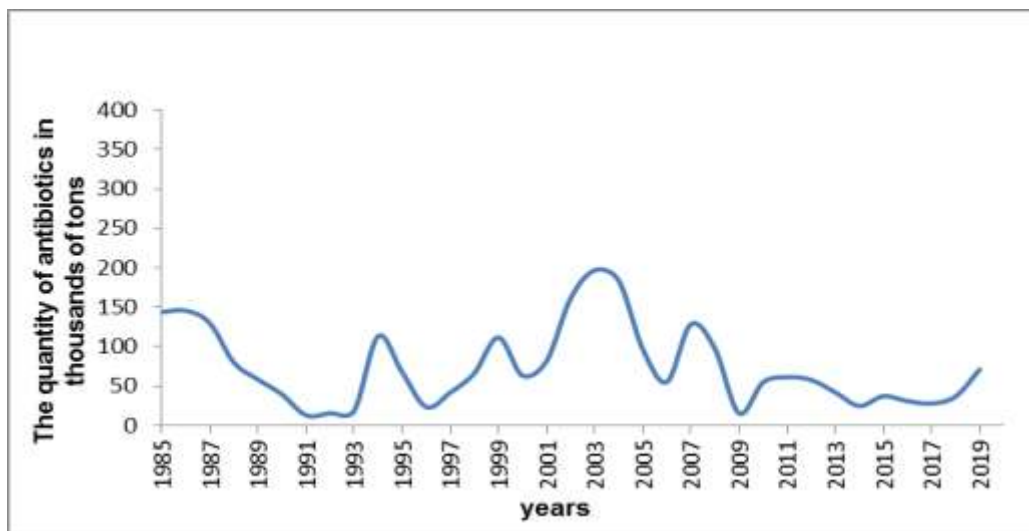


Table (3): Time Trend Equations of Egypt Cotton Imports and Exports

Number	Variable	Time Trend Equation	R ²	F
1	the value of Egypt's imports of cotton	$Y_1 = 3.29 + 2.62 X$ (0.25) (4.15)**	0.34	17.25
2	the quantity of Egyptian exports of cotton	$Y_2 = 208.08 + 27.29 X$ (3.29) (8.91)**	0.71	79.44
3	the quantity of Egyptian exports of cotton	$Y_3 = 330.1 - 7.26 X$ (18.01) (-5.66)**	0.59	31.99
4	the value of Egypt's cotton exports	$Y_4 = 265.1 + 9.46 X$ (7.3) (3.7)**	0.39	13.95
5	the quantity of Egyptian exports of cotton	$Y_5 = 67.6 + 1.70 X$ (3.01) (1.08)	0.05	1.17
6	the value of Egypt's cotton exports	$Y_6 = 214.7 + 4.12 X$ (3.2) (0.9)	0.04	0.9

Where: Y1 = the quantity of Egypt's imports of cotton (thousand tons)

Y2 = the value of Egypt's imports of cotton (million dollars)

Y3 = the quantity of Egyptian exports of cotton (thousand tons)

Y4 = the value of Egypt's cotton exports (million dollars)

Y5 = the quantity of Egyptian exports of cotton (thousand tons)

Y6 = the value of Egypt's cotton exports (million dollars)

Xi = time variable where i (1,2,3,.....,35)

The value in brackets indicates the calculated (T) value

(R2) coefficient of determination (F) significance of the model as a whole

(**) indicates the significance of the regression coefficient at the level of significance 0.01.

Relative Importance of Egypt Cotton Exports and Imports:

World exports of cotton were estimated at about \$56.40 billion on average during the period 2015-2019 as table 4 shows. China is ranked first in terms of the average value of exports, which was about \$15.09 billion. That is China contributed about 26.76% of the total world exports of cotton during the period 2015-2019. The U.S and India came in second and third places with an average of about 7.10 and 6.95 billion dollars respectively. The combined exports of China, U.S and India constitute about 51.7 percent of total world cotton exports.

