

An Economic Study of the Isopoda Effect on Fish Production from the Lake Qaroun in Fayoum Governorate

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ABSTRACT

The development of fish production is one of the objectives of the development process and a pivotal focus of its development. Its development policies affect the rebalancing of the rates of growth of fish production and population growth rates in order to raise the rates of fish production from different sources to meet the needs of domestic consumption. The area of Qaroun Lake is about 55,000 feddans, and the first and third of these are Al-Rayyan, about 30 thousand Acres produce about 15.3% of the production Makki in the province, which does not fit with the area of the water surface, which is enjoyed by the province because of the problems that are found in the lakes of pollution diseases and settlement of the Isopoda insect since 2013, and despite the increase in fish production in the recent but there is a significant decline in the production of some sources of fisheries, Fayoum Governorate The production capacity of 290 tons in 2016 due to the increase in the rates of environmental pollution significantly, because of the spread of insect isopoda, which led to the death of a lot of tons of fish, and the study aims to determine the composition of fish species and the development of fish food gap and the rate of act Self DONC of fish in the province. The lake contributes about 15.65% of the value of fish production in the inland lakes in Egypt. The first and third lakes of Qaroun and Al Rayyan contributed 21.04%, 11.84%, 3.6% of the total fish production in the governorate, of the total fish production in the governorate, while fish farms produce about 63.3% of the total fish production in the governorate. In the estimation of the correlative relations of the production capacity of the fish species in Lake Qaroun, a statistically significant decrease was observed in the months of April, July, August and December due to the spread of Isopoda Which have resulted in the extinction of some fish species and the decline in production Finny significantly.

The study also shows that the relative importance of the average fish production in Lake Qaroun reached about 3.2 thousand tons as an average for the period 2006-2016, which contributes about 8.1% of the average fish production in the inland lakes of 38.9 thousand tons. It can be said that Lake Nasser despite the many problems that exist in it, but it contributes about 69.5% of the total inland lakes, followed by Al Rayyan, the time and the crocodile, and the water bodies in the Valley The new and then flooded Toshka, Qaroun, Rayyan (1,3), and finally the water bodies in Siwa Oasis.

It was also found that the fish catch from Lake Qaroun contributed about 3.12 thousand tons representing about 0.85% of the catch of the natural fisheries of about 364.9 thousand tons, and contributed about 0.24% of the average national fish production during the period (2006 - 2016). While natural fisheries contribute 27.8% of the average national fish production during the same period, it is clear from the above that the percentage of fish production from Lake Qaroun is low due to the pollution of the lake with sewage and the seeds infected with the Isopoda On most species of fish, the study shows an increase available for consumption at the level of Fayoum Lakes Large Dah notes that rose about 16.90 thousand tons in 2016, the average annual amount during the period of study at about 16.33 thousand tons, and the rate of moral Altgiralsnoy statistically estimated at 3.36% of the annual average. The study also shows that the percentage of self-sufficiency of fish in Fayoum governorate decreased to about 10.24% in 2016, and that the annual rate of change reached about 3.10% of the annual average. While average per capita fish catch rose to about 20.45 kg / person in 2016. The annual rate of change was statistically significant at about 3.36%. It was also found that available for consumption in Fayoum governorate fell to about 1.65 thousand tons in 2016 and the annual rate of change is statistically significant estimated at 4.18% of the annual average. It was also found that the availability in the lake in Fayoum governorate decreased to about 0.20 thousand tons in

2016, and the annual change rate is statistically significant estimated at 3.17% of the annual average. The study also shows an increase in fish food gap in Fayoum governorate during The study time was about 18.80 thousand tons in 2016, with an annual average during the period of study amounted to about 17.04 thousand tons and an annual change rate is not statistically significant estimated at about 3.11%. The results showed that despite the relative stability of the fishery areas and the decline in fish production from natural fisheries, the local production of fish has recently increased significantly. This increase is due to fish farming, which represents about 60-65% of the local production, despite this increase, the local production is still not sufficient for consumption. Therefore, there is a nutritional gap, but the self-sufficiency rate has declined to a maximum of 10.24%, a minimum of 5.52% during the study period, , 10%, while the amount of water decreased Rat The average per capita consumption of about 15.9 kg / capita / year in 2009 to about 20.45 kg / capita / year in 2016, the study also revealed many problems that led to the low production of Fayoum lakes, including: First: - Problems with the seeds, including the lack of fish stocks in the lake to balance the fish to work communities adapted to the existing reality. And contamination of the lake with seeds infected with isopoda insect. Second: - Problems related to water: - The dumping of garbage and pesticides resulting from agricultural drainage in addition to dead animals, which works to raise the percentage of salinity, which helped the growth of Isopoda insect and its end and the completion of its life cycle. The main recommendations were: the establishment of good hatcheries for the governorate to produce good tilapia seeds and the thickness of the projects of fish farming in Lake Qaroun, and the establishment of a special administration for the development of the lake of specialists from the research centers, fisheries and the environment where the area is a nature reserve, and the use of disinfectants such as potassium permanganate at 2-4 g / m³ for 20 minutes at incubation stations, hatcheries and fry collecting stations to clear the seeds and fingerlings before giving them Liras. And coordination between the Fisheries Authority and the Ministry of Irrigation to pump clean water to agricultural banks, especially in the summer to reduce the percentage of concentrates. A study to study the environmental impact of the use of red tilapia for biological control as it feeds on the larvae of this parasite, the development of a cooperative protocol with irrigation to study the return of mixing, It was five years ago and continued deep drilling and filtration of water to deepen and develop the lake.

Key words: Qaroun Lake, Isopoda insect, fish production, Fayoum lakes

Introduction

The development of fish production is one of the objectives of the development process and a key focus of its development. Its development policies affect the balance between the growth rates of fish production and population growth rates in order to raise the rates of fish production from different sources to meet the needs of local consumption and contribute to food security. The global per capita share of fish increased from about 15.3 kg in 2005 to about 19.9 in 2016. Population growth, urban expansion, high standards of living, development and income are a key factor in increasing demand for fish. In Egypt, fish production is a component of production the button is considered a source of high quality protein. Fish production contributes about LE 20 billion, accounting for about 9.8% of the net agricultural income of about 209.9 billion pounds in 2016. Fish is an economic alternative to meet the demand for animal products, 61 million tons in 2016, while consumption amounted to about 2.96 million tons, which indicates a fish gap estimated at 200 thousand tons. The fish are used as substitute for meat. In Egypt, there are more than 13.9 million feddans. Fayoum Governorate represents about 0.69% of this area, and the development of production of small areas is the basis for increasing the natural resources of fish. Three lakes, namely Lake Qaroun, Al Rayyan Lake, the first and third, and occupy about 80 thousand feddans representing Lake Qaroun about 55 thousand feddans, and the first and third Al Rayyan lakes represent about 30 thousand feddans, which produce about 15.3% of fish production in the province, which does not fit with the area of water It is conservative because of the problems that exist Has been contaminated by disease and the settlement of the Isopoda insect since 2013. Fish farming is the most important source of fish production in Egypt, with about 1.35 million tons representing about 83% of the total fish production in Egypt. The rest of fish production from all other natural sources represented by sea, lakes, river Nile and its

branches amounted to about 391.8 thousand Ton represents about 24.3% of the total fish production. This illustrates the importance of fish farming in increasing the fish production in Egypt, in contrast to the natural resources, which shows the decline in fish production year after year. Thus, aquaculture is the main source of development and increased production.