Table (4): World Cotton Exports in billion dollars (2015-2019)

Year	2015	2016	2017	2018	2019	Average	%
China	15.81	15	15.13	15.39	14.14	15.09	26.76
America	5.87	5.69	7.64	8.38	7.91	7.1	12.58
India	7.47	6.26	6.92	8.11	6	6.95	12.33
Pakistan	4.04	3.5	3.5	3.52	3.25	3.56	6.32
Vietnam	1.71	2.1	2.64	2.84	3.06	2.47	4.38
Brazil	1.45	1.39	1.5	1.73	2.78	1.77	3.14
Türkiye	1.7	1.72	1.72	1.83	1.73	1.74	3.09
Hong Kong	2.35	1.87	1.6	1.45	1.11	1.68	2.97
Italy	1.46	1.42	1.44	1.42	1.27	1.4	2.48
Australia	0.83	1.18	1.59	1.82	1.11	1.31	2.31
Uzbekistan	1.47	1.32	1.18	1.03	1.29	1.26	2.23
Germany	0.98	0.95	0.96	0.95	0.81	0.93	1.65
Indonesia	0.82	0.78	0.82	0.81	0.77	0.8	1.42
Spain	0.65	0.73	0.69	0.64	0.66	0.68	1.2
The Republic of	0.64	0.53	0.52	0.45	0.4	0.51	0.9
Thailand	0.54	0.48	0.48	0.49	0.44	0.49	0.86
Japan	0.56	0.51	0.49	0.45	0.43	0.49	0.86
Egypt	0.48	0.47	0.47	0.48	0.47	0.47	0.84
Rest of the world	7.51	6.73	7.55	8.52	8.24	7.71	13.67
the world	56.34	52.64	56.84	60.3	55.87	56.4	100

Source : https://www.trademap.org/Country_SelProduct_TS

Table (5) indicates that the world imports of cotton were about \$49.02 billion on average during the period (2015-2019). China is ranked first in terms of the average value of imports, which was estimated at about \$9.15 billion with a relative importance of about 18.66% during the same period. Bangladesh and Vietnam came in second and third places with a relative importance of about 13.32% and 8.15% respectively. The average value of Egypt imports of cotton amounted to 0.77 billion dollars with a relative importance of about 1.57%.

Table (5): World Imports of Cotton in Billion Dollars (2015-2019)

Year	2015	2016	2017	2018	2019	Average	%
China	10.26	7.74	8.62	9.89	9.23	9.15	18.66
Bangladesh	7.15	5.41	6.25	7.31	6.52	6.53	13.32
Vietnam	3.4	3.38	4.06	4.77	4.37	3.99	8.15
Türkiye	2.26	2.3	3	2.51	2.63	2.54	5.18
Indonesia	2.12	2.1	2.26	2.4	1.97	2.17	4.43
Hong Kong	2.15	1.72	1.5	1.35	1.03	1.55	3.16
Italy	1.28	1.24	1.27	1.17	1.03	1.2	2.45
The Republic of Korea	1.34	1.19	1.16	1.28	1	1.19	2.44
India	0.6	1.07	1.16	0.84	1.55	1.04	2.13
Germany	1.02	0.99	1.06	1.04	0.87	0.99	2.03
Mexico	1.04	0.96	1.02	1.04	0.86	0.98	2
America	1.1	0.97	0.94	0.96	0.86	0.97	1.98
Pakistan	0.66	0.72	0.98	1.25	0.83	0.89	1.81
Thailand	0.8	0.74	0.78	0.86	0.73	0.78	1.6
Egypt	0.69	0.63	0.73	0.91	0.89	0.77	1.57
Sri Lanka	0.57	0.68	0.65	0	0.66	0.64	1.3
Portugal	0.57	0.58	0.66	0.73	0.59	0.63	1.28
Tunisia	0.61	0.6	0.62	0.64	0.6	0.62	1.26
Rest of the world	12.22	11.7	12.34	13.9	12.38	12.51	25.52
the world	49.87	44.72	49.04	52.85	48.61	49.02	100

Source: https://www.trademap.org/Country_SelProduct_TS

With regards to Egypt exports of cotton, table 6 shows that it was estimated at about \$474.4 million on average during the period (2015-2019). Clearly, Turkey comes first as the most important importer of Egyptian cotton, with an average value of about 124.8 million dollars which constitute about 26.31% of all Egyptian cotton exports. Italy and India came in second and third places, with a relative importance of about 19.72% and 12.70% respectively.

Table (6): Main Importers of Egyptian Cotton during the Period 2015-2019

Million U.S Dollars

Year	2015	2016	2017	2018	2019	Average	%
Turkey	128.3	138.3	148.5	115.6	93.6	124.8	26.31
Italy	118.8	98.6	83.3	88	79.2	93.6	19.72
India	26.1	58.4	51.6	69.6	95.8	60.3	12.7
Pakistan	19.8	17.1	23.8	30	40.7	26.3	5.54
Tunisia	14.5	21.2	22.7	28	24.2	22.1	4.67
Portugal	32.7	19.7	17.2	12.5	6.9	17.8	3.75
Bangladesh	10.1	10.3	10.7	16.9	23.7	14.4	3.03
Morocco	5.6	7.7	9.5	17.7	17	11.5	2.42
China	10.8	3.3	8.5	12.2	12.9	9.5	2.01
Germany	7.9	9.1	9.4	10.5	7.9	9	1.89
Switzerland	13.1	11.5	9.5	6.1	3.2	8.7	1.83
Saudi Arabia	10.6	9.1	8	4	5.9	7.5	1.59
Brazil	8.4	7.6	7.8	6.7	4.8	7.1	1.49
France	11.1	5.5	7.7	9.2	1.7	7	1.48
America	7.8	5.7	6	4.1	2.5	5.2	1.1
Algeria	4.2	2.9	4.2	5.5	9	5.2	1.09
Rest of the world	46.2	42.8	44.7	45.9	42.9	44.5	9.38
the world	476	468.8	473.1	482.6	471.6	474.4	100

Source : https://www.trademap.org/Country_SelProduct_TS

The data in table (7) shows that Egypt average imports of cotton stood at about \$770.72 million during the period (2015-2019). It is clear that India is the main exporter of cotton to Egypt with an average value of about 189.9 million dollars. That is India provided Egypt with about 24.64% of its imports during the period (2015-2019). China and Greece come in the second and third places with a relative importance of about 20.58% and 11.19% of total Egyptian imports, respectively.

Table (7): Main Exporters of Cotton to Egypt during the period 2015-2019
Million U.S Dollars

Year	2015	2016	2017	2018	2019	Average	%
India	199.15	157.66	145.47	211.43	235.8	189.9	24.64
China	146.16	129.09	145.41	197.48	175	158.63	20.58
Greece	59.62	77.97	81.23	89.37	123.22	86.28	11.19
Türkiye	69.51	52.95	67.27	115.91	114.17	83.96	10.89
Pakistan	64.46	60.56	50.59	55.94	46.47	55.6	7.21
America	44.33	23.36	61.58	54.62	31.78	43.13	5.6
Sudan	3.04	23.23	42.29	43.82	45.54	31.58	4.1
Benin	17.7	14.38	22.77	42.41	32.38	25.93	3.36
Burkina Faso	17.83	27.98	29.26	28.27	4.72	21.61	2.8
Rest of the world	69.68	65.09	80.89	73.77	81	74.09	9.61
the world	691.46	632.28	726.76	913.02	890.07	770.72	100

Source: https://www.trademap.org/Country_SelProduct_TS

Analysis of the Turkish market of imported cotton reveals that its total value of imports amounted to about \$2538.98 million on average during the period (2015-2019). As table 8 indicates the U.S came first as the most important supplier of cotton to Turkey with a market share of about 24.81% during the period (2015-2019). Turkmenistan and Greece came in second and third places with markets shares of about 11.94% and 7.05% respectively. Egypt ranked sixth, with an average value of exports to Turkey amounting to about 112.59 million dollars, with a relative importance of about 4.43%.