The problem of the study: -

The production activity of fish is considered to be one of the economic activities that depend on the quantity and type of available fish resources. The quantity and type of fish production is determined according to the availability of these resources. Despite the availability of these resources and the diversity of fish production sources in Egypt, About 13.9 million feddans. The relative contributions of different fish resources varied. Despite the increase in fish production in recent times, there is a significant decrease in the production of some sources of fish wealth, especially in the lakes of Fayoum governorate, however, the fish production does not exceed 36.7% of the total fish production in Fayoum Governorate. The area of Lake Qaroun is about 55 thousand feddans. Despite this area, its production is less than fish. It was estimated at 4518 tons in 2014, decreasing to about 1124 tons. 2016, respectively, due to the increase in the rates of environmental pollution significantly, because of the spread of the insect of Isopoda, which led to the death of many tons of fish, as they prey on fish and shared food, losing about 60% of the weight of fish, and California is home to the original insect, It moved to the Mediterranean through maritime trade, and moved to the Mediterranean Sea Lake Qaroun with fish fry.

Lake Qaroun and the fish farms in Fayoum governorate suffer from many problems that hinder their development and improve their productivity and increase their fish production, due to the many environmental variables and the different factors that will be studied in the study in an attempt to overcome them.

Aim of the study:

The study aims to identify the current status of fish production and its relative importance in Fayoum Governorate by studying the development of the economic importance of the fish production in the lake and its various sources and the identification of the species composition of fish and the development of its production. The growth rates achieved by each source, and the national and individual consumption to know the development of the fish food gap and the self-sufficiency rate of the fish in the governorate, in addition to studying the economic factors specific to the fish production in the lake and study the main causes of the spread of the insect in Lake Qaroun and address the reasons that led to its spread, The fish in the lake, in addition to the method of treatment of the problem. A - Mechanical: high technical methods, B - Chemical: by adding chemicals to kill the insect and harmful to the environment, A: - biological using the enemies of natural resistance to the insect. And to identify the most important obstacles facing the development of fish production in the province, and the solutions proposed to them. Finally, study the most important problems and means to promote the fish market from the point of view of the respondents of the sample field study.

Method of approach and data resources:

The study is based on two main sources of data: - The descriptive economic analysis and quantitative economic analysis of the variables studied in the analysis of some relationships, using some statistical and economic standard models including directional models, multiple regression and logarithmic estimation of the relative importance of the fishing area, . Productivity and economic efficiency of the lake

The study was based on the secondary statistical data published by the Ministry of Agriculture, Land Reclamation and Central Authority during the period 2006-2016 issued by the General Authority for Fisheries Development (Fish Production Statistics), the National Institute of Oceanography and Fisheries, and some websites. : Preliminary data collected through a specially designed survey questionnaire. A random field sample was taken from Lake Qaroun and fish farms in

Fayoum Governorate because of its relative importance in fish farming in the agricultural season (2015-2016) to cover the required data.

1- Geological and Environmental Descriptions of Lake Qaroun and Isawoboda:

Lake Qaroun is an important source of fish wealth in Egypt, and it is characterized by the production of about ten types of fish, as its production is threatened to continue the agricultural drainage operations, where the lake is a bank of agriculture to the province, which led to high salinity and it amounted to about 25-30 parts in a thousand. The lake contributes about 15.65% of the value of fish production in the inland lakes in Egypt. Fayoum governorate has three lakes, namely Qaroun Lake, Al Rayyan Lake, Al Rayyan Lake, and Fayoum Lakes. And the lake of Al Rayyan first w About 30 thousand feddans produce about 36.94% of the fish production in the province, which is not suitable for the area of the water surface in the province, and contribute to the lakes of Qaroun and Al Rayyan first and third by 21.04%, 11.84%, 3.6% of the total fish production in the province, while The Sea of Youssef contributes about 0.32% of the fish production in the governorate, while the fish farms produce about 63.3% of the volume of fish.

2- Morphological and anatomical description of insect: -

ISOPODA production in the province:

The insect is endemic in the Gulf of California, a crustacean that came to the Mediterranean Sea and was transferred to Lake Qaroun through the fry. It is difficult to distinguish insect larvae in the early age of the security through specialized technicians. The characteristics of the parasite are homozygous and live in the gills, fins, It grows to 6 cm and generates an insect male and is able to change its sex later, and feed on the gills of fish, and this parasite starts with the larvae that swim in the water, and attack the fish through the nostrils fish, and feed on the blood in them, until it becomes white color, Of After the maturation of the parasite, the male becomes female to mate, moves to the mouth of the fish and absorbs its blood, and then another male goes to the female, to reproduce and thus increase the number of parasite to eliminate the largest percentage of fish. There are four types of insect by Lake Qaroun for each type of fish intrusive then the insect was swamped to infect any kind of fish.

3- The causes of the spread of the insect in Lake Qaroun:

The parasite began to appear in Lake Qaroun in 2013 through the transfer of fry from its natural sources and helped spread it, increase the salinity of the lake, and increase the temperature and increase the rates of pollution from agricultural drainage and health.

4- Characterization of the study sample:

A random sample was selected from Lake Qaroun, Fayoum governorate, according to the relative importance of a number of licensed fishermen, representing 25% of the number of fishermen through a specially designed questionnaires questionnaire, and about 70 views were selected from the lakes of Fayoum governorate because of their relative importance in fish production. The percentage of illiteracy was about 48%. The percentage of university education was about 20%. Finally, the percentage of those who read and write is 32%. The average age of the sample is about 54 years. About 47% turned out to be an average gamma. The number of fishermen is about 3000 fishermen licensed to about 650 fishermen, the average number of boats licensed to about 600 vessels each of which about 5-6 fishermen and the average productivity of the fisherman about 4 tons per year, it was found that the productivity of the fisherman took a statistically significant decreasing trend by about 2. And the study of the water source of the lake shows that sanitation accounts for about 20%, and agricultural drainage accounts for about 35% of the total water source, followed by the mixing of agricultural drainage and water from the Nile River by about 45%. Types of important fish in Egyptian consumption, estimated quantity now. The total value of fish production in the lake is estimated at LE 96 million. The average quantity of fish produced is the lowest level of tilapia during the months of July and December and the highest level in February. For bour fish, December, and the maximum for the fish of Moses in Lake Qaroun reached its lowest level in July, August, September,

October, December, the highest in February, March and April, and for crustaceans in Lake Qaroun reached a minimum in April, The other varieties were limited In the months of February, April, July, August, September, October and November in the sample of the field study, and in the estimation of the correlative relations of the production capacity of the fish species in Lake Qaroun, the trend was statistically significant in the months of April, July, August, For the spread of the Isopoda insect, which resulted in the spread of some species of fish and the decline in fish production significantly.

Results

First: - Economic importance of fish production from inland lakes:

Fish are produced from capture fisheries represented in:

1. Marine fisheries (Mediterranean and Red Sea), fisheries of the northern and inland lakes, and the production of fresh water represented in the Nile River and its branches and Lake Nasser.
- 2 - Aquaculture in its various forms including pelvic farms, fish cages and farming in rice fields. The inland lakes include Lake Qaroun, Al Rayyan, Lake Nasser, Marsa, Crocodile, Tufaki and the water bodies in the New Valley.

The area of capture fisheries is estimated at about 11.2 million feddans, representing 82.3% of the total area of Egyptian fisheries. The amount of fish production from marine fisheries reached 111.8 thousand tons in 2016, accounting for about 6.6% , With a total area of about 1706.3 thousand tons. The northern lakes include Manzala Lake, Al-Borlos, Adco and Mariout. The area is estimated at about 252 thousand feddans and the amount of fish production from lakes fisheries is estimated at 210.2 thousand tons in 2016, 3% in the coverage of domestic consumption of fish, which is about 1706.3 thousand tons, and freshwater: include Lake Qaroun, R That, the High Dam, time and crocodile and New Valley Project water bodies in the New Valley. Table 1 shows that the area of the inland lakes is estimated at 1.4 million feddans, representing about 10.3% of the total area of the Egyptian fishery with an average production of about 38.9 thousand tons representing about 4.4%, 18.7% of the average production of Egyptian fisheries, Respectively, during the period (2006-2016). The area of Lake Qaroun is about 55 thousand feddans representing about 0.4% of the area of Egyptian fisheries and the average production of about 3.2% thousand tons, representing about 0.33% of the average production of Egyptian fisheries with an average productivity of about 62 kg / feddan during (2006-2016), while the area of Lake Al Rayyan is estimated at about 30 thousand feddans representing about 0.3% of the area of the Egyptian fishery and its average production is about 2.8 thousand tons representing about 0.2% of the average production of Egyptian fisheries, About 62.6 kg / fed during the period (2006 - 2016).

Table 1: Shows the evolution of the annual production of inland lakes from various sources (2006 - 2016). (quantity in tons)

Year Source	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Lakes inland											
The moura and the crocodile and Suez Canal	6162	4788	4863	4557	3966	3474	3894	4015	3685	3524	3604
Qaroun	1648	3072	3184	3400	3903	4364	4410	4420	4518	1124	290
Al Rayyan(1,3)	1691	2126	2055	2624	2494	3052	3451	3416	3782	4539	3767
Water bodies in the New Valley	479	482	403	452	1606	1653	1780	1832	1887	2094	1990
Naser Lake	25817	19592	29713	37657	27418	26270	26290	18716	21736	22653	22194
Fluffy Toshka	2913	2791	3184	4809	2483	2736	2301	1911	193	135	164
The water bodies of Siwa Oasis	0	0	0	0	0	0	0	0	0	40	30
Total	38728	32851	43402	53499	41324	41550	41126	34310	35801	34109	32039
General total lakes	151312	144033	157884	172242	179196	16339	1731416	182525	170932	171475	171203

Source: - Compiled and calculated from the data of the Ministry of Agriculture and Land Reclamation, the General Authority for the Development of Fish Resources, the annual Fishery Statistics Bulletin 2016, the study of fisheries during the period (2006 - 2016) - April 2017 - miscellaneous numbers.

Table 2: Shows the average quantities of fish production per ton of inland lakes and total lakes for the year (2006-2016).

Average period	The moura and the crocodile and Suez Canal	Qaroun	Al Rayyan (3,1)	Water bodies in the New Valley	Naser Lake	Fluffy Toshka	The water bodies of Siwa Oasis	Total for internal lakes	General total lakes
2006-2016	4230.18	3121.18	2831.9	1282.9	25277.8	2148.9	6.36	38976.3	167050.9

Source: - Compiled and calculated from Table (1) of the study.

The area of Lake Nasser is estimated at about 1.3 million feddans representing about 9.2% of the total area of the Egyptian fishery, with an average production of about 25,27 thousand tons representing about 14.8% of the Egyptian fishery production with an average productivity of 25.2 kg / feddan during In the same period, while the area of Lake Morsy and crocodile estimated about 60 thousand acres, representing about 0.44% of the area of Egyptian fisheries and an average production of about 4.3 thousand tons, an average of 73.3 kg / feddan during the same period, and estimated area of flood Toshka About 1.1 thousand feddans representing about 0.07% of the area of Egyptian fisheries, with an average production of about 2.2 thousand tons, representing about 0.28% of the average production Egyptian fisheries, with an average productivity of about 2.7 thousand kilo / feddan during the period (2006 - 2016). As shown in table (1), the average production of inland lakes during the period (2006-2016) reached about 97, 32 thousand feddans, between a minimum of about 32.03 thousand tons in 2016 and a maximum of 53.49 thousand Ton in 2009 with a decreasing annual rate of change that is not statistically significant, estimated at 2.09% per year as shown in Table (4) and Equation (8).

Table 3: Shows the relative importance of the evolution of the annual production of inland lakes from its various sources (2006-2016).

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Source	%										
Lakes inland											
The moura and the crocodile and Suez Canal	15.91	14.57	11.20	8.52	9.60	8.36	7.03	11.70	10.3	10.33	11.4
Qaroun	4.25	9.35	7.34	6.36	9.44	10.5	10.72	12.88	12.62	3.30	0.31
Al Rayyan(1,3)	4.37	6.47	4.73	4.90	6.03	7.35	8.39	9.96	10.56	13.31	11.89
Water bodies in the New Valley	1.24	1.47	0.93	0.84	2.57	3.98	4.33	5.34	5.27	6.14	6.32
Naser Lake	66.66	59.64	68.46	70.39	66.35	63.23	63.93	54.55	60.71	66.41	69.47
Fluffy Toshka	7.57	8.50	7.34	8.99	6.01	6.58	5.60	5.57	0.54	0.39	0.51
The water bodies of Siwa Oasis	-	-	-	-	-	-	-	-	-	0.12	0.09
Total	100	100	100	100	100	100	100	100	100	100	100
% General total lakes	25.59	22.80	27.48	31.06	23.06	25.43	23.71	18.79	20.94	19.89	18.71

Source: - Compiled and calculated from Table 1 data in the study.

The average annual production of Lake Al - In the New Valley, Lake Sad (Nasir), Tafshi and the water bodies of Siwa Oasis by about 4.2, 3.1, 2.8, 1.3, 2.5, 2.1 and 0.6 thousand tons, respectively, which represent a relative importance About 11.4%, 0.3% 1%, 11.8%, 6.3%, 69.5%, 0.51%, 0.09% on the ranking in 2016, and the change rate was decreasing and not statistically significant in Lake Mersa, Table (4). It can be said that Lake Nasser, despite its many problems, contributes about 69.5% of the total inland lakes, followed by Al Rayyan, Mara and Crocodile, and the water bodies of the New Valley, Tufaki, Qaroun, Al Rayyan (1.3) Siwa. The total area of the Nile River and its branches is estimated at about 187 thousand feddans and represents about 1.37% of the total area of Egyptian fisheries. The amount of fresh fish production of about 69,800 tons in 2016 contributed about 4.1% Of fish and about 1706.3 thousand tons. The area of fish farms is estimated at 377 thousand feddans, representing about 2.8% of the total area of Egyptian fisheries. It is estimated that the production was estimated at 1211.6 thousand tons in 2016, which contributed about 71.1% in coverage of the local consumption of fish, about 1706.3 thousand tons for the same year, and estimated production of rice

fields from Fish by about 35.9 thousand tons in 2016 contributed about 2.2% in the coverage of domestic consumption of fish and about 1706.3 thousand tons for the same year.