Table (8) Turkish Imports of Cotton during the period (2015-2019)

Million U.S Dollars

the years	2015	2016	2017	2018	2019	Average	%
America	532.29	522.56	737.79	707.26	649.51	629.88	24.81
Turkmenistan	430.33	358.72	319.06	215.06	192.07	303.05	11.94
Greece	183.55	115.39	177.81	129.29	288.75	178.96	7.05
Brazil	113.95	180.25	173.59	169.47	231.51	173.76	6.84
Pakistan	132.43	128.46	203.38	194.74	173.1	166.42	6.55
Uzbekistan	39.73	80.24	118.82	128.15	216.1	116.61	4.59
Egypt	131.17	116.42	136.28	93.44	85.65	112.59	4.43
China	138.65	114.75	119.85	92.3	76.25	108.36	4.27
India	61.71	98.79	138.48	100.8	74.07	94.77	3.73
Italy	88.59	77.56	78.25	72.87	72.58	77.97	3.07
Rest of the world	412.33	504.18	791.72	605.13	569.73	576.62	22.71
the world	2264.73	2297.31	2995.03	2508.5	2629.31	2538.98	100

Source: https://www.trademap.org/Country_SelProduct_TS

Cotton Production in Egypt:

Table (9) shows that the average area cultivated with the cotton crop amounted to about 642.11 thousand feddan during the period 1985-2019. It is clear that the cultivated area reached its lowest level in year 2016 with about 131.75 thousand feddans. The largest cultivated area during the study period was 1121.86 thousand feddans in 1985. The time trend equation in table indicates that the cultivated area of the cotton crop took a decreasing trend by a statistically significant annual rate of about 27.62 thousand feddans during the study period. This trend is illustrated in figure 5.

The decrease in the cultivated area of cotton is due to the low demand for cotton in the domestic as well as in the export markets and the low profitability of the cotton crop compared to the profitability of competing crops.

Table (9) shows that the average land productivity of the cotton crop was about 1.06 tons per feddan during the period 1985-2019. The productivity reached its lowest level in year 2015 by about 0.67 tons/ feddan and it reached its highest level in year 1998 by about 1.30 tons / feddan.

The time trend equation in table indicates that the land cotton productivity of the cotton crop took an upward trend by a statistically insignificant annual rate of about 0.001 tons / feddan during the study period. In other words the cotton yield tends to be stagnant in recent years. This trend is illustrated in figure 6.

Table (9) Production Statistics for the Cotton Crop (1985-2019)

Year	The area in thousands feddan	Productivity in tons per feddan	Production in thousands tons	year	The area in thousands feddan	Productivity in tons per feddan	Production in thousands tons
1985	1121.9	0.942	1191	2004	714.73	1.1	787.65
1986	1095.1	0.978	1120	2005	656.59	0.98	645.58
1987	1017.3	1.037	981	2006	536.4	1.12	601.87
1988	1052.6	1.193	882	2007	574.57	1.08	622.54
1989	1044	1.273	820	2008	312.71	1.02	318.19
1990	1031	1.23	838	2009	284.43	0.99	281.19
1991	883.9	1.086	814	2010	369.14	1.02	377.53
1992	872.4	0.897	973	2011	520.12	1.22	634.66
1993	918.1	0.848	1083.3	2012	333.36	0.88	293.73
1994	749	1.102	680	2013	286.72	0.88	252.5
1995	737.4	1.153	639.7	2014	369.18	0.83	307.87
1996	956.1	0.996	960	2015	240.87	0.67	160.25
1997	892.1	0.97	920.1	2016	131.75	1.1	144.56
1998	819	1.305	627.7	2017	216.95	1.19	258.29
1999	670.1	1.085	617.4	2018	335.98	1.27	426.04
2000	518.32	1.07	555.64	2019	239.39	1.17	281.14
2001	731.1	1.14	834.91	average	642.11	1.06	636.88
2002	706.41	1.08	764.12	minimum	131.75	0.67	144.56
2003	535.09	1.11	595.22	maximum	1121.86	1.3	1191

Source: <https://www.fao.org/faostat/en/#data/TCL>

Figure (5): The Cultivated Area of the Cotton Crop (1985-2019)