Table 4: Shows the equations of the general time trend of the evolution of the annual production of inland lakes from different sources in 2006-2016:

Equation number	Independent variable	Equation	R2	F	Mean	Rat of change%
1	The moura and the crocodile In ton	$\hat{Y} = 3,187 - 0,84 X1t$ (4.64)**	0.71	21.61	77.66	1.08
2	Qaroun In ton	$\hat{Y} = 2,533 - 0,164 X2t$ (0.50)*	0.027	0.250	2.97	5.52
3	Al Rayyan (1,3) In ton	$\hat{Y} = 1,192 + 0,953 X3t$ (9.40)**	0.908	88.46	99.8	0.95
4	Water bodies in the New Valley In ton	$\hat{Y} = 0,807 + 0,934 X4t$ (7.86)**	0.87	61.8	96.02	0.97
5	Naser valley In ton	$\hat{Y} = 4,92 - 0,389 X5t$ (-1.27)*	0.152	1.61	16.66	2.33
6	Fluffy Toshka In ton	$\hat{Y} = 0,570 + 0,712 X6t$ (3.15)**	0.440	3.15	26.77	2.65
7	The water bodies of Siwa Oasis In ton	$\hat{Y} = 0,882 + 0,652 X7t$ (2.58-)*	0.425	6.65	46.77	1.39
8	Total internal lakes	$\hat{Y} = 6,299 - 0,434 X8t$ (-1.44)*	0.189	2.09	20.75	2.19
9	Total Lakes Inner and Northern	$\hat{Y} = 11,618 + 0,675 X9t$ (2.74)**	0.456	7.35	50.11	1.34

Source: - Collected from Table (1), (2)

(*) Is significant at 0.05, (**) significant at 0.01, the figures between the arcs are the calculated T value.

\hat{y} = the estimated value of the dependent variable in year e and represent 3,2,1, 11

t = time variable.

Second: The economic importance of fish production in Lake Qaroun:

The area of Lake Qaroun is about 50 thousand feddans representing about 0.4% of the area of Egyptian fisheries and the average production of about 3.2% thousand tons, representing about 0.33% of the average production of Egyptian fisheries, with an average productivity of about 62 kg / feddan during (2006-2016), while the area of Lake Al Rayyan is estimated at about 35 thousand feddans representing about 0.3% of the area of Egyptian fisheries. The average production is about 2.8 thousand tons representing about 0.2% of the average production of Egyptian fisheries, (2006 - 2016). Table (5) shows that the relative importance of the average fish production in Lake Qaroun reached and to 3.2 thousand tons as an average for the period 2006-2016. It contributes about 8.1% of the average fish production in the inland lakes of 38.9 thousand tons and contributes about 2.33% of the average quantity of production in the lakes sector of About 167,050 thousand tons, and contribute about 0.90% of the average total quantity of fisheries production during the study period. The average production of the inland lakes sector is about 18.71% of the total lakes sector and about 48.54% of total fisheries production.

Table 5: Shows the relative importance of the average quantity of fish production in Lake Qaroun, inland lakes, lakes sector and total fish production during the period (2006-2016):

Statement	Average quantity of fish production (tons)	Relative importance%			
		Qaroun lake	Lakes sector	General lakes sector	Total Fish Production
Qaroun	3121.18	100			
The inland lakes sector	38976.3	8.1	100		
Total Lakes Sector	167050.90	2.33	18.71		
Total production of fisheries	344112	0.90	11,33	48.54	100

Source: - Compiled and calculated from the data of Table (1, 2) of the study.

1- The annual development of fish production in Lake Qaroun (2006 - 2016):

A. Evolution of the production of bone fish: -

1 - Evolution of tilapia production: -

The data of the table (6, 7) shows that the production capacity of tilapia was about 1013.5 tons as an average for the period 2006-2016. The minimum reached 114 tons in 2016 and reached a maximum of 1454 tons during 2008, at a decreasing rate of 441 tons, equivalent to about 44.5% of the average production of tilapia during the study period. As shown in Table (8) and Equation (1), the development of tilapia production capacity is that it has taken a statistically significant upward trend. The annual decline rate was about 486 tons representing about 47.9% of the average production capacity of tilapia, which is about 1013.5 tons. The coefficient of selection was about 0.24.

2 - Evolution of the production of the family Burial: -

Table (6,7) shows that the production capacity of the Burial family reached about 856 tons as an average for the period 2006-2016 and reached a minimum of about 48 tons in 2016 and reached a maximum of about 1424 tons during 2011 at a decreasing rate of 568 tons equivalent to about 66.4% of the average production of the Burial family during the study period, as shown in Table (8) and Equation (4) development of the production capacity of the Burial family that they took a significant upward trend was the annual decline rate of about 187 20.3% of the average production capacity of the Burial family of about 931 tons and the coefficient of selection was about 0.35.

3 - Evolution of production of crustaceans (shrimp): -

Table 6.7 shows that the production capacity of shrimp has reached about 456.8 tons as an average for the period 2006-2016. The minimum quantity reached about 25 tons in 2006 and reached a maximum of about 912 tons during 2012, at a decreasing rate 455.2 tons equivalent to about 99.6% of the average production of shrimp during the study period. As shown in Table (8) and Equation (2), the development of the production capacity of the shrimp that it took a significant upward trend, the annual decline rate was about 226 tons, representing about 49.5% of the average production capacity of shrimp, about 456.8 tons the coefficient of selection is about 0.51.

4 - Evolution of the production of Moses (Sefolia): -

Table 6.7 shows that the average production capacity of Moses fish reached 629.9 tons as an average for the period 2006-2016 and reached a minimum of 45 tons in 2016 and reached an upper limit of about 1111 tons during 2014, Decreasing by 481.1 tons, equivalent to about 76.4% of the average production of Moses during the study period. As shown in Table (8) and Equation (6), the development of the production capacity of the fish of Moses, it took an upward trend statistically significant and the rate of decline was about 102 tons, representing about 16.19% of the average production capacity of Moses fish and about 629.9 tons The coefficient of selection is about 0.10.

5 - Evolution of the production of other varieties: -

Table 6.7 shows that the average production capacity of other varieties reached about 42.45 tons as an average for the period 2006-2016 and reached a minimum of 8 tons in 2011, and reached an upper limit of about 136 tons during 2015, With a decreasing rate of 128 tons equivalent to about 30.15% of the average production of other varieties during the study period. As shown in Table (8) and Equation (7), the development of the production capacity of the other varieties is that it took an upward trend, which is statistically significant at an annual rate of about 20.8 tons, representing about 48.9% of the average production capacity of other varieties, which is about 42.45 tons. The coefficient of determination was about 0.43.

6 - Evolution of seabass production: -

The data of Table 6.7 shows that the production capacity of seafarers reached about 15 tons as an average for the period 2006-2016 and reached a minimum of about 5 tons in 2016 and reached a maximum of about 25 tons during 2007 with a decrease of 10 tons Equivalent to 66.6% of the average production of seabass during the study period. As shown in Table (8) and Equation (5), the development of the production capacity of the seafarers, it took a significant upward trend, and the annual decline amounted to about 2.60 tons, representing about 17.4% of the average capacity of the seabass and about 15 tons. The selection is about 0.67.

Table 6: Shows the annual development of fish catch from Lake Qaroun in (2006 – 2016).
(Quantity in ton)

Year	Product	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
	Tilapia	762	1350	1454	1071	996	1173	1226	1265	1312	426	114
	Shrimp	0	151	126	661	684	699	912	902	862	102	25
	Hunshan	0	0	0	10	8	11	6	8	6	76	19
	Denies*	0	0	0	0	5	7	2	2	5	0	0
	Segan(patata)*	0	0	0	0	1	5	3	4	2	0	0
	Family Burial	480	585	600	1021	1379	1424	1238	1207	1198	191	48
	Qarous	0	25	16	22	24	19	15	12	10	17	5
	Mussa	390	845	935	581	783	1018	946	1002	1111	176	45
	Other categories	16	116	53	34	23	8	17	18	12	136	34
	Total	1684	3072	3184	3400	3903	4364	4410	4420	4518	1124	290

Source: - Compiled and calculated from the data of the Ministry of Agriculture and Land Reclamation, General Authority for the Development of Fish Resources, Fishery Statistics Bulletin and survey of Fish Resources during the period 2006-2016.
(*) Development of the Dennis and Wesigan varieties for the first time in 2010.

Table 7: Shows the average annual development of fish catch from Lake Qaroun in 2006-2016.

Average Period	Tilapia	Shrimp	Hunshan	Denies	Segan	Burial	Qarous	Mussa	Other categories	Total
2006-2016	1013.5	456.8	13.09	1.91	1.36	856	15	629.9	42.45	3121.18

Source: - Compiled and calculated from Table (6).

Table 8: Shows the equations of the general time trend of the annual development of fish catch from Lake Qaroun in Fayoum Governorate (2006 - 2016)

Equation number	Independent variable	Equation	R2	F	Mean	Rat of change%
1	Local production of tilapia / ton	$\hat{Y} = 2,515 - 486 X1t$ (1.66)*	0.24	2.78	25.96	1.87
2	Local production of shrimp/ton	$\hat{Y} = 1,672 - 226 X2t$ (0.696)*	0.51	0.48	5.61	4.74
3	Local production Henshan / ton	$\hat{Y} = 1,023 + 0,573 X3t$ (2.91)*	0.33	4.40	36.14	1.58
4	Local production Burial family / ton	$\hat{Y} = 1,310 - 187 X5t$ (0.569)*	0.35	0.324	3.82	4.89
5	Local production of kerosene / ton	$\hat{Y} = 1,284 - 2,60 X5t$ (0.806)*	0.67	0.65	7.41	3.51
6	Local production of Mussa / ton	$\hat{Y} = 2,182 - 102 X6t$ (0.308)*	0.10	0.95	1.14	8.91
7	Local production Other categories / ton	$\hat{Y} = 2.318 - 20.8 X7t$ (0.639)*	0.43	0.409	4.78	4.35
8	Total	$\hat{Y} = 2,342 - 238 X8t$ (0.736)**	0.52	0.46	6.29	3.3

Source: - Compiled and calculated from Table (6)

(*) Is significant at 0.05, (**) significant at 0.01, the figures between the arcs are the calculated T value.

\hat{y} = the estimated value of the dependent variable in year e and represent 3,2,1, 11,

x = time variable

7 - Evolution of the total production of fish: -

Table 6.7 shows that the total production capacity of fish reached about 3121.18 tons as an average for the period 2006-2016 and reached a minimum of 290 tons in 2016. The maximum reached

about 4518 tons during 2014, Of 1396.8 tons equivalent to about 44.7% of the average for the total production of fish during the study period. As shown in Table (8) and Equation (8), the overall production of fish has increased significantly. The annual decline rate was about 2380 tons, representing about 76.25% of the total fish production of about 3121.18 tons. The coefficient of selection is about 0.48.

B - The development of fishing in Lake Qaroun: -

Table 9 shows that the average total fish production in Lake Qaroun reached about 3.12 thousand tons as an average for the period 2006-2016 and reached a minimum of about 0.29 thousand tons in 2016 and reached a maximum of about 4, 45 thousand tons during 2014, an increase of 1.33 thousand tons equivalent to about 42.6% of the average total fish production in Lake Qaroun during the study period. As shown in Table (10) and Equation (1), the total production of fish in the fishing of Lake Qaroun, it took a trend of statistically significant decrease and the annual decline rate reached about 0.168 thousand tons representing about 5.38% of the average total fish production in Lake Qaroun, which is about 3.12 thousand tons and has reached a selection factor of about 00.28

C. Development of capture fisheries:-

Table 9 shows that the average total fish production in capture fisheries was about 344.4 thousand tons as an average for the period 2006-2016, with a minimum of 344.1 thousand tons in 2016, and reached a maximum of about 387 tons , 4 thousand tons during the year 2014 with a decrease of 43.3 thousand tons equivalent to about 12.5% of the average total fish production of the total capture fisheries during the study period, as shown in Table (10) and Equation (2) total fish production in natural fisheries The annual decline was about 0.822 thousand tons representing about 2.38% of the average total production of Fish in the natural fisheries, which is about 344.4 thousand tons and the coefficient of selection was about 0.67.

D. Evolution of catch from national fish production:-

Table 9 shows that the total average national fish production reached 1312.18 thousand tons as an average for the period 2006-2016, and reached a minimum of 970 thousand tons in 2006, and reached a maximum of about 1519 thousand tons during the year An increase of 206.82 thousand tons, equivalent to about 15.76% of the average national fish production during the study period. As shown in Table (10) and Equation (3), the national fish production is a statistically significant increase. The annual increase was about 0.965 thousand tons, representing about 7.35% of the average total fish production in natural fisheries of about 1312.12 thousand tons. The limiting factor was about 0.93.

Table 9: Development of Fishing from Lake Qaroun, Natural Fisheries and National Fish Production (2006-2016). (Quantity per thousand tons)

Statement	Catching Lake Qaroun	Total capture fisheries	National Fish Production
2006	1.64	375.8	970
2007	3.07	372.5	1008
2008	3.18	373.8	1068
2009	3.40	387.4	1093
2010	3.90	385.2	1305
2011	4.36	357.3	1362
2012	4.41	354.2	1372
2013	4.42	356.8	1454
2014	4.45	344.8	1482
2015	1.12	344.1	1519
2016	0.29	344.4	1501
Mean	3.12	364.9	1312.18

Source: collected and calculated from the data of the Ministry of Agriculture and Land Reclamation, the General Authority for Fisheries Development, the annual Bulletin of Fish Statistics - April 2017 - consecutive numbers.