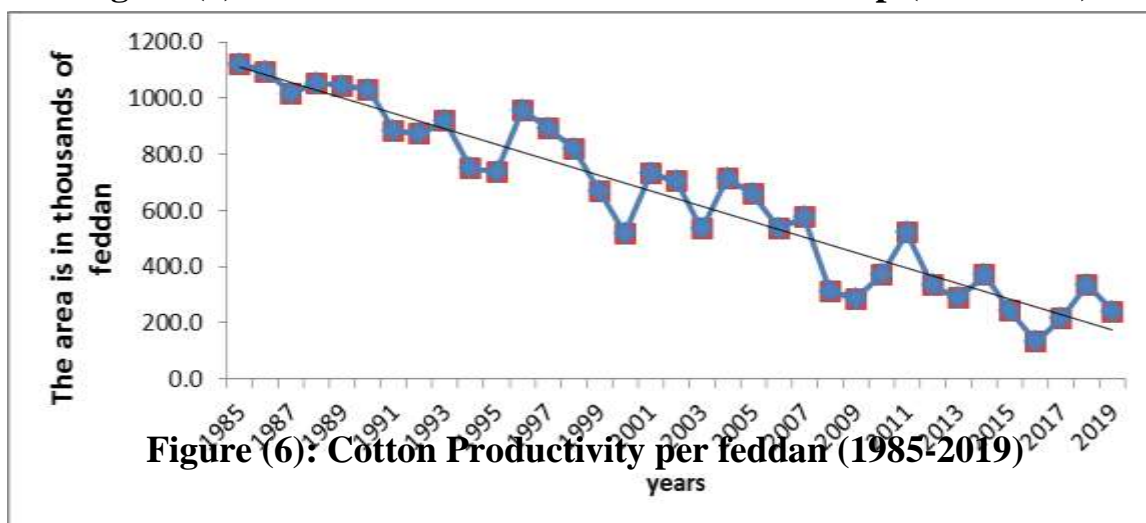


Figure (6): Cotton Productivity per feddan (1985-2019)

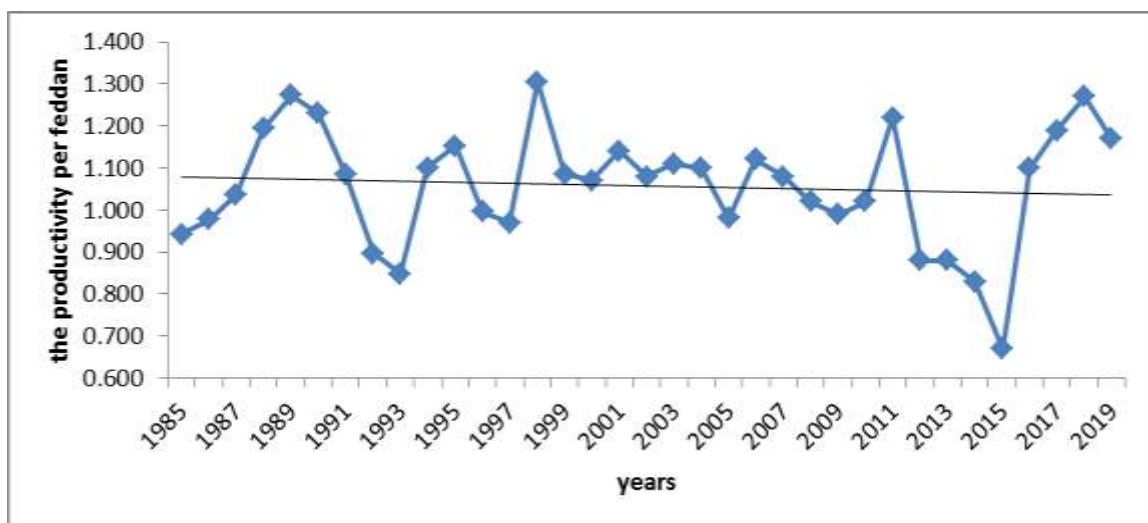


Table (10): Time Trend Equations of Cotton Production (1985-2019)

Number	Variable	Time Trend Equation	R ²	F
1	the estimated total cultivated area of cotton	$Y_1 = 1139.3 - 27.62 X$ (36.1)** (-18.1)**	0.91	326.13
2	estimated yield per feddan of cotton	$Y_2 = .108 - 0.001 X$ (22.05)** (-0.51)	0.008	0.26
3	estimated total production of cotton	$Y_3 = 1089.4 - 25.14 X$ (23.22)** (-11.06)**	0.79	122.3

Where: Y1 = the estimated total cultivated area of cotton (thousand feddan)

Y2 = estimated yield per feddan of cotton (ton/feddan)