Table 10: General Time Equations of the Evolution of Fishing from Lake Qaroun, Natural Fisheries and National Fish Production (2006-2016).

Equation number	Independent variable	Equation	R2	F	Mean	Rate of change%
1	Catching Lake Qaroun	$\hat{Y} = 2,534 - 0,168 X1t$ (0.512)*	0.028	0.262	3.112	5.39
2	Total capture fisheries	$\hat{Y} = 13,93 - 0,822 X2t$ (4.34)**	0.676	18.81	74.40	1.11
3	National Fish Production	$\hat{Y} = 1,804 + 0,965 X3t$ (2.91)*	0.935	120.18	102.34	0.94

Source: - Compiled and calculated from Table (9) of the study.

(*) Is significant at 0.05, (**) significant at 0.01, the figures between the arcs calculated T value,

Where \hat{y} = the estimated value of the dependent variable in year e and represents 3 ,2, 1, 11, X = time variable..

E - The relative importance of fishing in Lake Qaroun: -

Table (11) shows that fishing from Lake Qaroun contributes about 3.12 thousand tons, representing about 0.85% of the catch of natural catch of about 364.9 thousand tons, contributing about 0.24% of the average production During the period 2006-2016, natural fisheries contributed about 27.8% of the average national fish production during the same period. It is evident from the above that the percentage of fish production from Lake Qaroun is low, due to the pollution of the lake with sewage and infected fry With the Isopoda insect, which eliminated most species of fish.

Table 11: Shows the relative importance of fishing from Lake Qaroun, natural fisheries and national fish production for the period (2006-2016).

Statement	Quantity (thousand tons)	Relative importance (%)		
		Catching Lake Qaroun	Natural fisheries	National Fish Production
Catching Lake Qaroun	3.12	100		
Natural fisheries	346.9	0.85	100	
National Fish Production	1312.18	0.24	27.8	100

Source: - Compiled and calculated from Table (9) of the study.

F - Average per capita available for domestic consumption and the level of lakes Fayoum Governorate during the period (2009 - 2016): -

Table (12) shows that the increase in consumption available at the level of Fayoum Lake is a significant increase. It is noted that it increased from about 13.51 thousand tons in 2009 to about 16.90 thousand tons in 2016. The average annual rate during the study period was about 16.33 thousand tons, Table (13) shows that the annual change rate is statistically significant and is estimated at 3.36% of the annual average. As shown in Table (12), the percentage of self-sufficiency of fish in Fayoum Governorate decreased from 5.52% in 2006 to about 10.24% in 2016. Table 13 shows that the annual rate of change reached about 3% 10% of the annual average. While the average per capita fish catch increased from about 15.9 kg / person / year in 2006 to about 20.45 kg / person in 2016. Table (13) shows that the annual change rate is statistically significant at about 3.36%. It also shows that the available for consumption in Fayoum governorate amounted to about 3.06 thousand tons in 2012, and fell to about 1.65 thousand tons in 2016, and the average annual rate during the study period by about 2.86 thousand tons, as shown in Table 13) Showed that the annual change rate was statistically significant at 4.18% of the annual average. It is also found that the available in Lake Qaroun in Fayoum governorate amounted to about 1.71 thousand tons in 2012, and fell to about 0.20 thousand tons in 2016, and the average annual rate during the study period by about 1.26 thousand tons, as shown in table (13) showed that the annual rate of change was statistically significant at 3.17% of the annual average.

As shown in Table (12), the increase in the fish food gap in Fayoum Governorate during the period of the study from about 13.45 thousand tons in 2009 to about 18.80 thousand tons in 2016 and an average annual during the study period, which amounted to about 17.04 thousand Ton, with an

annual change rate not statistically significant, estimated at 3.11%. The results showed that despite the relative stability of the fishery areas and the decline in fish production from natural fisheries, the local production of fish has recently increased significantly. This increase is due to fish farming, which represents about 60-65% of the local production, despite this increase, the local production is still not sufficient for consumption. Therefore, there is a nutritional gap, but the self-sufficiency rate has declined to a maximum of 10.24%, a minimum of 5.52% during the study period, , 10%, while the quantity decreased The average consumption per capita has increased from about 15.9 kg / person / year in 2009 to about 20.45 kg / person / year in 2016. The fish self-sufficiency in the Fayoum lakes can be achieved through the interest of the marine culture in the pigeons, leeches and fingerlings, Hatcheries, and seed collection stations.

Table 12: Shows the average per capita available for domestic consumption and the level of lakes in Fayoum governorate during the period (2009-2016).

Years	Average per capita consumption available for consumption / kg / year 1	consumption available for domestic production / kg / year 2	Available in Fayoum Governorate 3	Available in the lake	The gap for Fayoum Governorate 3-1	% Self - sufficiency rate 3/2
2009	15.90	13.51	2.45	1.50	13.45	5.52
2010	19.70	16.44	2.55	1.56	17.15	6.45
2011	19.09	16.82	2.89	1.70	16.20	5.82
2012	20.55	16.48	3.06	1.71	17.49	5.39
2013	19.73	16.94	2.81	1.58	16.92	6.03
2014	20.83	16.75	2.76	1.51	18.07	6.07
2015	20.08	16.85	1.77	0.35	18.31	9.45
2016	20.45	16.90	1.65	0.20	18.80	10.24
Mean	19.45	16.30	2.86	1.26	17.04	6.88

Source: - Compiled and calculated from the data of the Ministry of Agriculture and Land Reclamation, the General Authority for the Development of Fish Resources, the annual Fishery Fishery Bulletin, the study of fisheries during the period (2009-2016).

Table13: Shows the equations of the general trend of the average per capita available for domestic consumption and the level of the lakes of Fayoum Governorate during the period (2009-2016):

Equation number	Independent variable	Equation	R2	F	Mean	Rate of change%
1	Average per capita available for consumption per year	$\hat{Y} = 8,80 - 0,707 X1t$ (2.451)**	0.500	6.06	21.11	3.36
2	Available for consumption from domestic production	$\hat{Y} = 10,68 + 0,656 X2t$ (2.129)**	0.430	4.53	18.77	3.63
3	Available for consumptionIn Fayoum Governorate	$\hat{Y} = 4,019 - 0,569 X3t$ (1.96)*	0.324	2.87	13.61	4.18
4	Available in the lake	$\hat{Y} = 1,49 - 0,750 X4t$ (2.77)**	0.562	7.70	23.62	3.17
5	Fish gap for Fayoum Governorate	$\hat{Y} = 6,166 + 0,834 X5t$ (3.381)**	0.696	11.42	27.42	3.11
6	Self - sufficiency rate	$\hat{Y} = 2,42 + 0,768 X6t$ (2.93)**	0.590	8.63	24.77	3.10

Source: - Compiled and calculated from Table (12)

(*) Is significant at 0,05 , (**) at 0.01, the figures between the arcs are the calculated T value, where \hat{y} = the estimated value of the dependent variable in the year e 9, t = time variable.

G: - The reasons for the low production in Fayoum lakes:-

There are several problems that can be divided into three problems:-

First : - Problems with the fry : -

- 1 - Lack of fish stocks in the lake to balance the fish to work communities adapted to the existing reality.
- 2- Pollution of the lake with seeds infected with isopoda.
- 3- Use special hatcheries for popular tilapia fish for their cheap price.
- 4 - Shortening the authorities that supervise the fry and lack of cooperation with the relevant competent authorities such as fisheries, the Institute of Marine Sciences, where the most important steps of production.
- 5 - The failure of the police of the territories to play an effective role and control the fry, and investigate the sources.
- 6 - The absence of hatcheries for the conservation of the fry, especially water bodies.
- 7 - Shortening the media in spreading awareness of the dangers of pollution banks in the lake, where there are 88 villages are throwing drainage in the lake by cars scouring.

Second:- Water problems:-

- 1 - The dumping of garbage and pesticides resulting from agricultural drainage in addition to dead animals, which works to raise the percentage of salinity, which helped the growth of Isopoda insect and land and to complete the life cycle.
- 2 - High percentage of ammonia, nitrite, copper, lead and uric acid in Lake Qaroun from the Bank of Wadi and Al - Batis.
- 3 - Dumped sewage waste in the belief of its usefulness to fish, but it is harmful to the spread of diseases.

Third: - Special problems for fishermen:-

1. Lack of awareness of fishermen of the poor physical potential of fishermen.
- 2 - Small size of loans for cooperative societies.
3. Use of rudimentary hunting equipment.
- 4 - There is no punishment for illegal fishing by illegal nets.

Fourth:- Proposals for solving problems and recommendations:-

1 - For the problems of fry : -

- The establishment of good hatcheries for the province to produce good fry of tilapia and mussie for projects of fish farming in Lake Qaroun, especially in the northern part to solve the problems of fry and problems of lack of fish production in Fayoum Governorate.
- of closure of the lake.
- Establishment of a special department for the development of the lake of specialists from research centers, fisheries and the environment where the area is a nature reserve.
- Make an environmental balance of fish stocks to not adjust the fish in the lake.
- Use disinfectants such as potassium permanganate at 2-4 g / m for 20 minutes at incubation stations, hatcheries and seed collection stations to clear the finger and fingerlings before dumping them in the lake.
- A survey of the sites of collection and examination of the fry (natural resources) in Qaroun Lake.

2: - Water problems:-

- Coordination between the Fisheries Authority and the Ministry of Irrigation to pump clean water to the agricultural banks, especially in the summer to reduce the percentage of concentrates of

pollutants to fade the proportion of ammonia, nitrite, copper, lead and uric acid in Lake Qaroun from Wadi Al-Wadi and Al-Batis.

- A study to study the environmental impact of the use of red tilapia for biological control as it feeds on the larvae of this parasite because it lives in water free for 21 days to reduce its spread.
- Do not throw garbage and pesticides from agricultural drainage in addition to dead animals to reduce the salinity, which helped the growth of insect isopoda and not to complement the life cycle.
- Do not throw the sewage waste from the villages in the belief that it is useful for fish, but hits them and encourages the spread of diseases.
- The imposition of fines for pollution according to the size of the damage.
- The development of a cooperative protocol with irrigation to study the return of mixing at the rates of five years ago and the continuation of deep drilling and filtration of water to deepen and develop the lake.

3- The problems of fishermen: -

- Develop a plan for the development of fishermen and raise awareness among them.
- Application of the penalty of fishing offending with the activation of the role of the police district in the province.
- Provide adequate financing for fishers through small enterprises.
- The use of primitive equipment for hunting.

Summary:-

The development of fish production is one of the objectives of the development process and a key focus of its development. Its development policies affect the balance between fish production growth rates and population growth rates in order to raise the rates of fish production from different sources to meet the needs of local consumption and contribute to food security. The per capita share of the world's fish has increased from about 15.3 kg in 2005 to about 19.9 in 2016. In Egypt there are more than 13.9 million feddans, Fayoum Governorate is about 0.69% of that area, and there are three Lakes, including Lake Qaroun, Lake Al Rayyan first and third, and operates about 80 thousand acres. The Lake Qaroun represents about 55 thousand feddans, and the first and third Al-Rayyan lakes represent about 30 thousand feddans, which produce about 15.3% of the fish production in the province, which is disproportionate to the surface area of the water which the governorate enjoys due to the problems that are found in the lakes of infection diseases and settlement of the Isopoda insect since In 2013, and despite the increase in fish production in recent times, there is a significant decrease in the production of some sources of fish wealth, especially in the lakes of Fayoum Governorate. Production was estimated at 290 tons in 2016 due to the increase in the rates of environmental pollution significantly because of the spread of isopoda insect which led to the death of many Tons Fish n, the study aims to identify the current status of fish production and relative importance in the province of Fayoum. The growth rates achieved by each source, and national and individual consumption to know the evolution of the fish food gap and the self-sufficiency rate of fish in the province. The study is based on descriptive economic analysis and quantitative economic analysis of the variables studied in the analysis of some relations, using some statistical and economic models, and the lake contributes about 15.65% of the value of production fish in the inland lakes in Egypt, and the Qaroun and Al Rayyan lakes contribute first and third by 21.04%, 11.84%, 3.6% of the total fish production in the governorate, while the Sea of Youssef contributes about 0.32% of the fish production in the governorate, About 63.3 percent of the fish production in the province. A random sample was selected from Lake Qaroun in Fayoum Governorate. Data on the average quantity produced reached the lowest level of tilapia during the months of July and December and the highest level during February. The correlation of the productive capacity of the fish species in Qaroun Lake was statistically significant in April, July, August and December, due to the spread of the Isopoda insect, which resulted in the spread of some species of fish and the decline in fish production significantly. The main research results: - The inland lakes of fresh water include both Lake Qaroun, , Nasser Lake, Marsa and the Crocodile and the flood of Toshka and water bodies in the New Valley. It