Y3 = estimated total production of cotton (thousand tons)

Xi = time variable where i (1,2,3,.....,35)

The value in brackets indicates the calculated (T) value

(R2) coefficient of determination (F) significance of the model as a whole

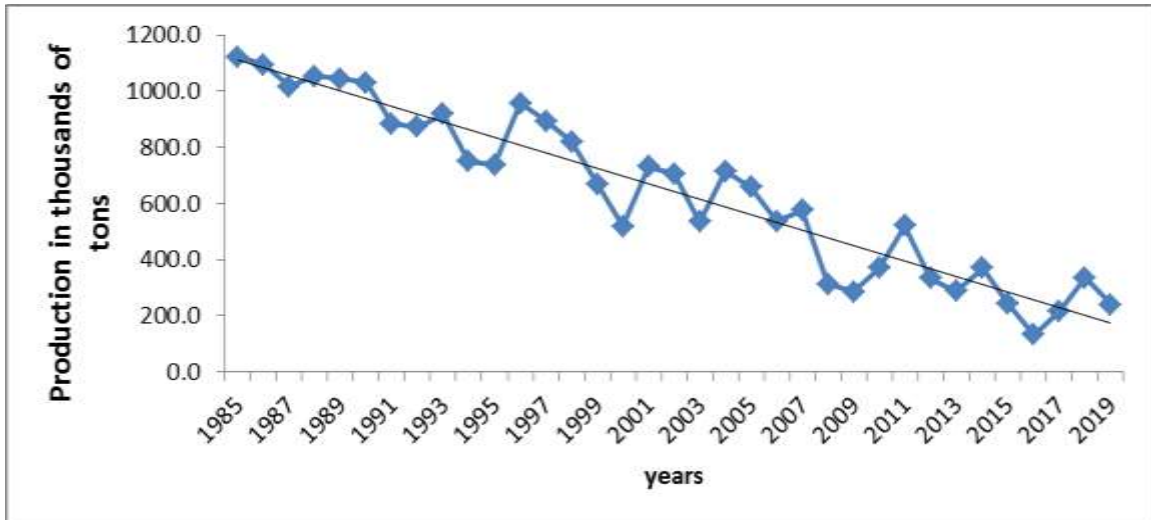
(**)indicates the significance of the regression coefficient at the level of significance 0.01.

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

The total production is a reflection of the cultivated area of cotton and the land productivity per feddan. Table (9) indicates that the average production of the cotton crop during the period (1985-2019) amounted to about 636.88 thousand tons. The table also shows that the total production during the same period reached the lowest level in year 2016 with about 144.56 thousand tons and reached its highest level in year 1985 with 1191.00 thousand tons.

The time trend equation in table indicates that total production of the cotton crop took a decreasing trend by a statistically significant annual rate of about 25.14 thousand tons during the study period. This trend is illustrated in figure 7.

Figure (7): Total Cotton Production (1985-2019)



Profitability of the Cotton Crop:

Table (11) shows that the average total revenue from the cotton crop during the period (2000-2019) was about 8713 Egyptian pounds per feddan. It is clear from the table that the total revenue during the same period reached its lowest level in the year (2000) with 2437 pounds per feddan and it reached its highest level in 2018 with about 24,508 pounds per feddan.

The time trend equation in table indicates that total revenue of the cotton crop took an upward trend by a statistically significant annual rate of about 1077 pounds per feddan during the study period 2000-2019.

**Table (11) Cotton Costs of Production and Revenue (2000-2019)
 Egyptian Pounds**

the year	total revenue	The total cost	Net Revenue per feddan	farm price
2000	2437	2053	383.8	386.5
2001	2597	2068	910.7	388.1
2002	2892	2063	844	419.8
2003	3865	2111	1773	547
2004	4393	2275	2118	613
2005	4675	2617	2058	745.8
2006	5654	2965	2689	796
2007	4736	3437	2765	658
2008	5347	4120	1227	812
2009	4401	3998	416	713
2010	8852	4571	4281	1415
2011	8408	5193	3179	1064
2012	6713	5490	1223	1169
2013	8456	5626	2830	1468
2014	6406	5916	489.6	1172
2015	5436	5631	-195	1245
2016	19069	10736	8333	2711
2017	21919	13491	16861	2874
2018	24508	14953	9555	3018
2019	23505	17010	6495	3111
Average	8713	5816	3411.8	1266.3
Minimum	2437	2053	-195	386.5
Maximum	24508	17010	16861	3111

Source: Compiled and calculated from the Ministry of Agriculture and Land Reclamation, Central Administration of Agricultural Economy.