was found that the area of the inland lakes is estimated at 1.4 million feddans, representing about 10.3% of the total area of Egyptian fisheries with an average production of about 38.9 thousand tons representing about 4.4%, 18.7% of the average production of Egyptian fisheries, the average production of inland and northern lakes during the period 2006-2016). The area of Lake Qaroun is about 55 thousand feddans representing about 0.4% of the area of Egyptian fisheries and the average production of about 3.2% thousand tons, representing about 0.33% of the average production of Egyptian fisheries with an average productivity of about 62 kg / feddan during (2006-2016), while the area of Lake Al Rayyan is estimated at about 30 thousand feddans representing about 0.3% of the area of the Egyptian fishery and its average production is about 2.8 thousand tons representing about 0.2% of the average production of Egyptian fisheries with average productivity 62.6 kg / fed during the period (2006 - 2016). It can be said that Lake Nasser, despite its many problems, contributes about 69.5% of the total inland lakes, followed by Al Rayyan, Mara and Crocodile, and the water bodies of the New Valley and then the flood of Toshka, Qaroun, Al Rayyan 1.3) and finally the water bodies in Siwa Oasis . The relative importance of the average fish production in Lake Qaroun reached about 3.2 thousand tons as an average for the period (2006-2016), contributing about 8.1% of the average fish production in the inland lakes of about 38.9 thousand tons, , And 33% of the average quantity of production in the lakes sector, which is about 167,050 thousand tons. As for the annual development of fish production in Lake Qaroun, it was found that the production capacity of tilapia was about 1013.5 tons as an average for the period 2006-2016 and that it took a statistically significant trend The annual decline rate is about 486 tons, representing about 47.9% of the average production capacity of tilapia The total production capacity of the Burial family reached about 856 tons as an average for the period 2006-2016 at a rate of decrease of 568 tons. The annual decline rate was about 187 tons representing about 20.3% of the average capacity of the Burial family and the production capacity of the shrimp was about 456.8 tons as an average for the period 2006-2016 with a decrease rate of 455.2 tons. The annual decline rate was about 226 tons, representing about 49.5% of the average capacity of shrimp. 456.8 tons. It was also found that the average production capacity of Moses fish was about 629.9 tons as an average for the period 2006-2016 and a decrease rate of 481 tons. , 1 ton has a decreasing rate of about 102 tons representing about 16.19% of the average energy , The average production capacity of other varieties reached 42.45 tons as an average for the period 2006-2016 and a decrease rate of 128 tons equivalent to about 30.15% of the average production of other varieties during The period of study was found to have taken a significant upward trend with a yearly average of about 20.8 tons representing about 48.9% of the average production capacity of the other varieties, which is about 42.45 tons. It was also found that the production capacity of the seabass was about 15 tons as average for the period (2006-2016), a decrease of 10 tons equivalent to about 66.6% of the average production of seabass during the study period. The annual decrease was about 2.60 tons, representing about 17.4% of the average capacity of the seabass, which is about 15 tons, and the total production capacity of fish was estimated at 3121.18 tons for the period 2006 - 2016), and it took a statistically significant low trend. The annual decline rate was about 2380 tons representing about 76.25% of the average total fish production of about 3121.18 tons. As for the development of fish catch in Qaroun lake, the average total fish production In Qaroun Lake was about 3.12 thousand tons as an average for the period (2006 - 2016), and it was taken The annual decline rate was about 0.168 thousand tons, representing about 5.38% of the average total fish production in Qaroun Lake, which is about 3.12 thousand tons. The total average of total fish production in the natural fisheries was about 344 , With an average annual decrease of about 0.822 thousand tons representing about 2.38% of the average total fish production in the natural fisheries, which is about 344.4 thousand tons , And it was found that the average national fish production amounted to about 1312.18 thousand tons as the average fat (2006-2016). The annual increase was about 0.965 thousand tons, representing about 7.35% of the total average of total fish production in natural fisheries of about 1312.12 thousand tons. It was also found that fish catch from Lake QAROUN contributes about 3.12 thousand tons representing about 0.85% of the catch of natural catch of about 364.9 thousand tons and contributes about 0.24% of the average national fish production during the period (2006 - 2016). Natural fisheries by 27.8% of the average national fish production during the same period. It is clear from the above that the percentage of production of fish catch is low Of the Lake Qaroun, due to the pollution of the lake with water and the seeds infected with the Isopoda, which eliminated most fish species. The study showed the increase in consumption available at the level of Fayoum lakes significantly

increased and it increased from about 13.51 thousand tons in 2009 to about 16.90 thousand Ton in 2016. The annual average during the study period was estimated at 16.33 thousand tons and the annual change rate was statistically significant at 3.36% of the annual average. The study also shows that the percentage of self-sufficiency of fish in Fayoum governorate decreased from 5.52% in 2006 to about 10.24% in 2016 and that the annual rate of change reached about 3.10% of the annual average. While average per capita fish consumption increased from about 15.9 kg / person / year in 2006 to About 20,45 kg individual / year 2016. The annual rate of change was statistically significant at about 3.36%. It was also found that available for consumption in Fayoum governorate amounted to about 3.06 thousand tons in 2012, and fell to about 1.65 thousand tons in 2016 and the annual rate of change is statistically significant estimated at 4.18% of the annual average. It was also found that the availability in the lake in Fayoum governorate amounted to about 1.71 thousand tons in 2012, and fell to about 0.20 thousand tons in 2016, and the annual rate of change is statistically significant estimated at 3.17% of the annual average. The study showed an increase in the size of the fish food gap in Fayoum governorate during the period of the study from about 13.45 thousand tons in 2009 to about 18.80 thousand tons in 2016 and an annual average during the study period was about 17.04 thousand tons and an annual change rate that is not statistically significant Estimated at about 3.11%. The results showed that despite the relative stability of the fishery areas and the decline in fish production from natural fisheries, the local production of fish has recently increased significantly. This increase is due to fish farming, which represents about 60-65% of the domestic production However, despite this increase, domestic production is still not sufficient for consumption. Consequently, there remained a nutritional gap, but the self-sufficiency rate declined to a maximum of 10.24%, a minimum of 5.52% during the study period, 3.10%, while the amount of water decreased and the average per capita consumption increased from about 15.9 kg / person / year in 2009 to about 20.45 kg / person / year in 2016. The study also revealed many problems that led to the low production in Fayoum lakes, including: - Problems with the seeds, including the lack of fish stocks in the lake to balance the fish to work communities adapted to the existing reality. And the contamination of the lake with seeds infected with Isoboda, shortening the authorities that supervise the fry and non-cooperation with relevant authorities such as fish wealth, Institute of Marine Sciences, where the most important steps of production. Second: - Problems related to water: - The dumping of garbage and pesticides resulting from agricultural drainage in addition to dead animals, which works to raise the percentage of salinity, which helped the growth of Isopoda insect and its end and the completion of its life cycle. - Disadvantage of fishermen: - Lack of awareness of fishermen. The poor financial resources of fishermen. Small size of loans for cooperative societies and the use of rudimentary hunting equipment.

The study concluded with the most important proposals and recommendations:

The establishment of good hatcheries in the governorate to produce good fry of tilapia and mussi for projects of fish farming in Lake Qaroun, especially in the northern part to solve the problems of fry and problems of lack of fish production in Fayoum Governorate. Especially for the development of the lake of specialists from research centers, fisheries and the environment where the area is a nature reserve and the use of disinfectants such as potassium permanganate at 2-4 g / m for 20 minutes at incubation stations, hatcheries and fry collecting stations to clear the seeds and fingerlings before dumping them in the lake and coordination between the Fisheries Authority and the Ministry of Irrigation to pump clean water to the agricultural banks, especially in the summer to reduce the percentage of concentrates of pollutants to fade the proportion of ammonia, nitrite, copper, lead and uric acid in Lake Qaroun of Wadi Valley and Albat. The larvae are fed on this parasite because they live in free water for 21 days to reduce their spread. A cooperative protocol was established with irrigation to study the return of mixing at the rates of five years ago and the continuation of deep drilling and water filtration to deepen and develop the lake. Hclat fishermen: - Develop a plan for the development of fishermen and spread awareness among them and the application of the penalty of fishing offending with the activation of the role of police stations in the province. And provide adequate funding for fishermen through small enterprises.

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