Table (12): Time Trend Equations of Costs of Production and Revenue Egyptian Pounds (2000-2019)

Number	Variable	Time Trend Equation	R ²	F
1	the total total revenue of cotton	$Y_1 = 2112.1 + 1077.1 X$ (1.2) (7.1)**	0.75	50.25
2	the total cost per feddan of cotton	$Y_2 = 1335.8 + 701.4 X$ (1.3) (8.1)**	0.79	65.2
3	farm price of cotton	$Y_3 = 162.02 + 136.03 X$ (0.8) (7.9)**	0.78	62.6

Where: Y1 = the total total revenue of cotton (pound per feddan)

Y2 = the total cost per feddan of cotton (pounds per feddan)

Y3 = farm price of cotton (pounds per quintal)

Xi = time variable where i (1,2,3,.....,20)

The value in brackets indicates the calculated (T) value

(R2) coefficient of determination (F) significance of the model as a whole

(**)indicates the significance of the regression coefficient at the level of significance 0.01 .

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

Table (11) shows that the average total costs per feddan of the cotton crop during the period (2000-2019) amounted to about 5816 pounds per feddan. It also appears from the table that the total costs per feddan during the same period reached its lowest level in year 2000 and reached its highest level in 2019 with 17010 pounds per feddan.

The time trend equation in table indicates that total costs of production of the cotton crop took an upward trend by a statistically significant annual rate of about 701 pounds per feddan during the study period.

Table (11) shows that the farm price of the cotton crop during the study period was about 1266.3 pounds per kintar. It also appears from the table that the farm price of the cotton crop during the same period reached its lowest level in year 2000, when it was estimated at about 386.5 pounds per kintar, while it reached its highest level in year 2019 at about 3111.0 pounds per kintar.

The time trend equation in table indicates that the farm price of the cotton crop took an upward trend by a statistically significant annual rate of about 136 pounds per kintar during the study period.

Table (13) shows that the average net revenue for the cotton crop was about 3411.8 pounds per feddan during the study period. Considering the net revenue of competing summer crops reveals that the average net revenue for the sesame crop during the study period was about 2224.4 pounds per feddan. And the average net revenue for the soybean crop and the sunflower crop during the study period were about 1439.9 pounds per feddan and about 926.8 pounds per feddan respectively.

**Table (13): Net Revenue per feddan of Competing Crops (2000-2019)
 Egyptian Pounds per feddan**

the years	cotton	sesame	soybeans	sunflower	peanuts	maize
2000	383.8	748.2	767	198	1196	1498.6
2001	910.7	952.2	811	209	1342	1595.2
2002	844	949	901	708	1352	1691.8
2003	1773	947	1070	677	1402	1788.4
2004	2118	1088	908	636	1632	1885
2005	2058	1007	798	626	1607	1821
2006	2689	1101	698	646	2423	1881
2007	2765	874	911	696	3957	3051
2008	1227	1654	988	259	3544	1753
2009	416	1569	1372	794	4831	1611
2010	4281	1787	681	787	5191	2430
2011	3179	1804	1447	718	6003	2658
2012	1223	3457	3878	1240	6404	3220
2013	2830	3594	3570	1785	7489	3038
2014	489.6	3704	3273	1574	8366	2921
2015	-195	3352	2934	2357	8404	2234
2016	8333	1912	1574	1088	7160	1629
2017	16861	3699	500	1109	10019	1781
2018	9555	5437	695	1043	7777	2185
2019	6495	4851	2102	1370	7599	2903
Average	3411.8	2224.3	1493.9	926	4884.9	2178.8
Minimum	-195	748.2	500	198	1196	1498.6
Maximum	16861	5437	3878	2357	10019	3220

Source: Compiled and calculated from the Ministry of Agriculture and Land Reclamation, Central Administration of Agricultural Economy.

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